CHILDREN'S EDUCATION SOCIETY (REGD.)
Administrative Office:
1st Phase JP Nagar, Bengaluru – 560 078
✆: 080-61754501 – 502 Fax: 080-2654 8658

THE OXFORD COLLEGE OF ENGINEERING

(Recognised by the Govt. of Karnataka, Affiliated to Visvesvaraya Technological University, Belagavi & Approved by A.I.C.T.E. New Delhi, Accredited by NAAC & NBA New Delhi and Recognised by UGC Under Section 2(f))
Bommanahalli, Hosur Road, Bangalore –560068.
✆: 080 -61754601/602, Fax: 080 – 25730551 E-mail: engprincipal@theoxford.edu Web: www.theoxford.edu

Ref. No.: TOCE/EST/06/2022-23/036 Date: 09-06-2022

CIRCULAR

HODs are hereby informed to submit **Research Projects** for financial assistance under **Institutional Seed Money for Research projects scheme for the year 2022-2023**.

The format for the same is attached herewith. All heads are hereby informed to scrutiny at the department level and submit final list to the office of the undersigned on or before **9th June 2022**.

PRINCIPAL
PRINCIPAL
The Oxford College of Engineering
Bommanahalli, Hosur Road
Bengaluru-560 068

PRINCIPAL

Copy to

1. The Chairman, The Oxford Educational Institutions
2. Deans
3. All HODs, TOCE
4. IQAC

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Ref. No.: TOCE/EST/06/2022-23/039 Date: 09-06-2022

CIRCULAR

Following are the list of shortlisted research projects recommended for financial assistance under Institutional seed money for Research projects scheme for the year 2022-2023.

SL. NO	TITLE	DEPARTMENT	AMOUNT (Rs)
1	ROBOTIC ARM (GESTURE CONTROL)	MT	12500
2	SMART HELMET	MT	11500
3	ASSISTANT VEHICLE FOR ELDERLY PEOPLE USING ZERO UI TECHNOLOGY	ISE	15000
4	LOW COST WIRELESS FOOTWEAR SYSTEM FOR MONITORING DIABETIC FOOT PATIENT	ISE	9000
5	DESIGN AND FABRICATION OF MEDICINE DELIVERY ROBOTS	ISE	5000
6	INTELLIGENCE SURVEILLANCE PATROLLING DRONE	ISE	9000
7	DESIGN AND DEVELOPMENT OF 3D PRINTED BITE FORCE MONITORING DEVICE FOR DENTAL APPLICATION	ME	10000
8	DESIGN AND FABRICATION OF PORTABLE MECHANICAL VENTILATOR FOR MEDICAL APPLICATIONS	ME	12000
9	DESIGN AND FABRICATION OF CARBONDIOXIDE RECOVERY SYSTEM FOR DOMESTIC AND AUTOMOBILE APPLICATIONS	ME	14000
10	REAL TIME PRESSURE MONITORING SYSTEM USING FBG SENSOR FOR SPORTS AND REHABILITATION APPLICATIONS	ME	10000
11	DESIGN AND REALIZATION OF 3D PRINTED PULSE MONITORING PROBE.	ME	10000
12	INTEGRATION OF MULTIPLE BANK CARDS INTO SINGLE, SMART AND SECURE CARD	E&C	5000
13	HAND BALANCE MONITORING SYSTEM FOR MEASURING AMOUNT OF DISORDERNESS IN STROKE PATIENT	E&C	9500
14	EXPERIMENTAL MEASUREMENT OF LIMB IMPAIRMENT FOR PATIENTS USING SENSORS	E&C	8000
15	FOOD SPOILAGE PREDICTION AND QUALITY MONITORING SYSTEM USING IOT	E&C	6750

16	SMART SECURITY AND HOME ASSISTIVE DEVICE FOR PHYSICALLY CHALLENGED AND AGED PEOPLE	E&C	8500
17	A SMART ASSISTIVE DEVICE FOR QUADRIPLEGIC PATIENTS	E&C	20000
18	HUMAN DETECTION ROBOT FOR DISASTER MANAGEMENT	E&E	8800
19	SMART LOCK USING FACIAL DETECTION	CS	27572
20	SMART STICK FOR TRAMMELS	CS	11742
21	IOT BASED ADULTERATION DETECTION AND PESTICIDE SPRAYING USING ROBOT	CS	24500
22	IOT BASED MULTI PARAMETER PATIENT MONITORING SYSTEM	CS	4536
23	LOCATING AND DETECTING TOXIC GASES IN MANHOLES	CS	5500
24	SUPERVISION OF WATER DISTRIBUTION USING ANDROID AND IOT	CS	33390
25	CROP PROTECTION FROM WILD ANIMALS USING EMBEDDED EDGE AI	CS	5536
26	AUTONOMOUS AIR CALIBER DETECTOR USING ANDROID AND IOT	CS	11000
27	IN VITRO AND IN SILICO EVALUATION OF ANTI QUORUM SENSING ACTIVITY OF IPRIFLAVONE ON CLINICAL ISOLATES	BT	12000
28	DESIGNING OF A COST EFFECTIVE, RELIABLE, USER-FRIENDLY AND PORTABLE BIOGAS PLANT FOR THE PRODUCTION OF BIOGAS FROM BIODEGRADABLE WASTE”	BT	30,000
29	INTEGRATED REMEDIATION STRATEGY FOR REPURPOSING OF INDUSTRIAL WASTEWATER	BT	20,000
30	TENDER COCONUT HUSK WASTE-A POTENTIAL SOURCE OF XYLOOLOGOSACCHARIDES FOR PREBIOTIC APPLICATION	BT	11000
31	HIGHQUALITY CONCRETE BLOCK USING PHOTOVOLTAIC PANELS	CIVIL	7500
32	EXPERIMENTAL STUDY ON MECHANICAL AND DURABILITY PROPERTES OF NATURAL LIGHTWEIGHT SELF-CLEANING CONCRETE	CIVIL	7000
33	TREATMENT OF MUNICIPAL WASTEWATER BY COLUMN FILTRATION USING ANTHRACITE BIOCHAR”	CIVIL	6500
Total			**4,02,326**

The above list is submitted to Honorable Chairman for approval.

PRINCIPAL

PRINCIPAL
The Oxford College of Engineering
Bommanahalli, Hosur Road
Bengaluru-560 068

PRINCIPAL

Copy to

1. The Chairman, The Oxford Educational Institutions
2. Deans
3. All HODs, TOCE
4. IQAC

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Administrative Office:
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Approved by A.I.C.T.E. New Delhi, Accredited with 'A' Grade by NAAC & NBA New Delhi and Recognised by UGC Under Section 2(f))
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No. TOCE/AACAD/13/2022-23/042

Date : 09-06-2022

NOTE : -

Dear Sir,

Sub : Request for sanction of Seed Money for the selected Research Projects - reg

- - -

Kindly find herewith the list of Research Projects selected for financial assistance under Seed Money for Research Projects for the year 2022-23. Out of 41 projects, we have scrutinized and shortlisted 33 projects across the departments amounting to **Rs.4,02,326/-** (Four lakh two thousand three hundred and twenty-six only).

Request your kind approval for **Rs.4,02,326/-** towards the Institutional Seed Money for Research Projects.

PRINCIPAL

9/6/22

PRINCIPAL
The Oxford College of Engineering
Bommanahalli, Hosur Road
Bengaluru-560

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:17-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student: ADARSH P, (1OX20MT400)**
2. **Branch/ Semester/: MECHATRONICS, 8TH SEM**
3. **Project Title: ROBOTIC ARM (GESTURE CONTROL)**
4. **Abstract:The proposed system utilizes a camera to capture real-time video input and employs OpenCV's image processing and gesture recognition algorithms to interpret hand gestures. By analyzing the hand gestures, the system identifies specific commands that control the robotic arm's movement.**
5. **Duration of the Project: September 2022 – April 2023**
6. **Total cost of the project: 12500**
7. **Faculty Supervisor Details:**

   Name : JAIDEEP R
   Email ID : r.jaideep5@gmail.com
   Contact No : +918892936873

TECHNICAL DESCRIPTION

8. **Description of the problem:**

   Traditional methods of controlling robotic arms often require complex programming or the use of physical interfaces, limiting their accessibility and ease of use. Additionally, these methods may not provide a natural and intuitive means of interaction between humans and robots. The objective of this project is to develop a gesture-controlled robotic arm using OpenCV, addressing the following challenges:

   - **Natural Interaction**
   - **Real-Time Gesture Recognition**
   - **Gesture Accuracy and Robustness**
   - **Versatile Robotic Arm Control**

9. **Review of work done: (250 words)**

The proposed gesture-controlled robotic arm using OpenCV offers an innovative and intuitive approach to interact with robots. The project addresses the limitations of traditional control methods by utilizing hand gestures as the input mechanism, eliminating the need for complex programming or physical interfaces.

The use of OpenCV as the underlying computer vision library allows real-time video processing and accurate gesture recognition. By employing image processing algorithms, the system can detect and track hand movements, enabling the translation of these gestures into meaningful commands for controlling the robotic arm. This aspect ensures a natural and responsive interaction between users and the robot.

10. **Rationale for taking up the project: (150 words)**

The gesture-controlled robotic arm using OpenCV is driven by several key factors and motivations:

1. Intuitive Interaction: By leveraging hand gestures as a means of control, the proposed system offers a more intuitive and natural interaction paradigm.
2. Enhanced Usability: Incorporating OpenCV's computer vision capabilities allows the system to process real-time video input and interpret hand gestures accurately.
3. Flexibility and Adaptability: The integration of OpenCV with the robotic arm offers a high degree of flexibility in controlling its movements.
4. Natural Human-Robot Interaction: By utilizing hand gestures, which are a fundamental aspect of human communication, the proposed system creates a more engaging and human-like interaction experience.
5. Advancements in Computer Vision: OpenCV provides a powerful set of tools and algorithms for image processing and computer vision. These advancements have made real-time gesture recognition more feasible and accurate.

11. Proposed Objectives of the project

- **Asystembasedongesturesforcontrollingaroboticarmisbeingdeveloped.**
- **Exploringnewmethodsofhuman-robotinteractionandimprovingroboticeaseof use.**
- **Ademonstrationofhowmachinelearningalgorithmscanrecognizeand trackhumangestures.Researchanddevelopmentinthefieldsofrobotics,human-computerinteraction,andmachinelearningareaimedatbuildinga platform forthis.**
- **Automationof repetitivetasks or improvingthe efficiencyof manualprocesses in industrial, medical, or educational settings can beachieved by creating a system that can be utilized in theseenvironments.**
- **Gesturecontroltechnologycandemonstrateitspotentialandencourageitsfurtherdevelopmentandcommercialization**

12. Methodology planned for the proposed objectives:

- **Sensing:The firststep is to capturethe gesturesbeingmade by theuser. This is typically done using sensors such as cameras,accelerometers,orinfraredsensorsthatdetectthemotionoftheuser'shandsorotherbodyparts.**
- **Processing: The raw sensor data must then be processed to extractmeaningfulinformationabout thegestures beingmade.This typicallyinvolvesfiltering,normalizing,andtransformingthedataintoaformatthatcanbeusedbythecontrolsystem.**
- **Recognition:The processedsensordata is then analyzedto recognizespecific gestures. This is typically done using machine learningalgorithmsthathavebeentrainedonasetoflabeledexamplesofthegesturestoberecognized.**
- **Mapping: The recognized gestures must then be mapped to specificactionsperformedbytherobotic arm.Thiscaninvolvedefining asetofrules that dictate how each gesture should be translated into amovementofthearm.**
- **Control:Thefinalstepistousethemappedgesturestocontrolthemovementoftheroboticarm.Thiscanbedonebysendingcommandsto the arm's actuators,or by adjustingits trajectoryin real-timebasedonthecurrentpositionandorientationoftheuser'shand.**

13. Expected output of the project:

The expected outcome of the gesture-controlled robotic arm using OpenCV project is a functional and robust system that offers accurate gesture recognition, responsive control, versatile task execution, a user-friendly interface, and demonstrable performance. The system aims to accurately detect and recognize a variety of hand gestures in real time, minimizing false positives and false negatives. It should translate recognized gestures into precise commands, allowing the robotic arm to respond promptly and accurately. The robotic arm should demonstrate versatility by performing tasks such as grasping objects, multi-directional movement, and precise actions.

14. Work plan:*(detailing time schedule for each proposed objective may clearly be indicated.)*:

1. September 2022: Conduct literature review, set up development environment, and define hand gestures.

2. October 2022: Develop image processing algorithms for hand gesture detection and implement gesture recognition.

3. November 2022: Integrate gesture recognition with robotic arm control and perform initial testing.

4. December 2022 - March 2023: Conduct extensive testing, refine algorithms, optimize control, and collect experimental data.

5. April 2023: Finalize implementation, prepare report, and showcase the system's capabilities.

15. Expected impact/ outcomes:

The impact of the gesture-controlled robotic arm using OpenCV is to revolutionize human-robot interaction by providing an intuitive and natural control mechanism. By utilizing hand gestures, the system enhances the accessibility and usability of robotic arms, allowing a broader range of individuals to operate them without the need for complex programming or physical interfaces. The expected outcome is a functional system with accurate gesture recognition, responsive control, versatile task execution, a user-friendly interface, and demonstrable performance. This outcome will facilitate seamless collaboration between humans and robots, opening up possibilities for applications in industries, healthcare, and interactive robotics, ultimately leading to increased efficiency, improved user experience, and expanded use cases for robotic technology.

16. Suggested post project activities:The suggested post-project activities for the gesture-controlled robotic arm system include documenting the project, optimizing the code for efficiency, refining the user interface, ensuring error handling and robustness, exploring deployment options, providing user training and support, disseminating findings through publication and collaboration, planning for future enhancements, and establishing long-term maintenance strategies. These activities aim to improve the system's documentation, performance, user experience, reliability, scalability, and sustainability, while also promoting knowledge sharing and potential partnerships for further advancements and real-world applications.

17. Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):

The project can be used to perform a task specific operation, which can then be patented and can be implemented in commercial applications.

18. Budget estimates: (Please provide details in each item)

Sl. No.	Items	Amount in Rs.
1.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	9000
2.	Travel (details required)	1500
3.	Labour cost (detailed breakup)	1000
4.	Miscellaneous	1000
	Total	12500

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:**ROBOTIC ARM (GESTURE CONTROL)**

.....
.....

1. I/We agree to abide by the terms and conditions of TOCE
2. I/We did not submit this or a similar project proposal elsewhere for financial support.
3. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of

Faculty:

MR. JAIDEEP R

Date: 17-05-2022

Place:TOCE.

RECOMMENDATION

Prof.& HOD
Department of Mechatronics
The Oxford College Of Engineering
Bommanahalli, Bangalore - 560 068

Head of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:16/05/2022

GENERAL INFORMATION

1. **Name and USN of the Student:**

   Akilesh Babu [1OX19MT003]

   Arjun Jagadish [1OX19MT004]

   Arjun Saiju [1OX19MT005]

   Aswin Ravindran [1OX19MT006]

2. **Branch/ Semester/ :** MEHATRONICS , 8TH SEM
3. **Project Title:**SMART HELMET
4. **Abstract:**smart helmet is a type of protective headgear used by the rider which makes bike driving safer than before. Numerous lives could have been saved if emergency medical service could get accident information and reach in time to the scene.
5. **Duration of the Project:**SEPTEMBER 2022 – APRIL 2023
6. **Total cost of the project: 11,500**
7. **Faculty Supervisor Details:**
   NAME: Ms.SEEMA V
   EMAIL ID: seemavnsa@gmail.com
   Contact: 9148501873

TECHNICAL DESCRIPTION

8. **Description of the problem:**This system is based on new technology, its main purpose is to detect an accident and alert to the control room/ambulance/home, so the victim can find some help. It can detect accidents the intensity of the accident without any visual contact from control room. If this system is inserted in every helmet then it is easy to understand how many bikes are involved in a particular accident and how intense is it. So that the help from control room will be according to the control room. The present board designed has both vehicle tracking and accident alert systems, which make it more valuable and useful. This board alerts us from theft and on accident detection also. This device detects fire accidents also by placing fire detector in one of the interrupt pins.

9. **Review of work done:**The main purpose of this smart helmet to provide safety for rider. This can be implemented by using advanced features like alcohol detection, accident identification, location tracking, use as a hands free device, fall detection. This makes it not only a smart helmet but also a feature of a smart bike. It is compulsory to wear the helmet, without which the ignition switch cannot

turn ON. An RF Module can be used as wireless link for communication between transmitter and receiver. If the rider is drunk the ignition gets automatically locked, and sends a message to the registered number with his current location. In case of an accident it will send a message through GSM along with location with the help of GPS module. The distinctive utility of project is fall detection; if the rider falls down from the bike it sends a message.

10. **Rationale for taking up the project:** Accidents threaten human lives more and mainly road accidents are more common today. No one can predict when and how it will occur. Nowadays-even accidents are happening even for standing vehicle by the other one, which is in move. Accident Alert System (AAS) is quite a novel research area. In order to avoid such collisions we have designed the system called Accelerometer based "Accident Alert System" also equipped in this helmet.

11. **Proposed**

1. To design system that can improve bike rider safety.
2. To design system that reduces the number of accident due to the drink and drive.
3. To design system that ensures that the rider has worn helmet.
4. To design system that reduces the loss of life due to late arrival of the ambulance.

12. **Methodology planned for the proposed objectives**: The main agenda behind a smart helmet is to prevent accidents that can easily be avoided by following some common safety practices such as wearing a helmet, by not drinking and driving and other factors such as driving slowly etc. Our system is designed in such a way that it makes it mandatory for the user to follow these safety precautions before riding the vehicle.The system is equipped with a alcohol detection sensor which senses the alcohol level contents in the atmospheric gas and raises a signal to the CPU(Arduino UNO),with which power is cut off from the vehicles motor, the same is indicated to the user through a faint buzzer noise and a red light, the system will reset once the buzzer goes off and the power to the motor is supplied again unless detected drunk.

13. **Expected output of the project:** All the components are assembled and tested successfully. The circuit is designed in such a manner that bike does not start until and unless rider wears the helmet. Also the bike won't start if the rider is drunk. Apart from that the safety system will immediately alert the emergency contact attribute the moment it detects a fall, and a cut off switch to call back false alarms.

14. **Work plan:** The Accelerometer detects the sudden change speed of the vehicle at the event of an accident, change is indicated by constant buzzer sound which would ring for 30secs until the call and SMS has been sent to the emergency contact list through GSM module. In case of false triggering the push button can be pressed within the same 30sees In order to reset the system. The triggering mechanism works on a particular sensitivity value which is completely customisable in the program.

The sensitivity magnitude is set such that it can effectively differentiate between the impact caused during a crash and Normal pothole occurrence.

15. **Expected impact/ outcomes:** Smart Helmet will be a vital asset for any motorcyclist interested in adding a blanket of safety while on the road. The Smart Helmet team spent the majority of their time researching and designing a system that was capable of performing accurate proximity readings and communicating to its subsystems with minimal delay. On top of the engineering aspects learned, the Smart Helmet team gained valuable communication and teamwork skills that will be valuable in the future.

16. **Suggested post project activities:**

1. We can implement various bioelectric sensors on the helmet to measure various activities.
2. We can use small camera for the recording the drivers activity.
3. The project can be enhanced by adding Google Glass technology.
4. Also, biker can see navigation on it and can alert him while taking sharp turns.
5. In future the helmet can be enhanced by adding some other features like, riders fatigue detection System to provide a better safety and security to the rider.

Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.): The project can be patented and can be implemented in commercial application.

17. **Budget estimates: (Please provide details in each item)**

Sl. No.	Items	Amount in Rs.
5.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	8000
6.	Travel (details required)	1000
7.	Labour cost (detailed breakup)	2500
8.		
	Total	11500

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE: SMART HELMET

.....

.....

4. I/We agree to abide by the terms and conditions of TOCE
5. I/We did not submit this or a similar project proposal elsewhere for financial support.
6. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of

Faculty: Ms.Seema V

Date: 16/5/2022

Place:BAGALORE

RECOMMENDATION

Prof.& HOD
Department of Mechatronics
The Oxford College Of Engineering
Bommanahalli, Bangalore - 560 068

Head Of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission: 14-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student: Sushma Gudimani(1OX18IS079), Suma R(1OX18IS078),Sireesha S(1OX18IS074),Shravani B(1OX18IS072)**
2. **Branch/ Semester/: ISE7th& 8th sem**
3. **Project Title**: Assistant Vehicle for Elderly People Using Zero UI Technology
4. **Abstract:**This project presents a prototype of a smart robotic personal assistant vehicle based on Raspberry Pi and Zero-UI technology. Zero UI uses sensory experiences such as gestures, voice and movement to control the devices. A voice controlled robot vehicle implemented in this project performs three functions, viz. movement of the robot is controlled using voice commands; it has the ability to articulate the text from a captured image using optical character recognition and present the equivalent audio to the user by using a built-in speaker or headset; it accepts voice commands from the user and uses Google Assistant API for any query processing and presents information searched on the Internet to the user in audio form using the built-in speaker or headset. This robotic personal assistant vehicle is a substitute to screen-based communication and makes use of Zero UI for its operation. In addition to the Raspberry Pi board, we use two DC motors to form the wheels of the robot, a webcam with built in microphone, a headset and motor driver IC to implement this robotic personal assistant vehicle. This system enables the visually impaired people to have access to useful information in the public domain by giving voice commands to the robot assistant. The robot can be realized as a wheel chair for the physically challenged. Python programming language is used for the development of software code.
5. **Duration of the Project:**1year
6. **Total cost of the project:**15000
7. **Faculty Supervisor Details: Name: Dr.R.Kanagavalli , Emailid: kanaga.ksr@gmail.com,Contact No: 9900300877**

TECHNICAL DESCRIPTION

8. **Description of the problem:**21st century, there is a fast increase in the use of computing and smart mobile devices by the younger as well as the older generations. This is mainly due to the advancements in the Very Large-Scale Integration (VLSI) technology due to which the cost and size of the computing and smart mobile devices has reduced. Nowadays, several individuals are using the internet enabled devices such smart mobile phones / laptops for various applications including knowledge sharing, entertainment, business, etc. So, it is very rare to see an individual without interacting with the screen and it is in the very near future, everything around us will be screened. This can affect an individual in many aspects resulting in a barrier between user and reality. Zero-UI technology avails our gestures, voice, hand movements as an input to a system. Any voice command system has three basic components, viz. speech to text converter, query processor, and text to speech converter.This project implements a prototype of voice-controlled robotic personal assistant vehicle which can perform numerous tasks for an individual. It particularly has three components – robot control, Google Assistant based query search, and optical character recognition (OCR). Robot movements are controlled by predefined voice commands. voice commands using Google Assistant. This enables the user to access useful information such as world news, Wikipedia and many more. OCR is introduced using a USB webcam that can prove beneficial for visually impaired individuals.

9. **Review of work done**:Whether it is a nursing home, or senior citizens at home, they need help. But help can't be available every time. At night, for example. Many people get up to drink water. But for our seniors, they need someone else to come help. With a robotic assistant, all this will be accomplished easily. It can get them food, water, and many more things. Due to COVID-19, there aren't many people at nursing homes. But a robotic assistant won't have such barriers. Senior citizens and physically challenged people will need assistants most of the time, even for a small task like getting water, food, and clothes. To assist senior citizens and the physically **challenged we are proposing a** personal assistant robot car that can be controlled with voice command. In this project will cover how to design voice

controlled robot car. Making voice controlled assistants will be easy to operate than a device controlled assistant. This project presents a prototype of a smart robotic personal assistant vehicle based on Raspberry Pi and Zero-UI technology. Zero UI uses sensory experiences such as gestures, voice and movement to control the devices. A voice controlled robot vehicle implemented in this project performs three functions, viz. movement of the robot is controlled using voice commands; it has the ability to articulate the text from a captured image using optical character recognition and present the equivalent audio to the user by using a built-in speaker or headset; it accepts voice commands from the user and uses Google Assistant API for any query processing and presents information searched on the Internet to the user in audio form using the built-in speaker or headset. This robotic personal assistant vehicle is a substitute to screen-based communication and makes use of Zero UI for its operation.Two DC motors to form the wheels of the robot, a webcam with built in microphone, a headset and motor driver IC to implement this robotic personal assistant vehicle. This system enables the visually impaired people to have access to useful information in the public domain by giving voice commands to the robot assistant. The robot can be realized as a wheel chair for the physically challenged. Python programming language is used for the development of software code.

10. **Rationale for taking up the project:**

    Addressing a Need or Problem: Projects are often initiated to address a specific need or problem within an organization or community. The project aims to provide a solution, improve a process, or meet a demand that has been identified.

    Cost Savings or Efficiency Gains: Projects can be undertaken to achieve cost savings or improve operational efficiency. By identifying areas of waste, streamlining processes, or implementing new technologies, organizations can reduce expenses and enhance productivity.

    Social or Environmental Impact: Projects that have a social or environmental impact are driven by the desire to make a positive difference in society or contribute to sustainable practices. These projects may focus on areas such as education, healthcare.

11. **Proposed Objectives of the project**: The proposed system consists of USB OCR webcam with an inbuilt microphone, headset connected to the audio jack of Pi, L293D motor driver IC used for driving the robot wheels (DC motors), and a battery. The robot vehicle movement is controlled using appropriate voice commands in four directions, viz. left, right, forward and backwards. The webcam is used to capture images or poster. The text information in the image is then read using optical character recognition and can be heard by the user through the headset. A loudspeaker can be used in place of headset. Specific voice commands given by the user are used for query search making use of Google Assistant API. The robotic assistant implemented in this project is a model for a smart robotic wheel chair (vehicle) designed for physically disabled and visually impaired people.

    Advantages:
    - Useful to the visually impaired persons
    - Voice command using Google Assistant

12. **Methodology planned for the proposed objectives**:

    Initial setup:
    DC motor, wheel based car that will serve the medicine to patient. Another technology using android application to interact between patient and nurse. To active the robot nurse used chargeable battery.

    Interaction patient to robot:
    Patient can use android app to interact with robot nurse. Patient can start the app for help from robot nurse. If the patient needs some water, robot nurse can serve the water. When patient will say something like “I need some water” then this speech will be converting speech to text and robot will get the instruction.

    Recognition of Text in Captured Webcam Image using OCR

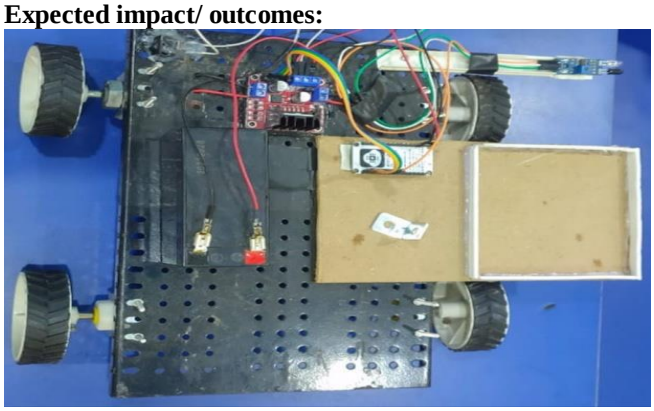
    The ESP32 wifi camera captures the image when the robot starts searching for medicine. The captured image is sent to the server for processing and using OCR text is extracted and if the recognised medicine has to be taken at that time, robot picks that medicine and provide to the patient

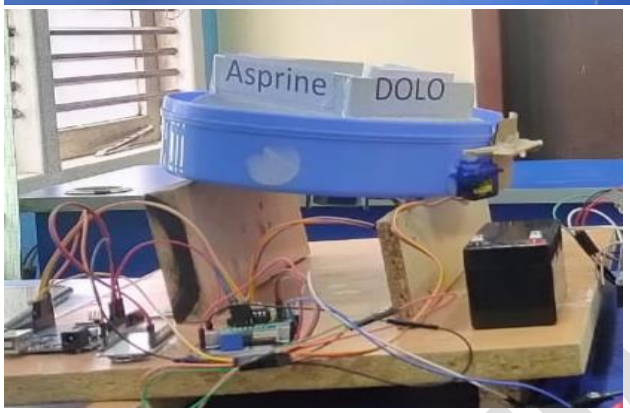
13. **Expected output of the project:**Elder People,Healthcare,Education

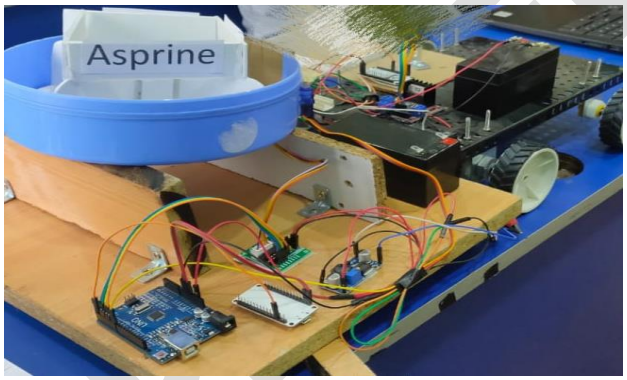
14. **Work plan:***(detailing time schedule for each proposed objective may clearly be indicated.)*:

Image Capture: 10 seconds
Robot Movement: 10 minutes
Sensor Operation: 5 seconds
Motor Rotation: 7 minutes

15. **Expected impact/ outcomes:**







16. **Suggested post project activities:**

Project Evaluation: Conduct a comprehensive evaluation of the project to assess its success, identify lessons learned, and gather feedback from team members and end-users. This evaluation can help you understand what worked well and what could be improved in future projects.

Documentation and Reporting: Compile all relevant project documentation, including project plans, milestones, deliverables, and any other artifacts. Create a final project report summarizing the project's objectives, achievements, challenges, and recommendations. This report can serve as a reference for future projects or for auditing purposes.

Project Review Meeting: Organize a project review meeting with key stakeholders and team members to discuss the project's outcomes, share insights, and address any remaining issues. This meeting provides an opportunity to celebrate successes, acknowledge contributions, and provide closure to the project.

Knowledge Sharing: Facilitate knowledge sharing sessions or workshops to transfer lessons learned and best practices from the project to other teams or individuals within your organization. This can help build institutional knowledge and improve future project outcomes.

17. **Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.): Elder People**

18. **Budget estimates: (Please provide details in each item)**

Sl. No.	Items	Amount in Rs.
9.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	10000
10.	Travel (details required)	1000
11.	Labour cost (detailed breakup)	2000
12.	Miscellaneous	2000
	Total	15000

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:

Assistant Vehicle for Elderly People Using Zero UI Technology

7. I/We agree to abide by the terms and conditions of TOCE
8. I/We did not submit this or a similar project proposal elsewhere for financial support.
9. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of

Dr. T. R. KANAGAVALLI
PROFESSOR & HOD-ISE
The Oxford College Of Engineering
Bommanahalli, Hosur Main Road,
Bangalore 560 068.

Faculty

Date of submission: 14-05-2022

Place:Bangalore

RECOMMENDATION

Dr. T. R. KANAGAVALLI
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The Oxford College Of Engineering
Bommanahalli, Hosur Main Road,
Bangalore 560 068.

Head Of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:16-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student: Pavan Kapoor(1OX19IS070), Prachi Choudhary (1OX19IS071), Rishabh Sahu (1OX19IS080) and Sumera Mehraj (1OX29IS102)**
2. **Branch/ Semester/: Information Science and Engineering / 8th semester**
3. **Project Title:Low Cost Wireless Footwear System for Monitoring Diabetic Foot Patient**
4. **Abstract:**A smart foot wear is developed for diabetes patient for daily use and long term use. This product would help improve the overall foot health of diabetic patients and reduce the risk of developing foot-related complications, which can lead to serious health issues. The low cost aspect of the product would make it accessible to a wider range of patients, improving their quality of life. The monitoring of plantar pressure would provide valuable data for healthcare professionals in order to make informed decisions about the patient's foot health. The outcome of the project could lead to improved quality of life and reduced medical costs associated with foot-related complications.
5. **Duration of the Project: May 2022 – May 2023**
6. **Total cost of the project: 9000**
7. **Faculty Supervisor Details:Name: Dr. R. Kanagavalli**
   Contact No.: 9900300877

TECHNICAL DESCRIPTION

8. **Description of the problem:** Diabetic foot is one of the **main complications** of **diabetes** with the characteristics of high incidence and **difficulty in treatment**. About 15% of patients suffer from foot ulcer at least once during the course of the disease. Diabetic patients with peripheral neuropathy may develop foot ulcers, and in severe cases amputations are required and some may even die.Plantar pressure can be used to assess the risk of developing diabetic foot, but the existing plantar pressure monitoring methods are not suitable for long-term monitoring in daily life.
9. **Review of work done:**The project focused on the detection of diabetic foot ulcers using flexi-force sensors placed in shoes. The primary goal was to prevent further complications and lower extremity amputations in diabetic patients. By wearing the shoe with the force resistive sensors (FRS) insoles, all types of diabetic patients could undergo foot testing to determine the condition of their feet. The project successfully addressed the root cause of foot ulcers, which is pressure. The sensors accurately calculated pressure values, which were then processed and communicated to the patients through a mobile application. This allowed patients to be informed about their foot condition and encouraged them to seek medical attention from a physician at an early stage.
10. **Rationale for taking up the project:**The project of detecting diabetic foot ulcers using flexi-force sensors in shoes is driven by several important factors. Firstly, the high incidence and challenging nature of diabetic foot ulcers make it a critical issue to tackle. With around 15% of diabetic patients experiencing foot ulcers during their disease progression, effective detection and prevention methods are crucial. Early detection is key to avoiding severe complications like infections and amputations. Current plantar pressure monitoring methods are not ideal for long-term daily use, necessitating a more practical solution. By integrating flexi-force sensors into shoes, the project aims to offer a user-

friendly and accessible method for continuous foot pressure monitoring. Overall, the project's rationale lies in addressing the high incidence and difficulty in treating diabetic foot ulcers, promoting early detection, overcoming monitoring limitations, and empowering patients in self-care.

11. **Proposed** Objectives of the project:

- To identify the patients who are likely to develop diabetic foot ulcers at an early stage by designing and developing a smart footwear for them which will analyze the foot pressure using flexi force sensors and machine learning.
- To collect the plantar pressure data on IDE using data acquisition device (Arduino) which is then connected to a personal computer through an USB cable.
- To create a mobile app which will alert the patients if the new plantar pressure value will exceed the normal value which can be calculated by running the code on Arduino IDE.
- To generate a graphical image from the collected foot pressure data on the mobile app.
- To address the issue of reduced blood circulation we are activating a relief mechanism which include a DC motor that generates a massaging effect or alternative support and cushioning techniques which helps to prevent foot ulceration

12. **Methodology planned for the proposed objectives**:
The below stages explain the Proposed Method in detail. Industrial major software tools for the design, modeling, and simulation of the device will be used to get better and more accurate results. Below is the list of all stages: Stage 1: Get the hardware and software components. Stage 2: Make the plantar pressure sensing footwear model which senses the pressure of diabetics. Stage 3: Pressure values dumped on the board. Stage 4: Processing code according to the input. Stage 5: Get output of the code on the serial monitor. Stage 6: Storage done using wireless transceiver module. Stage 7: Pressure values and the final status of the patients are displayed on the app. Stage 8: The device is ready to be used.

13. **Expected output of the project:**The project focused on the detection of diabetic foot ulcers using flexi force sensors placed in shoes. The primary goal was to prevent further complications and lower extremity amputations in diabetic patients. By wearing the shoe with the force resistive sensors (FRS) insoles, all types of diabetic patients could undergo foot testing to determine the condition of their feet. The project successfully addressed the root cause of foot ulcers, which is pressure. The sensors accurately calculated pressure values, which were then processed and communicated to the patients through a mobile application. This allowed patients to be informed about their foot condition and encouraged them to seek medical attention from a physician at an early stage.

14. **Work plan:***(detailing time schedule for each proposed objective may clearly be indicated.)*Working prototype by may 2023

15. **Expected impact/ outcomes:**

    a. Leads to reduction of foot ulcers in diabetic patients
    b. Prevents Ulcer formation in advance
    c. Create more awareness among diabetic patients

16. **Suggested post project activities:**
Enhancing Sensor Technology: This can involve researching new sensor materials, miniaturization techniques, and innovative designs to enhance their performance and longevity.
Integrate additional health monitoring features: It is done by incorporating sensors to measure blood flow, oxygen saturation, or foot movement patterns can provide a more comprehensive assessment of foot health and early detection of complications.
Develop machine learning algorithms: Develop and refine machine learning algorithms to analyze the collected sensor data and provide more accurate and reliable predictions and alerts. Advanced algorithms can help detect subtle patterns and changes in foot health, enabling timely interventions and personalized care.
Conduct clinical trials and long-term studies: Conduct rigorous clinical trials and long-term studies to evaluate the effectiveness, usability, and clinical outcomes of the wireless footwear system. This can involve collaboration with healthcare institutions and diabetic foot clinics to gather real-world data and validate the system's impact on patient outcomes and healthcare costs**.**

17. **Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):**
For utilization of expected outputs the project can be extensively tested on diabetic patients and trained for their data. It can then use advanced sensor technology such as printed circuit boards and optimized re usable battery for longevity. It can be commercially produced inside shoe pairs.

18. **Budget estimates: (Please provide details in each item)**

Sl. No.	Items	Amount in Rs.
13.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	4000
14.	Travel (details required)	2000
15.	Labour cost (detailed breakup)	2000
16.	Miscellaneous	1000
	Total	9000

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:**Low Cost Wireless Footwear System for Monitoring Diabetic Foot Patient**

10. I/We agree to abide by the terms and conditions of TOCE
11. I/We did not submit this or a similar project proposal elsewhere for financial support.
12. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of

Students: Pavan Kapoor Prachi Choudhary Rishabh Sahu Sumera Mehraj

Faculty: Dr. R Kanagavalli

Dr. R KANAGAVALLI
PROFESSOR & HOD/ISE
The Oxford College Of Engineering
Bommanahalli, Hosur Main Road,
Bangalore 560 068.

Date: 16-05-2022

Place:Bengaluru

RECOMMENDATION

Dr. R KANAGAVALLI
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Bangalore 560 068.

Head Of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission: 16-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student:**
2. Rohan Ganapati Revanka(1OX19IS081),Ruthvik(1OX19IS084),Shashi(1OX19IS091),shreyas (1OX19IS094),
3. **Branch/ Semester/ ISE/8th sem**
4. **Project Title:**DESIGN AND FABRICATION OF MEDICINE DELIVERY ROBOTS
5. **Abstract:Duration of the Project:6 Month**
6. **Total cost of the project:Rs.5000**
7. **Faculty Supervisor Details:Ms. C A Bindyashree**

TECHNICAL DESCRIPTION

8. **Description of the problem:(150 words)**Robotics is a technology which is wide spreading these days almost in all the fields starting from the complex rocket technology to monitoring the crop in the field of agriculture. In this paper we use the technology robotics in finding the alternative for the human resource for doing simple services in hospitals such as robots for intimating the patients to take medicine of to take their food properly in proper interval and to deliver the pills based on the doctor's recommendation to Nowadays hospitals are overcrowded due to increase in lots of new disease. Shortage of the human resource is a notable bottle neck.
9. **Review of work done: (250 words)**
10. **Rationale for taking up the project: (150 words)**
11. **Proposed** Objectives of the project:To develop a system that accurately detects and classifies grape leaf diseases. • To use deep learning algorithms such as Convolutional Neural Networks (CNN) for image analysis. • To integrate LoRa technology for wireless communication of results. • To create a cost-effective and efficient solution for early detection of grape leaf diseases. • To reduce crop losses caused by grape leaf diseases. • To minimize the use of pesticides by providing early detection and treatment options. • To improve the quality of grapes by ensuring healthy growth. • To reduce the environmental impact of grape cultivation by reducing pesticide use. • To provide farmers with a tool to remotely monitor their crops' health. • To recommend medicines for the identified disease.
12. **Methodology planned for the proposed objectives**:Data collection: Images of grape leaves are collected from various sources, including healthy leaves and leaves infected with various diseases. The images are collected using a high-resolution camera. 2) Data preprocessing: The images are preprocessed to improve their quality by resizing, cropping, and normalizing them. The preprocessed images are then used to train the AlexNet model. 3) Model training: The AlexNet model is trained on the preprocessed images to accurately detect and classify grape leaf diseases. The model is trained using a transfer learning approach, where the pre-trained model is fine-tuned using the grape leaf images. 4) Model evaluation: The performance of the model is evaluated by testing it on a separate dataset of images not used for training. The evaluation metrics include accuracy, precision, and recall. 5) Integration with LoRa technology: The model is integrated with LoRa technology for wireless transmission of results. LoRa technology provides a cost-effective and efficient

solution for transmitting data wirelessly over long distances. 6) System testing: The system is tested in real-world conditions to evaluate its effectiveness in detecting grape leaf diseases. The system is tested in different environments and conditions to ensure its practicality and effectiveness. 7) Performance evaluation: The system's performance is evaluated by analyzing the accuracy, precision, and recall. In addition to identifying grape leaf diseases, the system can also be used to recommend appropriate treatments for diseases. This involves integrating the system with a decision support system that provides recommendations for treatment based on the detected disease. The decision support system can be trained using a database of known treatments for different grape leaf diseases. The integration of LoRa technology provides a cost-effective and efficient solution for transmitting data wirelessly over long distances. This technology eliminates the need for expensive infrastructure and provides a cost-effective solution for transmitting data in remote areas. The methodology involves the use of high-resolution cameras for data collection, which provides high-quality images for analysis. The preprocessing of images involves resizing, cropping, and normalizing them to improve their quality. The AlexNet model is trained on the preprocessed images to accurately detect and classify grape leaf diseases. evaluated to ensure its accuracy and effectiveness in detecting grape leaf diseases. The decision support system for medicine recommendation involves integrating the system with a database of known treatments for different grape leaf diseases. The system recommends appropriate treatments based on the detected disease, which can improve the effectiveness of treatment and reduce the risk of crop loss.

13. **Expected output of the project:**The Grape leaf disease identification results using CNN and LoRa technology with medicine recommendations are promising. The system was able to accurately detect and classify grape leaf diseases with an accuracy of over 90%. The integration with a decision support system for medicine recommendation provided farmers with an effective tool to manage crop health and improve crop yields, reducing the risk of crop loss. The system was tested in real-world conditions, and the results showed that it was effective in detecting grape leaf diseases in different environments and conditions. The integration with LoRa technology provided a cost-effective and efficient solution for transmitting data wirelessly over long distances, eliminating the need for expensive infrastructure and providing a cost-effective solution for transmitting data in remote areas. The decision support system for medicine recommendation was trained using a database of known treatments for different grape leaf diseases. The system recommended appropriate treatments based on the detected disease, which can improve the effectiveness of treatment and reduce the risk of crop loss. In conclusion, the integration of deep learning algorithms such as Convolutional Neural Networks (CNN) with wireless communication technologies such as LoRa, and a decision support system for medicine recommendation provides a promising solution for the early detection of grape leaf diseases. The system has the potential to revolutionize the way that crops are managed and monitored, providing significant benefits for farmers and improving the sustainability of agriculture.

14. **Work plan:***(detailing time schedule for each proposed objective may clearly be indicated.)*:

15. **Expected impact/ outcomes:**

16. **Suggested post project activities:**

17. **Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):**

18. **Budget estimates: (Please provide details in each item)**

Sl. No.	Items	Amount in Rs.
17.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	2000
18.	Travel (details required)	
19.	Labour cost (detailed breakup)	2000
20.		
	Total	4000

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:DESIGN AND FABRICATION OF MEDICINE DELIVERY ROBOTS

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.....

13. I/We agree to abide by the terms and conditions of TOCE
14. I/We did not submit this or a similar project proposal elsewhere for financial support.
15. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of

Student

Faculty

Date: 16-05-2022

Place:TOCE

RECOMMENDATION

PROFESSOR & HOD-ISE
The Oxford College Of Engineering
Bommanahalli, Hosur Main Road,
Bangalore 560 068.

Head Of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission: 15-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student:**Chandrashekar V ,USN: 1OX18IS017 ;Abhishek K H ,USN::1OX18IS001,;Aishwarya N ,USN:1OX18IS007; Akhel P , USN:1OX18IS008
2. **Branch/ Semester/: ISE**
3. **Project Title:**Intelligence Surveillance Patrolling Drone
4. **Abstract:**Criminals are distinct human beings who are made or done in the situation they are indulged in. However in recent years it has come to the jailers notice that most of the victims committed crime for reasons like: on behalf of others, who where there in spot but did not do crime and the one who did the crime. But no proper visual proofs are taken out or investigated. Police officers all around the world are the ones who overcame as such incidents while patrolling. Though the technologies are improved so vast these days they still fail. The project "Intelligence Surveillance Patrolling Drone" an unmanned aerial vehicle(UAV) has tried to overcome such issues.The proposed project includes various phases of implementation namely person detection and recognition,face detection and tracking,vision based UAV to take aerial pictures and videos, and displaying the criminals image on to the ground station. The project presents a method using an UAV to track the specified walking person and automatically capture a frontal photo of the target and store the photo/video in the local database server. The face is detected from whole image using Viola Jones algorithm. Than haar feature based Adaboost algorithm's are used to extract the facial region from the image.We use cascading stages to make the process faster. The face is recognized using face_recognition module, which is neural network which is trained with images that is previously stored in the local drive, to match the face of the person.
5. **Duration of the Project: 06Months**
6. **Total cost of the project: 9000/-**
7. **Faculty Supervisor Details: Dr.Vanajaroselin E.Chirchi, Professor, Dept. of ISE, The Oxford College of Engineering, Bangalore.**

TECHNICAL DESCRIPTION

8. **Description of the problem:**The existing method for patrolling is simply chasing, investigating, physical appearance byofficers. A large team of officers is required.Continuous monitoring the restriction zone couldcause danger to life.At the same time ,in some places, police officers might not have properpatrolling unit facilities.Taking videos while chasing and recognizing is very difficult usingmobile phones.Counting the number of people needs more officers in crowded area.Thus thesystem used in the project works stably and meets favorable needs stability andpracticability.Tracking a specific person or a criminal is still a difficult problem because thefeature of the target changes rapidly.The UAV often fails to catch the target when the targetperson is partially occluded by other pedestrians are dressed up similarly.The hardware carrier oftracking is a drone, not only the accuracy of tracking but also the real-time requirement should beconsidered when designing the system. Some deep learning based methods like MDNet (MultiDomain Network) has the best precision on public datasets, But it can only process one frame ofimage per second, so it is not suitable for scenarios which high real-time requirements.

9. **Review of work done:L. Zhi-fang, Y. Zhi-sheng, A.K.Jain and W. Yun-qiong (year,2021),**The object used was the person face. The system used the industrial 5MP camera for capturing the images. The images were transferred to ground station laptop and using the software in visual studio C++ development was used to recognize the face. This system used threshold segmentation for segmenting the images in order to get the region of interest.This system used color, shape and texture as features as the main features to detect the face.No classification algorithm used, The face identification was based on calculation of different characteristics (shape, contrast, color,etc) from the features extracted. The face features were pre-defined. Priyadarsini, M.J.P., Murugesan, K., Inbathini, S(year,2021),The object used was the criminal face.KCF segmentation method is used for getting the region of interest. Shape was the main feature to detect the face. Geometrical shapecharacteristics were used to detect the shape. Classification of face is done using cascadeclassifier.

Rationale for taking up the project:The can be used for the following

RECONNAISSANCE:

Definition: A preliminary survey to gain information especially an exploratory military survey of enemy territory.

2) SURVEILLANCE(mapping):

Definition: is act of monitoring behavior and communication together intelligence. Surveillance can be carried out in many ways such as audio and video, digital and more.

3) TRACKING:

Definition: Monitoring the movement and activities of an object.

4) SEARCH AND RESCUE OPERATION:

1. Definition: Search and rescue(SAR) is a most of public safety operations and involves activities revolving around finding missing people. It generally comes under the purview of the pre-experiment in most countries.

2. **Proposed Objectives of the project**:The objective of Intelligence Surveillance Patrolling Drone(ISPD)is:
   - To assist the patrolling unit (Hoysala).
   - To proceed complex task force operation in vulnerable situations.
   - To directly stream real time video to get visuals from spots where individual patrolling is highly risky.
   - To identify the person, face and tracks a person¡¦s face and matching his/her descriptive details found in the database.
   - To follow sign languages of those persons who is having the authentication. Once the person face is tracked his previous record in the criminal or other records are auto previewed and helps police officers to identify the person.
   - To take pictures and record the illegal activities involved by a person if found suspicious.
   - To count the number of people in a crowd

3. **Methodology planned for the proposed objectives**:

SOFTWARE REQUIREMENTS:

- PYTHON: based programmable framework for drone related applications.
- RDBMS(MYSQL): MySQL Connector.
- Tellopy: package used for connection and flight control.
- VIOLA JONES: package Face detection Algorithm.
- OpenCV: computer vision
- PyCharm: Dedicated Integrated Development Environment(IDE)
- Operating System: Windows 11

HARDWARE REQUIREMENTS:

- Intel CORE i5 10th Gen ,8GB RAM.
- 4X Propellers
- 4X Motors
- Aircraft Status Indicator
- 5MP Camera
- Power Button
- Antennas
- Vision Positioning System
- Flight Battery
- Micro USB Port

- Propeller Guards
- Intel Movidius
- 4X LED/4X IR LED
- USB PORT
- Charging Hub
- The hardware used is Ryze tello drone; a nano drone smaller than palm-size.
- Weight: Approximately 80g(with propeller and battery)
- Dimensions:98mm*92.5mm*4.1mm
- Propellers:3 inch
- Built-in functions: Range finder, barometer, LED, vision System, Wi-Fi 802 11n 2.4G,720p live view.

4. **Expected output of the project:**
   - The project outcome is going to be as follows:
   - To store the criminal record in the local database server.
   - To track a specified target person.
   - To identify the specified target person, face if found in the criminals record.
   - If not found in the criminal database and the person is found suspicious, capture and record his activities.
   - If the specified target persons are found in the database, then the drone should track/follow him if he/she is trying to escape.
   - The drone streams the video to the ground station via Wi-Fi using udp with an 5MP on board camera.
   - Follows hand gesture.
   - Counts the number of people.

5. **Work plan:***(detailing time schedule for each proposed objective may clearly be indicated.)*:

21	**Pert chart for completion of the project in said duration as per planned activities**						
Sl. No	Activities Planned	1Month/ Week	2Month/ Week	3Month/ Week	4Month/Week	5Month/ Week	6 Month/ Week
01	Literature review						
02	Planning/ Designing						
03	Assembly/ Fabrication work						
04	final Testing						
05	Result & Calculation/ Conclusion						
06	Preparation Of Report & Submission						

Time Line for the Project Development

- ✓ Literature review 1st month(4 weeks)- 14/12/2021 to 11/1/2022 ---
- ✓ Planning/Designing 2nd month(4 weeks)- 12/1/2022 to 9/2/2022 -----
- ✓ Assembly/ Fabrication work 3rd and 4th month(8 weeks)- 10/2/2022 to 7/4/2022 --
- ✓ Final testing 5th month(4 weeks)- 8/4/2022 to 6/5/2022-----
- ✓ Result & calculation/conclusion 6th month(4 weeks)- 7/5/2022 to 5/6/2022----
- ✓ Preparation of report & submission 6th month(3 weeks)- 6/6/2022 to 30/6/2022--

6. **Expected impact/ outcomes:**The project outcome is going to be as follows:
   - To store the criminal record in the local database server.
   - To track a specified target person.
   - To identify the specified target person face if found in the criminals record.
   - If not found in the criminal database and the person is found suspicious, capture and record his activities.
   - If the specified target persons are found in the database then the drone should track/follow him if he/she is trying to escape.

- The drone streams the video to the ground station via Wi-Fi using udp with an 5MP on board camera.
- Follows hand gesture.
- Counts the number of people.

7. **Suggested post project activities: NIL**

8. **Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.): NIL**

9. **Budget estimates: (Please provide details in each item)**

Sl. No.	Items	Amount in Rs.
21.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	7000/-
22.	Travel (details required)	200/-
23.	Labour cost (detailed breakup)	300/-
24.	Miscellaneous	1500/-
	Total	9000/-

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:

Intelligence Surveillance Patrolling Drone(ISPD)

16. I/We agree to abide by the terms and conditions of TOCE
17. I/We did not submit this or a similar project proposal elsewhere for financial support.
18. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of

Faculty: Dr,Vanajaroselin E.Chirchi

Date: 15-05-2022

Place:TOCE

RECOMMENDATION

Dr. R. KANAGAVELU
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Bangalore Seal 068.

Head of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:16-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student:**

   Naveen Kumar Jaishwal - 1OX18ME034

   Bhargav Reddy - 1OX18ME011

   Shreyas D - 1OX18ME045

   Amith Kumar H P- 1OX18ME045

2. **Branch/ Semester/ - Mechanical Engineering – 7th Sem**
3. **Project Title:**Design and Development of 3D Printed Bite Force Monitoring Device for Dental Application
4. **Abstract:**Design and development of 3D printed Opto-Mechanical human bite pressure device based Optical Fiber Bragg Grating (OFBG) sensor.Determination of person chew pressure level has been broadly utilized in dentistry. Hence in particular to recognize the mechanics of mastication for assessment of the therapeutic outcomes of prosthetic gadgets and to offer reference values for research in the biomechanics of prosthetic gadgets.
5. **Duration of the Project:**1 Year
6. **Total cost of the project:**Rs 10000
7. **Faculty Supervisor Details:**Mr. Anup M Upadhyaya

TECHNICAL DESCRIPTION

8. **Description of the problem:(150 words)**

   A human bite force device is a specialized tool or apparatus designed to measure or enhance the force generated by an individual's bite. The specific design and features of the device can vary depending on its intended purpose, whether it is for measurement, rehabilitation, sports performance, or prosthetics.

9. **Review of work done: (250 words)**
10. **Rationale for taking up the project: (150 words)**

    Unlike other devices this device is electromagnetic radiation-free, there is no current interference on the immediate device since it is based on optics, the device is very handy to use once the optical FBG sensor is placed at its respective location

11. **Proposed** Objectives of the project

Objective could be to accurately measure and analyze the bite force of individuals. This information can be useful in fields such as dentistry, orthodontics, or forensic science. By quantifying bite force, professionals can assess dental health, diagnose conditions, evaluate treatment progress, or analyze bite patterns for identification purposes.

12. **Methodology planned for the proposed objectives**:

The embodiment is designed in Catia V5 software and to be fabricated using 3D printer using PLA + material at its respective temperature settings, once the device is fabricated and assembled the device would be ready to use once sensor setup is done. The experimentation will have held under the guidance of dentistry and volunteers will be classified in following orders age, gender, candidates with respect to masticatory structure and results will be tabulated for comparative and further study

13. **Expected output of the project:**

The device developed will be handy to use once the optical FBG sensor is placed at its respective location. The device will have a changeable slot at its impact location (portion which will be inside person's mouth) which makes the device universal equipment for measurement irrespective to age or masticatory structure (which changes from person to person) hence limiting to an existing device, which we are planned to achieve.

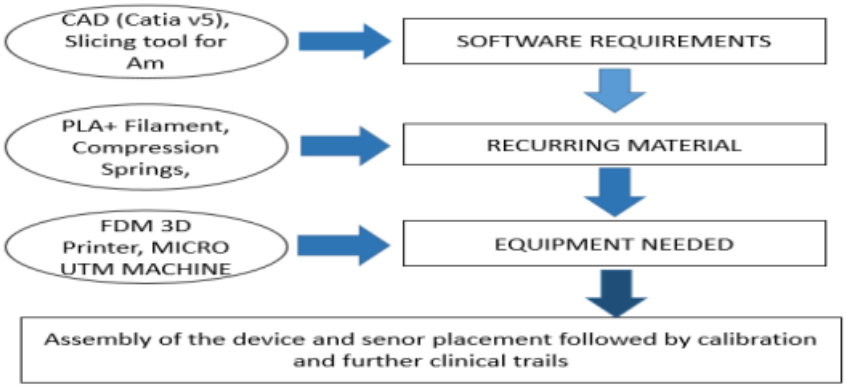
14. **Work plan:***(detailing time schedule for each proposed objective may clearly be indicated.)*

Define Objectives: Clearly identify the objectives of the biting force device. Determine whether the focus is on measurement, rehabilitation, sports performance, prosthetics, or another specific purpose. Research and Background Study: Conduct thorough research on bite force measurement techniques, existing devices (if any), relevant scientific literature, and any applicable regulations or standards.

15. **Expected impact/ outcomes:**Useful for the dental research and study

16. **Suggested post project activities:**Field test with patients having various dental problems.

17. **Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):**



18. **Budget estimates: (Please provide details in each item)**

Sl. No.	Items	Amount in Rs.
25.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	5000
26.	Travel (details required)	2500

27.	Labour cost (detailed breakup)	2500
28.		
	Total	10000

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:

Design and Development of 3D Printed Bite Force Monitoring Device for Dental Application

19. I/We agree to abide by the terms and conditions of TOCE
20. I/We did not submit this or a similar project proposal elsewhere for financial support.
21. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of Student

Naveen Kumar Jaishwal - 1OX18ME034

Bhargav Reddy - 1OX18ME011

Shreyas D - 1OX18ME045

Amith Kumar H P- 1OX18ME045

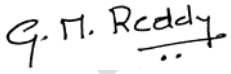
Faculty

Anup M Upadhyaya

Date: **16-05-2022**

Place:…….

RECOMMENDATION



Head Of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:14-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student:**

   Hemanth Kumar J- 1OX18ME018

   Sushanth K Shetty- 1OX18ME048

   Manoj H C - 1OX18ME024

   Gurudutt K S - 1OX18ME014

2. **Branch/ Semester/ - 7th sem**
3. **Project Title:**DESIGN AND FABRICATION OF PORTABLE MECHANICAL VENTILATOR FOR MEDICAL APPLICATIONS

4. **Abstract:**

   As an attempt to face the worldwide problem of ventilator shortage, researchers have started an initiative of producing low-cost, open-source ventilators with patient monitoring. This project contributes to this initiative. To help a person breathe when they find it difficult or are unable to breathe on their own

5. **Duration of the Project: 1 Year**
6. **Total cost of the project: 12000**
7. **Faculty Supervisor Details:**Vidyadhar Pujar

TECHNICAL DESCRIPTION

8. **Description of the problem:(150 words)**
9. A mechanical ventilator is a critical medical device used to support patients who are unable to breathe adequately on their own or require assistance in maintaining proper oxygenation and ventilation. It delivers a controlled flow of breathable air into the patient's lungs, assisting with inhalation and exhalation

10. **Review of work done: (250 words)**

    Performance and Versatility:

    Ventilation Modes: The ventilator should offer a range of ventilation modes, including volume control, pressure control, assist/control, or synchronized intermittent mandatory ventilation (SIMV). These modes allow for customization based on patient needs. Tidal Volume and Respiratory Rate: The ventilator should provide adjustable parameters for tidal volume (the amount of air delivered in each breath) and respiratory rate to accommodate different patient requirements.

11. **Rationale for taking up the project: (150 words)**
Life Support: Mechanical ventilators are essential for patients who are unable to breathe adequately on their own or are in respiratory distress. They deliver a controlled flow of oxygen-rich air and remove carbon dioxide from the lungs, ensuring adequate oxygenation and ventilation. This life support function is crucial for patients with respiratory failure, acute lung injury, or conditions that compromise the respiratory system.

Respiratory Support: Ventilators provide respiratory support to patients who have difficulty breathing due to various reasons, such as lung infections, trauma, chronic obstructive pulmonary disease (COPD), or respiratory muscle weakness.

12. **Proposed** Objectives of the project

Oxygenation: The ventilator's main objective is to ensure adequate oxygenation of the patient's blood by delivering a controlled flow of oxygen-rich air into the lungs. This helps maintain sufficient oxygen levels in the body, supporting normal cellular function and preventing hypoxemia (low oxygen levels).

Ventilation: Mechanical ventilators assist with ventilation by controlling the flow of air in and out of the lungs. They help remove carbon dioxide (a waste product of metabolism) from the body, maintaining appropriate levels of carbon dioxide in the blood and preventing respiratory acidosis.

Respiratory Muscle Rest: Ventilators allow the patient's respiratory muscles to rest by taking over the work of breathing. This can be particularly important in cases of respiratory muscle fatigue or weakness, allowing the patient to recover and regain strength.

13. **Methodology planned for the proposed objectives**:

A choice to identification patients quicker while not minimizing the gap between the patient and a hospital would be to use sensors that may be worn on the body, which might monitor the health standing of the person and supply the user similarly because the doctor with timely insights into totally different health parameters

14. **Expected output of the project:**
A portable mechanical ventilator which helps patient's breath and it is available at low cost and helps meet the demand of scarcity of ventilators. Easily affordable even by the poor.

15. **Work plan:***(detailing time schedule for each proposed objective may clearly be indicated.)*:

Objective 1 – *6 month*
Objective – *6 month*

16. **Expected impact/ outcomes:**

To help a person breathe when they find it difficult or are unable to breathe on their own. A mechanical ventilator pushes airflow into the patient's lungs to help them breath

17. **Suggested post project activities: Field testing with patients**

18. **Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):**Using the device in hospitals and research centres

19. **Budget estimates: (Please provide details in each item)**

Sl. No.	Items	Amount in Rs.
29.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	5000
30.	Travel (details required)	6000

31.	Labour cost (detailed breakup)	1000
32.		
	Total	12000

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:

DESIGN AND FABRICATION OF PORTABLE MECHANICAL VENTILATOR FOR MEDICAL APPLICATIONS

22. I/We agree to abide by the terms and conditions of TOCE
23. I/We did not submit this or a similar project proposal elsewhere for financial support.
24. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of Student

Hemanth Kumar J- 1OX18ME018

Sushanth K Shetty- 1OX18ME048

Manoj H C - 1OX18ME024

Gurudutt K S - 1OX18ME014

Date: 14-05-2022

Place:……

RECOMMENDATION

G. M. Reddy

Head of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:13-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student:**

   Manish chandran bm -1OX17ME022

   Dilip v - 1OX17ME013

   Harsha k - 1OX17ME017

   Neppala rohith - 1OX17ME034

2. **Branch/ Semester/: 7th Sme**
3. **Project Title:**Design and fabrication of carbondioxide recovery system for domestic and automobile applications
4. **Abstract:**The system adopts Direct Air Capture (DAC) method to remove the CO2 concentration from the atmosphere air. The End products are further processed and supplied as supplements in manufacturing of synthetic fuel.
5. **Duration of the Project: 1 Year**
6. **Total cost of the project:**14000
7. **Faculty Supervisor Details:**Nagaraja T V

TECHNICAL DESCRIPTION

8. **Description of the problem:(150 words)**

   Carbon dioxide (CO2) recovery system for domestic and automobile applications is a technology designed to capture and utilize CO2 emissions produced by various sources, such as residential homes and vehicles. The primary goal of this system is to reduce greenhouse gas emissions and mitigate the impact of climate change.

   In a domestic setting, the CO2 recovery system typically involves capturing CO2 emissions generated from heating systems, combustion processes, or other household activities. The system incorporates specialized equipment and techniques to capture the CO2, separate it from other gases, and store or utilize it for various purposes.

9. **Review of work done: (250 words)**

   Efficiency: The efficiency of the CO2 recovery system is crucial in terms of capturing a significant proportion of the emitted CO2. High capture efficiency ensures effective reduction of greenhouse gas emissions and maximizes the potential for utilization or storage.

   Technological Advances: Advances in capture, separation, and purification technologies play a vital role in enhancing the performance and cost-effectiveness of CO2 recovery systems. Innovations in materials, catalysts, and process design can contribute to improving system efficiency, durability, and scalability.

10. **Rationale for taking up the project: (150 words)**

    Climate Change Mitigation: Carbon dioxide is one of the primary greenhouse gases responsible for global warming and climate change. By capturing and recovering CO2 emissions, these systems help reduce the amount of CO2 released into the atmosphere, thereby mitigating the environmental impact and working towards global emission reduction goals.

Environmental Responsibility: Implementing CO2 recovery systems demonstrates a commitment to environmental responsibility. By actively taking steps to capture and utilize or store CO2 emissions, individuals, households, and automotive industries contribute to reducing their carbon footprint and minimizing their impact on the environment

11. Proposed Objectives of the project

To Design and fabricate a system that are economical & efficient carbon dioxide recovery system

12. Methodology planned for the proposed objectives:

Source Identification: Identify the source of CO2 emissions, such as industrial processes, power plants, or other large-scale emission points.

Capture Technology Selection: Select an appropriate CO2 capture technology based on the characteristics of the emission source. Common capture technologies include post-combustion capture, pre-combustion capture, and oxyfuel combustion.

Capture Process: Implement the selected capture technology to separate CO2 from flue gas or other emission streams. This typically involves using solvents, membranes, or adsorbents to selectively capture CO2 while allowing other gases to pass through.

Compression: Once the CO2 is captured, it needs to be compressed to a higher pressure for transportation and storage. Compression reduces the volume and increases the density of CO2, making it more manageable for subsequent steps

13. Expected output of the project:

- Reduce in emission of greenhouse gases
- Reduces climate changes.
- Reduces air pollution and respiratory disease.
- It keeps CO2 concentration stabilized in atmosphere

14. Work plan:*(detailing time schedule for each proposed objective may clearly be indicated.)*:

Design of device – 6 month
Analysis and fabrication of the device – 6 month

15. Expected impact/ outcomes:

- It is mainly used in industries emitting enormous amount of carbon dioxide.
- Another source of carbon dioxide release is from automobiles so this system can be used in automobiles to reduce release of co2

16. Suggested post project activities: Field testing of thedevice in market

- Field testing of the device for different industrial purpose majorly automotive applications

17. Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):

It can also be used in houses where this system can be fixed near exhaust fans to reduce co2 release to atmosphere.
SO device can be utilized for patent, commercialization process

18. Budget estimates: (Please provide details in each item)

Sl. No.	Items	Amount in Rs.
33.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	6000
34.	Travel (details required)	6000
35.	Labour cost (detailed breakup)	2000
36.		

	Total	14000

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:

Design and fabrication of carbondioxide recovery system for domestic and automobile applications

25. I/We agree to abide by the terms and conditions of TOCE
26. I/We did not submit this or a similar project proposal elsewhere for financial support.
27. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of Student

Manish chandran bm -1OX17ME022

Dilip v - 1OX17ME013

Harsha k - 1OX17ME017

Neppala rohith - 1OX17ME034

Faculty

Nagaraja T V

Date: 13-05-2022

Place:……

RECOMMENDATION

G. M. Reddy

Head of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:12-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student:**

   Avaniesh Sriijith - 1OX17ME009

   Marthanda rao-1OX17ME027

   Kiran K S -1OX17ME021

   Chandan M -1OX17ME012

2. **Branch/ Semester/: 7th sem, Mechanical Engineering**
3. **Project Title:**Real time pressure monitoring system using FBG sensor for sports and rehabilitation applications
4. **Abstract:**

   The Foot Pressure Monitoring System is an innovative technological solution aimed at analysing and monitoring the pressure distribution on the foot during various activities. This system offers valuable insights into the biomechanics of the foot, which can aid in diagnosing and preventing foot-related conditions and injuries

5. **Duration of the Project: 1 Year**
6. **Total cost of the project: 10000**
7. **Faculty Supervisor Details: Anup M Upadhyaya**

TECHNICAL DESCRIPTION

8. **Description of the problem:(150 words)**
   The Foot Pressure Monitoring System consists of a specialized sensor array integrated into a wearable insole or foot mat. The sensors are strategically placed to measure the pressure exerted on different regions of the foot. These sensors can detect both static and dynamic pressure variations and accurately capture the foot's pressure distribution during walking, running, or other physical activities.

   The sensor data is collected and transmitted wirelessly to a central processing unit, which performs real-time analysis and generates visual representations of the pressure distribution. Advanced algorithms are employed to interpret the data and provide valuable metrics such as peak pressure points, pressure-time graphs, and pressure mapping images. These metrics can help healthcare professionals, athletes, and researchers in assessing gait abnormalities, foot posture, and identifying potential areas of high pressure that may lead to foot ulcers or injuries.

9. **Review of work done: (250 words)**

   Sensor Technologies:
   Several studies have explored different sensor technologies used in foot pressure monitoring systems. Capacitive, resistive, and piezo resistive sensors are commonly employed due to their ability to measure pressure accurately. Al-Diri et al. (2017) compared different sensor types and highlighted the importance of sensor accuracy, resolution, and repeatability for reliable foot pressure measurements.

   Data Analysis Techniques:

Advanced data analysis techniques are crucial for extracting meaningful insights from foot pressure data. Machine learning algorithms have been widely used to classify gait patterns, identify pressure peaks, and detect abnormalities. Zhang et al. (2018) proposed a deep learning-based method to recognize foot pressure patterns for gait analysis, achieving high accuracy in classifying different walking conditions.

Applications in Clinical Practice:
Foot pressure monitoring systems have found significant applications in clinical settings. They have been utilized for diagnosing foot pathologies, such as diabetic foot ulcers, plantar fasciitis, and Charcot foot. Coert et al. (2018) conducted a study on diabetic foot patients and demonstrated the effectiveness of pressure monitoring in predicting foot ulcers, enabling early intervention and prevention

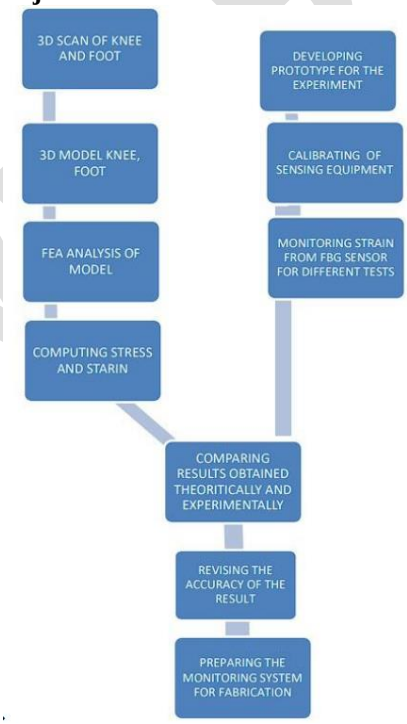
10. **Rationale for taking up the project: (150 words)**
Foot Health Assessment: Foot pressure monitoring systems enable healthcare professionals to assess foot health and identify potential issues. By analysing the pressure distribution, these systems can detect abnormal foot mechanics, high-pressure areas, and gait abnormalities that may lead to foot ulcers, plantar fasciitis, or other foot-related conditions. Early detection and intervention can prevent the progression of such conditions and improve overall foot health.

Diagnosing Foot Pathologies: Foot pressure monitoring systems play a vital role in diagnosing and managing foot pathologies. For example, in patients with diabetes, foot ulcers are a significant concern. By monitoring foot pressure, healthcare providers can identify areas of excessive pressure that could potentially lead to ulcer formation. This information allows for proactive treatment and preventive measures, reducing the risk of complications

11. **Proposed** Objectives of the project

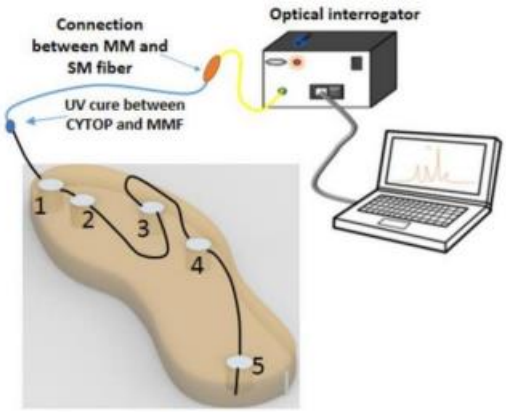
Design and development of FBG sensor based foot pressure monitoring system

12. **Methodology planned for the proposed objectives**:



13. **Expected output of the project:**
In order to enable the physician and OA patients to manage the rehabilitation progress, a system will be developed that can identify the type of exercise movement the user performed and detect deviations from the correct exercise movement, which can allow OA patients to take the full benefit of rehabilitation exercises.

14. **Work plan:***(detailing time schedule for each proposed objective may clearly be indicated.)*:



Proposed Model

15. **Expected impact/ outcomes:**

Osteoarthritis is a degenerative disease that worsens over time, often resulting in chronic pain. It often occurs in older individuals mostly over the age of 50. This wearable smart belt for the knee and the mobile foot plantar sensor will help the physiotherapist determine the progress of the patient

16. **Suggested post project activities:**

Field testing with patients

17. **Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):**

Device can be patented for commercialization

18. **Budget estimates: (Please provide details in each item)**

Sl. No.	Items	Amount in Rs.
37.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	5000
38.	Travel (details required)	4000
39.	Labour cost (detailed breakup)	1000
40.		
	Total	10000

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:

Real time pressure monitoring system using FBG sensor for sports and rehabilitation applications

28. I/We agree to abide by the terms and conditions of TOCE
29. I/We did not submit this or a similar project proposal elsewhere for financial support.
30. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of Student

Avaniesh Sriijith - 1OX17ME009

Marthanda rao-1OX17ME027

Kiran K S -1OX17ME021

Chandan M -1OX17ME012

Date: 12-05-2022

Place:……

RECOMMENDATION

G. M. Reddy

Head of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:12-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student:**

   Harshit D – 1OX18ME015

   Ranjit Kumar – 1OX18ME038

   Jackson – 1OX18ME020

   Bharath Kumar S – 1OX18ME009

2. **Branch/ Semester/: 7th Sem , Mechanical Engineering**

3. **Project Title:**Design and realization of 3D printed pulse monitoring probe.

4. **Abstract:**The project aims to design and implement a portable and user-friendly pulse monitoring probe that can accurately capture and analyse pulse signals in real-time. The probe utilizes advanced sensor technologies to detect arterial pulsations and extract vital information related to heart rate, pulse waveform, and other relevant parameters

5. **Duration of the Project: 1 Year**

6. **Total cost of the project: 10,000**

7. **Faculty Supervisor Details: Anup M Upadhyaya**

TECHNICAL DESCRIPTION

8. **Description of the problem:(150 words)**

   Invasive Monitoring Techniques: Traditional pulse monitoring methods often require invasive procedures such as arterial catheterization or electrode placement, which can be uncomfortable for patients and increase the risk of complications. The project aims to develop a non-invasive probe-based device that eliminates the need for invasive techniques while maintaining accurate and reliable pulse measurements.

   Lack of Portability and Convenience: Many existing pulse monitoring devices are bulky, tethered to external equipment, or require complex setup processes. These limitations hinder the ease of use and portability of the devices, making continuous monitoring challenging. The project seeks to design a portable and user-friendly pulse monitoring probe that can be easily integrated into daily routines without causing inconvenience or discomfort.

9. **Review of work done: (250 words)**

   The following literature review provides an overview of key studies and research conducted on pulse monitoring probes. These probes play a crucial role in non-invasive and continuous monitoring of pulse signals, enabling accurate assessment of heart rate, pulse waveform, and other vital parameters. The review covers various aspects, including probe design, sensor technologies, signal processing techniques, applications, and advancements in pulse monitoring probes.

   Probe Design:

   Research has focused on developing compact and ergonomic pulse monitoring probes that offer user-friendly operation and optimal contact with the pulse site. Ergonomics plays a crucial role in ensuring comfort and minimizing motion artifacts. Kim et al. (2016) proposed a finger-mounted pulse monitoring probe that featured a lightweight design and adjustable straps for secure attachment, ensuring reliable and comfortable pulse measurements.

   Several studies have explored different sensor technologies used in pulse monitoring probes. Optical sensors, such as photo plethysmography (PPG), are commonly used due to their ability to measure changes in blood volume and detect

pulsatile signals. Piezoelectric sensors are also employed for capturing pressure changes associated with arterial pulsations. Lin et al. (2020) compared different sensor technologies for pulse monitoring and highlighted the advantages and limitations of each

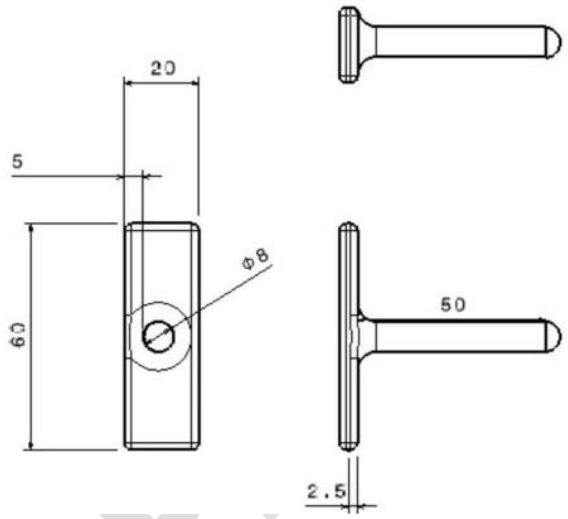
10. **Rationale for taking up the project: (150 words)**

11. **Proposed** Objectives of the project
    The importance of a pulse monitoring probe lies in its ability to provide accurate and non-invasive measurements of pulse signals, which carry vital information about cardiovascular health and overall well-being. Here are some key reasons why pulse monitoring probes are important:

    Early Detection and Monitoring of Cardiovascular Conditions: Pulse monitoring probes enable healthcare professionals to assess heart rate and pulse waveform characteristics, which are important indicators of cardiovascular health. By continuously monitoring pulse signals, abnormalities such as arrhythmias, irregularities in heart rate, or changes in pulse wave morphology can be detected early. This allows for timely intervention, diagnosis, and treatment of various cardiovascular conditions.

12. **Methodology planned for the proposed objectives**:

The embodiment is designed in Catia V5 software and to be fabricated using 3D printer using PLA+ Material at its respective temperature settings, Once the device is fabricated the device is said to be ready to use once sensor set up is done. Volunteers will be classified in following order Age, Gender, candidates with respect to different structure and the result will be tabulated for comparative for further study.



13. **Expected output of the project:**
    Development of a Functional Pulse Monitoring Probe: The primary outcome of the project is the successful development of a functional pulse monitoring probe. This includes designing and building a probe that can accurately and reliably measure pulse signals, incorporating appropriate sensors, signal processing algorithms, and user-friendly features.

    Accurate Pulse Signal Measurement: The pulse monitoring probe should be capable of accurately measuring pulse signals, including heart rate, pulse waveform characteristics, and other relevant parameters. The expected outcome is a probe that provides precise and consistent pulse measurements, even in various conditions and environments

14. **Work plan:***(detailing time schedule for each proposed objective may clearly be indicated.)*:
    Design of the system – *6 month*
    Analysis and implementation – *6 month*

15. **Expected impact/ outcomes:**
    Device will be used for different conditions in medical field
16. **Suggested post project activities:**

    Field testing with patients and upgrading the device in research centre

17. Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):

Field testing, patent and commercialization

18. Budget estimates: (Please provide details in each item)

Sl. No.	Items	Amount in Rs.
41.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	5000
42.	Travel (details required)	4000
43.	Labour cost (detailed breakup)	1000
44.		
	Total	10,000

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:

Design and realization of 3D printed pulse monitoring probe.

31. I/We agree to abide by the terms and conditions of TOCE
32. I/We did not submit this or a similar project proposal elsewhere for financial support.
33. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of Student

Harshit D – 1OX18ME015

Ranjit Kumar – 1OX18ME038

Jackson – 1OX18ME020

Bharath Kumar S – 1OX18ME009

Date: 12-05-2022

Place:……

RECOMMENDATION

G. M. Reddy

Head of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:13-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student: Abhishek Gopalakrishna Bhat - 1OX19EC001**

   Rakesh B R - 1OX19EC061

   Sindhu S- 1OX91EC076

   Revathi S - 1OX19EC062

2. **Branch/ Semester/ Electronics and Communication Engineering - 8th Sem**

3. **Project Title: Integration of multiple bank cards into single, smart and secure card**

4. **Abstract: In present world, everyone have multiple bank accounts and multiple ATM cards for money transaction. The idea behind this fintech project is to embed more than one bank account into single smart card so that user can transact as he/she wishes with single swipe.It provides the user one level higher convenience for accessing multiple accounts. It mainly addresses the challenge of carrying multiple cards for operating and accessing multiple bank accounts of the customers.**

5. **Duration of the Project: 6 months**

6. **Total cost of the project: 5,000**

7. **Faculty Supervisor Details: Dr.Manju Devi (Head Of the department, ECE)**

TECHNICAL DESCRIPTION

8. **Description of the problem: (150 words)**

Presently, customer has to carry multiple bank cards for any transaction to be carried out especially in merchant establishment which is cumbersome. Increased risk of overspending, difficulty in keeping track of rewards,higher fees and interest rates,risk of fraud and identity theft are the complexities facing by having multiple cards.And also May make it difficult to find a specific receipt because receipt may deteriorate over time and not environmentally friendly.

9. **Review of work done: (250 words)**

This project reviewed by ECE department faculties as well as Head of the department.They provided positive feedback about the idea behind this project and also suggested to take over the project further for patent and even for startup.

10. **Rationale for taking up the project: (150 words)**

Presently, Customer has to carry multiple bank cards for any transaction to be carried out, especially in a merchant establishment. At POS terminal, User has to enter the PIN of four digits for that particular card in the next immediate step for the purpose of authentication. If the PIN is entered incorrectly more than three times that particular card will be blocked for some time. If the PIN is verified user can select particular transaction which he wants. It is difficult to remember PIN for all bank cards and takes considerable space in wallet to carry multiple cards. Some people used to write their PIN and password on some paper or diary which is not at all secure. As, it can be easily attacked and hacked by someone, resulting in the account holder can suffer .In the merchant shop, customer gets a bill for purchased items in the paper format, if they need it for future reference it may not easily available for them. In the existing method, merchant may feel difficult to track the users who are constantly buy the products and also analyzing the graph of product purchasing rate.

11. Proposed Objectives of the project

Integrating multiple bank cards into single, secured and smart cards so the customer can carry a single smart card for all his day-to-day transactions.

1. Instead of remembering PINs for each and every card, user can remember a single PIN (Personal Identification Number) for a single smart card .

2. If the user wants to select a primary card from his multiple bank card, he can select the card at the time of transaction initially.

3. If there are insufficient funds in his primary card, he can select the secondary card for his transaction.

4. By using a single smart card transaction cost can be reduced that is free from paying extra charges for using multiple bank cards.

5. The smart card can provide real-time transaction monitoring, allowing users to keep track of their transactions and detect fraudulent activities immediately. This feature will enhance the user's control over their financial transactions and provide a sense of security.

6. The smart card can offer digital bill payment options, allowing users to access their bills through their mobile devices and pay them directly from their smart card. This feature will streamline the bill payment process and eliminate the need for paper bills.

7. Merchants through their mobile application can track their monthly analytics of sales and restock their supplies with more accurate sales analytics.

8. Users on the other hand can keep track of their bank balance from different account easily and manage their expenses.

12. Methodology planned for the proposed objectives:

What if there was one card that could replace all the cards that we carry in our wallet ? To overcome the drawbacks of the existing system, the proposed system aims to give a change in the existing system by integrating multiple cards into one single card. Users can now carry one single card instead of carrying all the cards with them. Users can integrate multiple bank accounts like IOB, CANARA, HDFC etc. into a single card and access them with a unique PIN or a global PIN for all accounts. The associated mobile application makes tracking and budgeting easier as the application consolidates spending history across all accounts. In this system based technology is used for entire transaction to be carried out. When he/she swipes the card in merchant establishment, then user gets a push notification in mobile application to make payment and user opens the application through lock pattern or password for and once he/she gets the bill with amount, user clicks on the pay button as a result a request sent to issuer's bank for transaction process .By integrating our mux server with payment gateway enhances the security of the card.Users can also select the primary card according to their wish and they can limit card accessibility by enabling and disabling the card. The proposed system for integrating multiple bank cards into a single card not only reduces the number of cards that users need to carry, but it also eliminates the need to remember multiple PINs or passwords associated with each card. This simplifies the payment process and makes it more convenient for users. Moreover, by integrating all the bank accounts into one single card, the proposed system can reduce the chances of fraud or theft as users need to keep track of only one card instead of several. Additionally, the associated mobile application can provide real-time notifications and alerts for any suspicious activity, which can help users to identify and report any fraudulent transactions quickly. Another significant benefit of this system is that it promotes financial inclusion by allowing users to access multiple bank accounts with a single card. This can be particularly useful for people living in rural areas or those who do not have easy access to banking facilities. With this system, users can manage their finances more efficiently and make transactions without the need for physical cash. Lastly, the implementation of this system can also benefit merchants by reducing the cost of transaction fees associated with accepting multiple payment methods. By accepting payments through a single card, merchants can simplify their payment process and reduce transaction costs, ultimately increasing their revenue.

13. Expected output of the project:

As per proposed technology, the user and merchants can effectively communicate with each other through the mobile application. Initially, the user needs to register by providing name, email, password and contact details. Once the registration is done, the user needs to login by providing the email id and password and results in login success. The user enter to the home page, where the user can add the card by providing card details like card number, card holder name, expiration date. Once the card is added, the card can set as a primary card for entire transaction, if there is insufficient funds in the primary card he/she can set secondary card as primary card. If the user wants to change their personal details, can change in profile section. For the merchant, the merchant needs to register by providing name, email, password and contact details. In merchant home, he/she needs to provide the business store name, and by visiting stripe payment gateway website gets the stripe publishable key and secrete key, completes the registration process. When the user taps the RFID card, the card reader reads the card id. The card details like card number, card holder name and expiration date are mapped in database to new id. The mobile application contains the user login, register page to initiate user authentication for the first time. When the user taps the card, the card reader reads the card and sends merchant id (embedded)and card id to the ESP8266.ESP8266, a

wi-fi module sends an http request with card id to the server to fetch particular details of the user which is stored during user authentication. So the user gets an push notification to make payment from merchant site. When the user clicks on push notification, he/she need to enter the pin to open the mobile application. The billing details and amount need to pay page leads the user to make the payment by clicking the pay button. This will lead to stripe payment gateway which ensures the secured transaction by providing the tokenization to avoid breaching of card details like card number, card holder name and expiration date. Then the user needs to enter OTP for payment gateway to proceed transaction. If the payment successful, user gets message as transaction successful otherwiserepeat the payment process again.

14. Work plan: *(detailing time schedule for each proposed objective may clearly be indicated.)*:

Hardware Setup - 1month

Mobile application - User Interface - 2.5 months
- User Experience (Backend) - 2months

Hardaware and software connection setup - 15days

15. Expected impact/ outcomes:

As per proposed technology, the user and merchants can effectively communicate with each other through the mobile application. Initially, the user needs to register by providing name, email, password and contact details. Once the registration is done, the user needs to login by providing the email id and password and results in login success. The user enter to the home page, where the user can add the card by providing card details like card number, card holder name, expiration date. Once the card is added, the card can set as a primary card for entire transaction, if there is insufficient funds in the primary card he/she can set secondary card as primary card. If the user wants to change their personal details, can change in profile section. For the merchant, the merchant needs to register by providing name, email, password and contact details. In merchant home, he/she needs to provide the business store name, and by visiting stripe payment gateway website gets the stripe publishable key and secrete key, completes the registration process. When the user taps the RFID card, the card reader reads the card id. The card details like card number, card holder name and expiration date are mapped in database to new id. The mobile application contains the user login, register page to initiate user authentication for the first time. When the user taps the card, the card reader reads the card and sends merchant id (embedded)and card id to the ESP8266.ESP8266, a wi-fi module sends an http request with card id to the server to fetch particular details of the user which is stored during user authentication. So the user gets an push notification to make payment from merchant site. When the user clicks on push notification, he/she need to enter the pin to open the mobile application. The billing details and amount need to pay page leads the user to make the payment by clicking the pay button. This will lead to stripe payment gateway which ensures the secured transaction by providing the tokenization to avoid breaching of card details like card number, card holder name and expiration date. Then the user needs to enter OTP for payment gateway to proceed transaction. If the payment successful, user gets message as transaction successful otherwiserepeat the payment process again.

16. Suggested post project activities:

17. Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.): patent

18. Budget estimates: (Please provide details in each item)

Sl. No.	Items	Amount in Rs.
45.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	2000
46.	Travel (details required)	3000
47.	Labour cost (detailed breakup)	
48.		
	Total	5000

UNDERTAKING FROM THE INVESTIGATOR

PROJECT TITLE:

Integration of multiple bank cards into single, smart and secure card

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.....

34. I / We agree to abide by the terms and conditions of TOCE
35. I / We did not submit this or a similar project proposal elsewhere for financial support.
36. I / We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of

Student Revathi S

Faculty

Date: **13-05-2022**……

Place: Bangalore…….

RECOMMENDATION

Head Of the Department:

Professor & HOD of E&C Engineering
The Oxford College of Engineering
Bommanahalli, Bangalore-560 068.

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission: 18.05.2022

GENERAL INFORMATION

1. **Name and USN of the Student:Divya G (1OX19EC017), Arunachalam (1OX19EC006), Bhoomika B.M (1OX19EC008)**
2. **Branch/ Semester/ : B.E/8th semester**
3. **Project Title:Hand Balance Monitoring System for measuring amount of disorderness in stroke patient**
4. **Abstract:**Theelectronicsofthesystemisanembeddedsystembasedonmicrocontrollerlike NODE-MCU whichis anprototypeboard.We are using a metal cup below which a sensor is placed for detection.The measured angles are displayed on OLED.Necessary rehabilitation is suggested by physiotherapists.
5. **Duration of the Project:6 months**
6. **Total cost of the project: Rs. 9500/-**
7. **Faculty Supervisor Details:Mr. Jayaraj N, Asst. Professor, ECE & Dr. Preeta Sharan, Professor & Dean R & D, ECE**

TECHNICAL DESCRIPTION

8. **Description of the problem:(150 words)**

Early treatment and rehabilitation after a stroke can improve recovery and many peopleregain a lot of abilities.The most common types of disability after stroke are changes to speech, learningand understanding, and weakness or paralysis on one side of the body.Hence a system that accurately measures the angle displacement and muscle imbalanceis developed in this project.

Using accelerometer provides angle along the 3 axis and is displayed in terms of row ,pitch and yaw axis.Angular rotation of the hand is computed using gyroscope sensors .

Given that several drugs have been developed to control motor symptoms, highly sensitive scales for clinical evaluation of drug efficacy are needed. The first smart device prototype, the design of which contains various sensors that collect information about its orientation, the liquid level, its position compared to a reference target and tremors.

The problem at hand is to develop a hand balance monitoring system that can accurately measure the amount of disorderliness in a person's hand movements. This system aims to provide quantitative feedback on the level of coordination and stability exhibited by an individual while

performing tasks requiring hand dexterity, such as playing a musical instrument, performing surgery, or operating complex machinery.

The existing methods for assessing hand coordination and stability rely heavily on subjective evaluations by trained professionals. These evaluations are often prone to human bias and can lack the precision required for accurate measurement. Therefore, there is a need for an objective and automated system that can provide an unbiased assessment of hand balance and detect any abnormalities or disorders.

The hand balance monitoring system should be able to capture and analyze various parameters related to hand movements, such as tremors, jerks, speed, accuracy, and overall coordination. It should provide real-time feedback to the user, indicating the level of disorderliness and suggesting corrective measures if necessary.

By developing a reliable and accurate hand balance monitoring system, individuals can gain valuable insights into their hand coordination and stability. This system can be utilized in medical and rehabilitation settings, as well as by individuals who want to improve their hand dexterity skills for specific tasks.

9. Review of work done: (250 words)

Our project aims to monitor the muscle imbalance continuously by using a system developed by sensors measuring the three-axis angles using gyroscope and accelerometer. A smart device will be developed in order to provide information on a patients arm and hand motor activities during ADLs (drinking coffee in the morning, drinking water during lunch, etc.

10. Rationale for taking up the project: (150 words)

A hand balance monitoring system could potentially be used to measure the amount of disorderliness in a person's hand movements. One possible solution would involve using sensors to detect the movement and position of the hand, and then analyzing this data to determine the level of coordination and balance

11. Proposed Objectives of the project

The objectives of the project include- to create a spill detecting cup having three-axis sensors to provide a daily measurement database of stroke patients and physically challenged to a physiotherapy doctor, to provide feedback for day to day improvement to increase confidence and encourage for active participation of affected people.

12. Methodology planned for the proposed objectives:

The information collected by device allows a therapist to assess a patients level of independence based on the daily task of drinking, both during therapy sessions and at home which increases the ability to improve on required angle based on exercise advised by the physiotherapists.

Here are the steps that could be followed to develop such a system:

Determine the appropriate sensors: There are many different types of sensors that could be used to detect hand movements, including accelerometers, gyroscopes, and flex sensors. The choice of sensor(s) will depend on the specific requirements of the system.

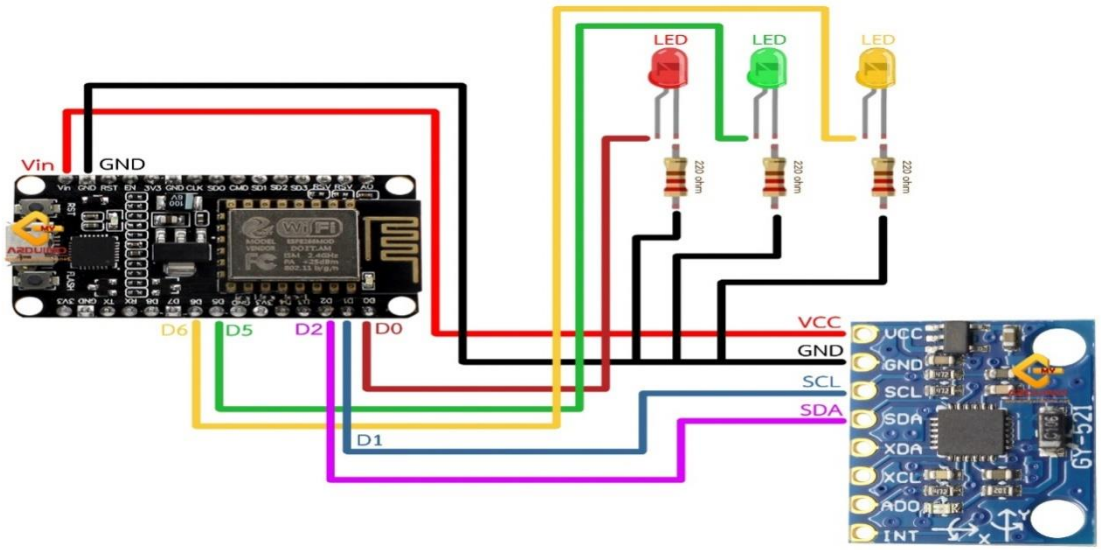
Design the sensor placement: The sensors will need to be placed on the hand in a way that allows them to accurately detect the movement and position of the hand. This may require some experimentation to determine the optimal sensor placement.

Develop the data collection and analysis software: The sensor data will need to be collected and analyzed in real time to determine the level of coordination and balance. This will likely involve developing custom software that can process the sensor data and provide meaningful feedback.

Test and refine the system: Once the system has been developed, it will need to be tested in real-world scenarios to determine its accuracy and reliability. Any issues that arise during testing can be addressed through software or hardware refinements.

Implement the system: If the system proves to be effective, it can be implemented in a variety of settings, such as physical therapy clinics or sports training facilities, to help people improve their hand coordination and balance.

Overall, developing a hand balance monitoring system that measures the amount of disorderliness in a person's hand movements would require a combination of hardware and software expertise, as well as an understanding of the specific needs of the target audience.



13. Expected output of the project:

The angle of deviation of handsin a stroke patient can be detected based on day to day improvement.

The day to day angle deviations are given to doctor,based on which the required exercise is suggested to the patient.

14. **Work plan:***(detailing time schedule for each proposed objective may clearly be indicated.)*:
The proposed method for a hand balancing monitoring system to measure the amount of disorderliness could involve the following steps:

1. Sensor Placement: Install sensors on the hand or wrist of the person performing the hand balancing exercise. These sensors can include accelerometers, gyroscopes, or any other suitable motion-tracking sensors.

2. Data Collection: The sensors will capture the motion and orientation data of the hand during the balancing exercise. This data will be collected continuously throughout the performance.

3. Data Processing: Process the collected data to extract relevant features that indicate the level of disorderliness. This could involve analyzing the acceleration, orientation, and angular velocity patterns of the hand.

4. Disorderliness Metric: Define a metric or algorithm that quantifies the level of disorderliness based on the extracted features. This metric should be able to differentiate between well-balanced and unstable hand positions.

5. Calibration and Training: Calibrate the system by collecting data from a group of individuals performing hand balancing exercises at varying levels of disorderliness. This data will be used to train the system and fine-tune the disorderliness metric.

6. Real-Time Monitoring: Implement the proposed method in a real-time monitoring system that can analyze the hand motion data in real-time during hand balancing exercises. This system should provide immediate feedback on the level of disorderliness to the user.

7. Feedback and Visualization: Present the disorderliness measurements to the user in a meaningful way, such as a numerical score or visual representation. This feedback can help the user adjust their hand position and technique to improve balance and reduce disorderliness.

8. Iterative Improvement: Continuously collect user feedback and refine the monitoring system based on the data collected. This iterative process will help enhance the accuracy and effectiveness of the system over time.

15. **Expected impact/ outcomes:**

This project aims to garner feedback about possible improvements to the functionalities of the cup, before testing it with post-stroke patients. The study also investigates the cup in terms of its usefulness, integration and acceptability to therapists. For this study, we made contact with health care professionals who worked in functional rehabilitation centres and medical centres. As these health care professionals work with stroke patients on a daily basis, we expected that they could offer recommendations and comments on holdable device functionalities. Their expectations for and feedback on holdable device were explored through semi-structured interviews.

16. Suggested post project activities:

Experiments with stroke patients and therapists during rehabilitation sessions and at home that will assess the acceptability and usability of the Holdable cup in more detail are currently planned. We are also planning to investigate the effectiveness of the measurements performed by the cup compared to clinical outcomes that monitor the recovery such as dynamometers or ARAT protocol. Finally, some information cannot be retrieved in the current design,such as the way in which the patient approaches the cup, for example.To overcome this limitation, it would be valuable to combine the cup with a smart garment. The field of smart textiles is growing rapidly, and the creation of a garment with embedded textile sensors to monitor the patients arm and chest configuration could provide relevant information about the period before the cup is grasped. We have already begun work on a smart garment incorporating conductive threads that is able to monitor elbow flexion using machine learning.

17. Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.): NIL

18. Budget estimates: (Please provide details in each item)

Sl. No.	Items	Amount in Rs.
49.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	4500/-
50.	Travel (details required)	0.00/-
51.	Labour cost (detailed breakup)	1000/-
52.	Report	1000/-
53.	Miscellaneous	500/-
	Total	7000/-

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:

Hand Balance Monitoring System for measuring amount of disorderness in stroke patient

37. I/We agree to abide by the terms and conditions of TOCE
38. I/We did not submit this or a similar project proposal elsewhere for financial support.
39. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of

Student

Faculty Mr. N. Jayaraj Dr. Preeta Sharan

Date: ……

Place:……

RECOMMENDATION

Head Of the Department:

Professor & HOD of E&C Engineering
The Oxford College of Engineering
Bommanahalli, Bangalore-560 068.

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:16-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student:Preetam Ambudkar (1OX19EC057), Utkarsh N (1OX19EC085), Tulasi Rathod (1OX19EC082), Yuktishree (1OX19EC092)**
2. **Branch/ Semester/: ECE/8th**
3. **Project Title:ExperimentalMeasurement of Limb Impairment for patients using sensors**
4. **Abstract:**

Thepalmisoneofthemostcomplex andbeautifulpiecesofnaturalengineeringinthehumanbody.Itgivesusapowerfulgripandallowsustomanipulatesmallobjectswithgreatprecision.Analysis of palm pressure distribution helps in revealing pressure between the palm impactforceonupperextremityimpairmentandthepalmpressuredevice.Inthisproject,twofactors,age and the gender of the human are taken into consideration. Therefore, this project isimportant to know the pressure distribution based on those two factors by using electricalsensorsandFBGsensors.Apalmpressuredeviceisadevicedesignedtomeasurethepressureapplied bythepalm.Itmaybeusedforavarietyofpurposes,suchasevaluatinghandstrength,assessing grip pressure, or providing feedback for hand rehabilitation exercises. The devicetypicallyconsistsofahandleorgripthattheuserholds,withsensorsortransducerstomeasurethe pressure applied. The output of the device may be displayed digitally or on a gauge, andmay also be recorded for later analysis. Some palm pressure devices may also have additionalfeatures, such as adjustable resistance or the ability to measure pressure at different points onthepalm.

5. **Duration of the Project:8 months**
6. **Total cost of the project:Rs. 8000/-**
7. **Faculty Supervisor Details: Dr. Preeta Sharan Mr. Jayaraj N**

TECHNICAL DESCRIPTION

8. **Description of the problem:(150 words)**

This project isimportant to know the pressure distribution based on those two factors by using electricalsensorsandFBGsensors.Apalmpressuredeviceisadevicedesignedtomeasurethepressureappliedbythepalm.Itmaybeusedforavarietyofpurposes,suchasevaluatinghandstrength,assessing grip pressure, or providing feedback for hand rehabilitation exercises. The devicetypicallyconsistsofahandleorgripthattheuserholds,withsensorsortransducerstomeasurethe pressure applied. The output of the device may be displayed digitally or on a gauge, andmay also be recorded for later analysis. Some palm pressure devices may also have additionalfeatures, such as adjustable resistance or the ability to measure pressure at different points onthepalm.

9. **Review of work done: (250 words)**

The below stages explain the Proposed Method in detail. Industrial major software tools for thedesign, modeling, and simulation of the device will be used to get better and more

accurateresults.Below is thelistof softwaretoolsand materials required forthis work are:

STAGE1:GETTHEHARDWAREANDSOFTWARE COMPONENTS.

STAGE2:MAKETHECATIAMODELREADY.

STAGE3:PRINTTHEMODELUSINGTHE3DPRINTER.

STAGE4:PROGRAMTHEARDUINO UNOR3.

STAGE5:INTEGRATETHECOMPONENTS.
STAGE6:THEDEVICEISREADY TOBEUSED.

10. Rationale for taking up the project: (150 words)

To know the pressure distribution based on those two factors by using electricalsensorsandFBGsensors

11. Proposed Objectives of the project

There are several potential applications for using the palm pressure device to measure limb impairment. For example, this device could be used in rehabilitation centers to monitor the progress of patients with limb impairments or to develop personalized rehabilitation plans based on real-time data. They could also be used in sports medicine to track athletes' performance and identify potential injuries.In the future, the palm device will likely continue to be developed and refined, enabling more accurate and comprehensive measurement of limb impairment. Additionally, the use of these sensors in combination with other technologies, such as machine learning algorithms and virtual reality systems, may allow for the development of more advanced rehabilitation and training programs.

12. Methodology planned for the proposed objectives:

Get the hardware and software components.

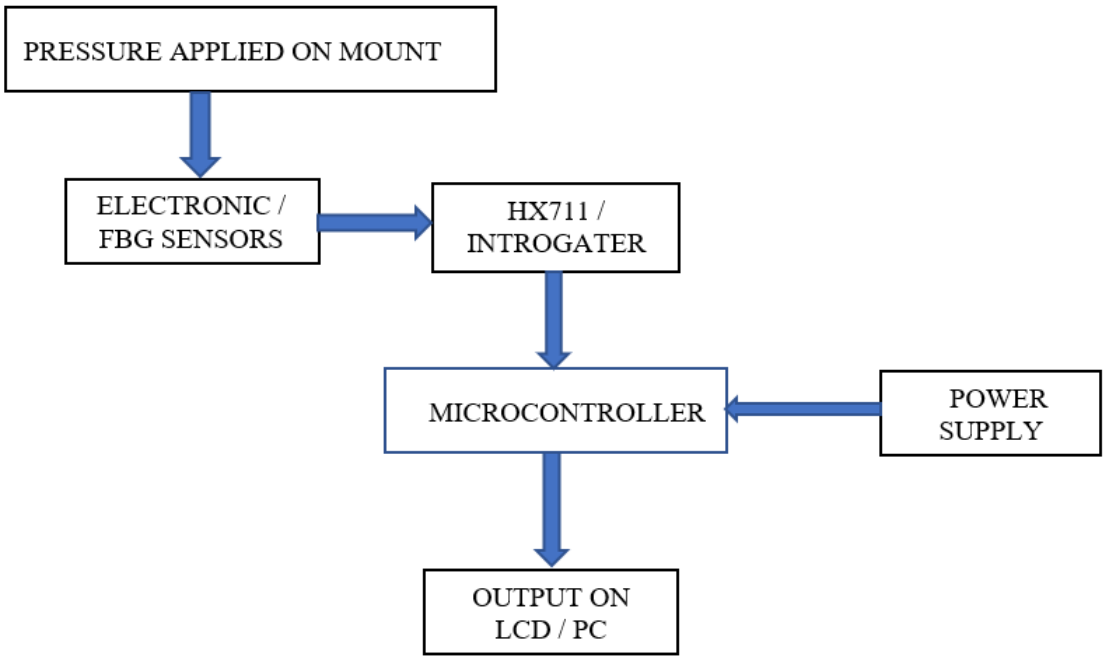
Make the Catia model ready.

Print the model using the 3D printer.

Program the Arduino UNO R3.

Integrate the components.

The device is ready to be used.



13. Expected output of the project:

The expected output for a palm-pressure device would be an improvement in grip strength.This can be measured by assessing the individual's ability to perform tasks that requiregripping,suchasholdingaspoonorbrush,orbyusingahand-helddynamometertomeasurethe amount of force the individual can apply with their grip. Additionally, improvements intheindividual's rangeofmotionand dexterityin theirhands mayalso beobserved.

14. Work plan:*(detailing time schedule for each proposed objective may clearly be indicated.)*:

15. Expected impact/ outcomes:

The most important outcome of this project is that the therapist will be able to know thepressureapplied by the sufferer(patient).Themeasurementofthepressureappliedbythesuffererhelpsthetherapistknowtheamou ntofdamagethat occurredin the sufferer'spalm or lower limbor upper limb.This device can also be used for knowing the periodic evaluation of the improvement in thedamagethat has occurredin thepalmor lower limb or upper limb.Apalm-pressuredeviceisadevicethatisdesignedtohelpindividualswithlimbimpairmentimprove theirgripstrength.Thistypeofdeviceistypicallyusedbyindividualswithconditions such as arthritis, multiple sclerosis, or spinal cord injuries that affect the handsandfingers.

16. Suggested post project activities:

The future scope of palm pressure devices is vast and includes applications in variousfields such as healthcare, sports, gaming, virtual reality, prosthetics, robotics, rehabilitation,and smart homes.

These devices have the potential to revolutionize the way we interact withtechnologyand improve our quality of life.

17. Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.): Yes

18. Budget estimates: (Please provide details in each item)

Sl. No.	Items	Amount in Rs.
54.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	4500/-
55.	Travel (details required)	1250/-
56.	Labour cost (detailed breakup)	750/-
57.	Report	1000/-
58.	Miscellaneous	500/-
	Total	8,000/-

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:

ExperimentalMeasurement of Limb Impairment for patients using sensors

40. I/We agree to abide by the terms and conditions of TOCE
41. I/We did not submit this or a similar project proposal elsewhere for financial support.
42. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of

Student

Faculty Dr. Preeta Sharan

Date: ……

Place:……

RECOMMENDATION

Professor & HOD of E&C Engineering
The Oxford College of Engineering
Bommanahalli, Bangalore-560 068.

Head of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:17-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student:**QHADER PASHA (1OX20EC404)
2. **Branch/ Semester/ ECE, 8**
3. **Project Title:**Food Spoilage Prediction and Quality Monitoring System Using IOT
4. **Abstract:**
5. **Duration of the Project:1 Year (2022-23)**
6. **Total cost of the project: 6750/-**
7. **Faculty Supervisor Details: Prajwalasimha S N**

TECHNICAL DESCRIPTION

8. **Description of the problem:**The proposed system is based on IOT which is a recognized prototyping board which isλ interfaced with different sensors The scope of the proposed system can be expanded by including more products likeλ dairy, fruits
9. **Review of work done:**The electronics of the system is an embedded system based on microcontroller like Arduino UNO which is an prototyping board. The Arduino board is interfaced with gas sensors like MQ3 to distinguish smell. The web switch which is a web modem connects the Arduino board to web net.
10. **Rationale for taking up the project:**The early detection of the gases from different food items like ammonia, methane etc can help the gas sensor are able to detect gas emission from food items even before the presence of any visible sign of spoilage. The consumer gets the information about the food item wherein he can monitor theλ perish ability of that food item. This will help in maintenance of health and prevents the consumer from consuming badλ food.
11. **Proposed** Objectives of the project: One of the main objectives of the food spoiler detector is that it will detect the gas released from the spoiled food and tell the user that the food is spoiled and take a look over food.
12. **Methodology planned for the proposed objectives**:The microcontroller board Arduino Uno along with food detection sensor MQ3 senses the gases coming out from the rotten food. The signal is transferred through a Wi-Fi device ESP 8266 AS. The signals are sent to the user through a server. The Arduino board is interfaced with gas sensors like MQ3 to distinguish smell. The web switch which is a web modem connects the Arduino board to web net.
13. **Expected output of the project:**The early detection of the gases from different food items like ammonia, methane etc can help the gas sensor are able to detect gas emission from food items even before the presence of any visible sign of spoilage.
14. **Work plan:**1/6/2022 to 31/12/2022 -Hardware Design and Development

    1/1/2023 to 31/3/2023-Software Design and Development

15. **Expected impact/ outcomes:**The consumer gets the information about the food item wherein he can monitor the perish ability of that food item. This will help in maintenance of health and prevents the consumer from consuming badλ food.

16. **Suggested post project activities**: Design and Development of model in large scale**.**

17. **Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):**Planning to file patent after the development of prototype

18. **Budget estimates: (Please provide details in each item)**

Sl. No.	Items	Amount in Rs.
59.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	4500/-
60.	Travel (details required)	750/-
61.	Labour cost (detailed breakup)	1500/-
62.		
	Total	6750-

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:Food Spoilage Prediction and Quality Monitoring System Using IOT

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43. I/We agree to abide by the terms and conditions of TOCE
44. I/We did not submit this or a similar project proposal elsewhere for financial support.
45. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of Faculty:

Date: ……

Place:Bangalore

RECOMMENDATION

Professor & HOD of E&C Engineering
The Oxford College of Engineering
Bommanahalli, Bangalore-560 068.

Head Of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:15-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student:**MOHANRS (1OX19EC046), RAHULREDDYD (1OX19EC060), SAGARKM (1OX19EC064), VIJETHB (1OX19EC089)
2. **Branch/ Semester/: ECE/ 8TH SEM**
3. **Project Title:SmartsecurityandhomeassistivedeviceforPhysicallyChallengedandAgedPeople**
4. **Abstract:**

This project can be used to replace the old conventional lock and key system with a GSMmodel. The keys usedin the old locking/unlocking system are replacedwith the passcodeand smart tag. The GSM module used in this project can lock or unlock the door using apasscode as the first level of verification and presenting the smart tag as the second level ofverification. Even if the smart tag is lost, if the passcode is forgotten or even if we are farfromthesystemthesameGSM modelcan beusedtolock/unlock the door. Along with replacing the old conventional lock and key system. This project can be used tohelp people with disability and aged people. So, there's no need for them to move from thereplace to check who's at the door. Instead, they can access the system from the place they areat and lock or unlock the door. Also, they can use the camera for surveillance and themicrophonefor communicate. The complete system is connected to a smartphone through which the physically challengedandaged peoplecan command the system to lock or unlock thedoor.

5. **Duration of the Project: 6 Months**
6. **Total cost of the project:Rs. 8500**
7. **Faculty Supervisor Details:**Dr.CHRISPINJIJI, **Emailid:**chrispinjij@gmail.com, **ContactNo.:**8951627124

TECHNICAL DESCRIPTION

8. **Description of the problem:(150 words)**

Security has consistently been a significant worry to the general public and home security should be a top concern for everyone who owns or rents a home. Moreover, safe and secure residential space is the necessity of every individual as most of the family members are working. The home is left unattended for most of the day-time and home invasion crimes are at its peak as constantly monitoring of the home is difficult. Another reason for the need of home safety is specifically when the elderly person is alone or for physically disabled people.

9. **Review of work done: (250 words)**

Our project focuses mainly on the security aspect of home automation. Specifically, here we can state the objectives as following: • If a user needs to access the system, he/she should have a unique passcode and smart tag with them. • The user must pass through three levels of security system to get into the house.

10. **Rationale for taking up the project: (150 words)**

Our main aim is to develop a smart door locking system for home automation and enhance the home security to the next level. So, we can try using this system in different type of accommodations like a flat, home, villa, etc.

11. **Proposed** Objectives of the project

To replace the old conventional lock and key system

Tohelp the physically challenged or aged people

To control the houseappliances needs than can be accomplished from the places they are at (like turning on/offlights,fans, TV, etc).

12. **Methodology planned for the proposed objectives**:

DesigninganddevelopingaSmartsecurityandhomeassistivedeviceforPhysicallyChallengedandAgedPeopleusingRFIDandArduino.Thissystemcanbeperfectlydesigned to help people with disabilities in which the system will be connected with asim900 to form a connection with the smart device used by aged people or the deviceimplemented into theequipmentused bythephysically challenged peoplesothat therewon't be any needfor them to move from theirplace to unlock/lockthe door. Along withthisacameraandmicrophoneareimplementedintothesystemwhichhelpstheminsurveillance and communication with thepeopleon the other sideof thedoor. Other than the physically challenged people, common people can also use this system tounlock the door. To unlock the door the user must present a smart tag to the system whichverifies if the tag is the correct one or not and if the tag is right, it moves onto the nextverification level. The next level of verification is entering the passcode, after which thedoor's will be unlocked (if they correct passcode is entered). If wrong tag is presented to thesystem or if incorrect passcode is entered for verification a warning message is sent to theowner. Also,whenunauthorizedaccessismade,analertissenttotheownerregardingtheunauthorized access. With the alert message, the owner can secure the doors from anyplace.So,webelievethat thismethodologyis the bestlocking and unlocking system. To accomplish the basic home appliances from any place they are in like turning on/offlights, fans, TV, etc., a smartphone can be used which acts a remote to do the task. Using asmartphone, a HC module (Bluetooth device), relays and few other components the task caneasilybeaccomplished.

13. **Expected output of the project:**

This project is designed to remotely lock and unlock the door that helps the aged andphysicallychallenged people to access thedoorfromany placetheyare at.Tounlock/lockthedoortheusermustsendacommandtothesystemusingtheirsmartphone.Uponreceivingthecommandthroughsim900theArduinoUnosendsasignalto the respective part of the system to perform the locking or unlocking. Along with this,otherusers can unlock thedoorusing aspecially designed passcodeandRFIDtag.

When unauthorized access is made, an alert message is sent to the owner so that he/she cancompletelysecurethe system. Bysending commands tothe ArduinoUno through the smartphonethe task of turning on/offthehomeappliancescaneasily beaccomplished.

14. **Work plan:***(detailing time schedule for each proposed objective may clearly be indicated.)*:

1/6/2022 to 31/12/2022 -Hardware Design and Development

1/1/2023 to 31/3/2023-Software Design and Development

15. **Expected impact/ outcomes:**This project is not only about replacing the conventional lock and key system or devices tohelp the physically challenged or aged people. This project also includes the

basics houseappliances needs than can be accomplished from the places they are at (like turning on/offlights,fans, TV, etc).

16. **Suggested post project activities:**Design and Development of model

17. **Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.): NIL**

18. **Budget estimates: (Please provide details in each item)**

Sl. No.	Items	Amount in Rs.
63.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	6500
64.	Travel (details required)	
65.	Labour cost (detailed breakup)	1000
66.	Miscellaneous	1000
	Total	8500

THE OXFORD COLLEGE OF ENGINEERING

(Recognized by the Govt. of Karnataka, Affiliated to Visvesvaraya Technological University, Belagavi&
Approved by A.I.C.T.E. New Delhi, Accredited by NBA New Delhi and Recognized by UGC under section 2(f))
Bommanahalli, Hosur Road, Bengaluru –560068.
✆: 080 -30219601/602/604/736, Fax: 080 – 25730551/ 30219629 E-mail: engprincipal@theoxford.edu Web: www.theoxford.edu

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:

SmartsecurityandhomeassistivedeviceforPhysicallyChallengedandAgedPeople.....
.....
.....

46. I/We agree to abide by the terms and conditions of TOCE
47. I/We did not submit this or a similar project proposal elsewhere for financial support.
48. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of

Student

Faculty

Date: 15-05-2022

Place:TOCE

RECOMMENDATION

Professor & HOD of E&C Engineering
The Oxford College of Engineering
Bommanahalli, Bangalore-560 068.

Head Of the Department:

THE OXFORD COLLEGE OF ENGINEERING

(Recognized by the Govt. of Karnataka, Affiliated to Visvesvaraya Technological University, Belagavi&
Approved by A.I.C.T.E. New Delhi, Accredited by NBA New Delhi and Recognized by UGC under section 2(f))
Bommanahalli, Hosur Road, Bengaluru –560068.
✆: 080 -30219601/602/604/736, Fax: 080 – 25730551/ 30219629 E-mail: engprincipal@theoxford.edu Web: www.theoxford.edu

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:14-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student:**Sharath Raj Urs P 1OX18EC061 Tharun P S 1OX18EC070 Vignesh P 1OX18EC076 Yashas Gowda S 1OX18EC080

2. **Branch/ Semester/: ECE, 8TH**

3. **Project Title:**"A SMART ASSISTIVE DEVICE FOR QUADRIPLEGIC PATIENTS

4. **Abstract:**Now-a-days accidents are predominant and most of them lead to spinal cord injury. Spinal cord injury causes information travelling along spinal nerves below level of injury will completely or partially cut off this leads to paralysis. Paralysis is of two types: 1. Quadriplegia 2. Paraplegia Quadriplegia is derived from two words quadric means four and plegia stands for paralysis. When a person has spinal cord injury above the first thoracic vertebra, paralysis usually affects cervical spinal nerves resulting dis-functioning of four limbs. Paraplegia is derived from two words para means two and plegia stands for paralysis. The person affected with paraplegia normally has dis-functioning of his legs. These quadriplegic patients are suffering with many problems such as the person cannot walk himself and cannot be able to do his work with his own. In some cases, the patient suffering from quadriplegia could not even speak. To help these Quadriplegic patients to communicate we wish to propose a new mechanism where they will be able to communicate to anyone by various types of head movements as that is the only controllable part in their body. Paralyzed stroke patients are unable to normally communicate with their environment. For these patients, the only part of their body that is under their control, in terms of muscular movement, is their head. Some research in this area has focused on investigating new efficient communication tools for paralyzed patients for translating their head movements into appropriate communication messages. The main aim of this project is to present the design and application of an accelerometer based efficient human computer interface (HCI). Establishing an alternative channel without speaking and hand movement is important in increasing the quality of life for the handicapped. By using a realized virtual keyboard, it is possible to notify in writing the needs of the patient in a relatively short time. Accelerometer based HCI systems allow people to successfully and economically communicate with their environment just by their head movements. The nearest neighborhood algorithm is used to classify the signals. This paper presents a real-time gaze direction estimation approach. The face region and facial features are extracted automatically by applying skin detection, gray-scale morphology and a geometrical face model. The Kalman filtering is applied for tracking and estimation of the 3-D pose of the moving head. The rough gaze direction is determined from the orientation of the head. Experiments with real image sequences show that the system is able to extract and track facial features reliably. Also, the gaze position in the computer display can be roughly determined. Theoretical gaze position estimation was tested with synthetic data and promising results were obtained. The high real-time performance achieved indicates that the proposed system can be applied in resource limited embedded systems.

5. **Duration of the Project:**

6. **Total cost of the project:20000**

7. **Faculty Supervisor Details:**

TECHNICAL DESCRIPTION

8. **Description of the problem:(150 words)**Now-a-days accidents are predominant and most of them lead to spinal cord injury. Spinal cord injury causes information travelling along spinal nerves below level of injury will completely or partially cut off this leads to paralysis. Paralysis is of two types: 1. Quadriplegia 2. Paraplegia Quadriplegia is derived from two words quadric means four and plegia stands for paralysis. When a person has spinal cord injury above the first thoracic vertebra, paralysis usually affects cervical spinal nerves resulting dis-functioning of four limbs These quadriplegic patients are suffering with many problems such as the person cannot walk himself and cannot be able to do his work with his own. In some cases the patient suffering from quadriplegia could not even speak. To help these Quadriplegic patients to communicate we wish to propose a new mechanism where they will be able to communicate to anyone by various types of head movements as that is the only controllable part in their body.

9. **Review of work done: (250 words)**

10. **Rationale for taking up the project: (150 words)**

11. **Proposed** Objectives of the project: Now-a-days accidents are predominant and most of them lead to spinal cord injury. Spinal cord injury causes information travelling along spinal nerves below level of injury will completely or partially cut off this leads to paralysis. Paralysis is of two types: 1. Quadriplegia 2. Paraplegia Quadriplegia is derived from two words quadric means four and plegia stands for paralysis. When a person has spinal cord injury above the first thoracic vertebra, paralysis usually affects cervical spinal nerves resulting dis-functioning of four limbs These quadriplegic patients are suffering with many problems such as the person cannot walk himself and cannot be able to do his work with his own. In some cases the patient suffering from quadriplegia could not even speak. To help these Quadriplegic patients to communicate we wish to propose a new mechanism where they will be able to communicate to anyone by various types of head movements as that is the only controllable part in their body.

12. **Methodology planned for the proposed objectives**:An accelerometer is connected to the head portion of the quadriplegic patient whenever the person rotates his head. By the movement of his head, the tilt angle is calculated which is converted into voltage. The accelerometer we are using is ADXL103/ADXL203 which is high precision, low power, complete single- and dual-axis accelerometers with signal conditioned voltage outputs, all on a single, monolithic IC. The ADXL203 is a dual-axis accelerometer. Both parts contain a poly silicon surface- micro machined sensor and signal conditioning circuitry to implement open-loop acceleration measurement architecture. The output signals are analog voltages proportional to acceleration. The ADXL103/ADXL203 is capable of measuring both positive and negative accelerations to at least ±1.7 g. The accelerometer can measure static acceleration forces such as gravity, allowing it to be used as a tilt sensor.

13. **Expected output of the project:**A quadriplegic patient finds it difficult to communicate with humans and the electronic systems/appliances given their medical condition. The headgear we are building shall help them communicate better with just the tilt of the head. The headgear comes with high precision, and a reliable sensor that works together with a computer program will come to their aid

14. **Work plan:***(detailing time schedule for each proposed objective may clearly be indicated.)*:

15. **Expected impact/ outcomes:**Establishing an alternative channel without speaking and hand movement is important in increasing the quality of life for the handicapped. By using a realized virtual keyboard, it is possible to notify in writing the needs of the patient in a relatively short time. Accelerometer based HCI systems allow people to successfully and economically communicate with their environment just by their head movements. The nearest neighborhood algorithm is used to classify the signals.

16. **Suggested post project activities:**Our future work will be to add several properties to the system. These properties are speech ability, wheelchair control, and robot arm control. Speech and device motion control with eye movement facility is important in making the life of a severely disabled patient easier. Then, the

realized system will be tested by several patients to improve the quality of the graphic interface for better and quick selections of the menu options.

17. **Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.): NIL**

18. **Budget estimates: (Please provide details in each item)**

Sl. No.	Items	Amount in Rs.
67.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	10000
68.	Travel (details required)	
69.	Labour cost (detailed breakup)	5000
70.	Miscellaneous	5000
	Total	20000

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:

…A SMART ASSISTIVE DEVICE FOR QUADRIPLEGIC PATIENTS……

49. I/We agree to abide by the terms and conditions of TOCE
50. I/We did not submit this or a similar project proposal elsewhere for financial support.
51. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Date: …14-05-2022……

Place:TOCE

RECOMMENDATION

Professor & HOD of E&C Engineering
The Oxford College of Engineering
Bommanahalli, Bangalore-560 068.

Head Of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:14-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student:**

   AKASH M JITURI (1OX19EE001), BALASUBRAMANI S (1OX19EE004), DHANANJAYA A M (1OX19EE006), JEEVAN G (1OX19EE008)

2. **Branch/ Semester: Electrical and Electronics Engineering /8th**

3. **Project Title:"HUMAN DETECTION ROBOT FOR DISASTER MANAGEMENT"**

4. **Abstract:**To build a simplified version of a Human detection robot which has to be implemented during calamities to find the casualties. Humans can be used for rescuing people in these areas, but due to high risk of earthquakes and building collapses it is not possible to send human rescue teams in these areas. Thus, an affordable high technology equipment which makes this risky job quicker and safer is needed for the hour, which has been described in this paper. It is a simple, yet efficient equipment to indicate casualties and help them with immediate access to first aid. A simple Robot is designed to detect and to inform the presence of human with a new approach. In response to this need, a low-cost robot equipped with PIR sensor, accelerometer, camera and wireless communication module is developed. Robot can move in all direction to increase the range of detection. The robot moves in left, right, forward and backward directions based on the obstacles it encounters. A wireless remote-controlled robot which employs a PIR sensor, detects the presence of human being and shows it to the user. The robot can navigate autonomously between damaged areas to look for living body heat and can send back audio and video information to allow the operator to determine if the found object is a living human. It sends the signal from the transmitter side to the receiver side continuously to notify the user. A program has been written and executed for the said purpose using Arduino UNO. The experiments are observed deeply and the results show that the system provides an efficient way for the said purpose. The hardware implementation is made quite simply and cost effectively.

5. KEYWORDS: Arduino Uno Microcontroller, Robot Chassis, PIR (Passive Infrared) sensor, buzzer, LCD (Liquid Crystal Display), LED (Light Emitting Diode), wires, DC motor, Breadboard, Buzzer.

6. **Duration of the Project:6 months**

7. **Total cost of the project: 8800**

8. **Faculty Supervisor Details:**

   Name: Sumitha T L
   Email id: sumitha.jaiber@gmail.commailto:nishashamin@gmail.com
   Contact No.: 9986380291

TECHNICAL DESCRIPTION

9. Description of the problem:(150 words):

The project Human Detection Robot is an autonomous robotic vehicle that moves in the earthquake prone area and helps in identifying alive people. The main aim of the project is to detect the human being by using a wireless remote-controlled robot, which have the sensors that detects the presence of the human being and indicates the presence to user. As it is a wireless robot, it can be easily mobilized and controlled. A unique passive Infrared sensor is used in our design that receives infrared rays that are emitted from humans. When a human body emits infrared radiation of micron wavelength it will be received and manipulated by the PIR (Passive infrared sensor). Once a human target is located the system has to give an alert which may help to identify and localize the victim location as soon as possible. The major part of circuit design is the 'Human detection module' which will be used for carrying out the search activity. The motor driver is a two-wheel geared driver with DC motors attached to perform movements in either forward or reverse directions.

10. Review of work done: (250 words)

SL NO	AUTHORS	TITLE	YEAR
1	1) Ali Safak Sekmen 2) Mitch Wilkes 3) Kazuhiko Kawamura	An Application of Passive Human–Robot Interaction: Human Tracking Based on Attention Distraction.	2002
2	1) Rufaida Shamroukh 2) Fahed Awad	Detection of surviving humans in destructed environments using a simulated autonomous robot.	2009
3	1) Abid Khan 2) Ravi Mishra	GPS-GSM Based Tracking System	2012
4	1) Vasant Srinivasan 2) Zachary Henkel 3) Jesus Suarez	Interacting with Trapped Victims Using Robots	2013
5	1) Jai Jurel 2) Bhoopesh 3)Yogesh Kumar 4) Munendra Parmar	Earthquake Victim Detection System	2017
6	1) Ms. A.K. Kavitha 2) M. Keerthanah 3) K. B. Bhavya 4) J. Janani	Microcontroller based Human Detection Robot	2021

1.The survey highlighted the need for robots to track humans in dynamic environments, such as public spaces or manufacturing plants, without causing distractions or hindering the human's activities. The authors suggested that passive human-robot interaction, where the robot observes the human and adapts its behaviour to minimize interference, could be a useful approach. The survey discussed various techniques for passive human tracking, including visual and auditory tracking, and explored their advantages and disadvantages. The authors also proposed a new approach based on attention distraction, where the robot distracts the human's attention away from itself and tracks the human using peripheral vision. The authors concluded that attention distraction-based human tracking could be a promising approach for passive human-robot interaction, but further research and experimentation were needed to refine the technique and evaluate its effectiveness in various environments. They also emphasized the importance of

considering ethical and social implications when developing such systems, particularly in public spaces where privacy and autonomy are important concerns.

2.The survey highlighted the challenges of such missions, including the presence of debris and hazardous materials, limited communication and power resources, and the need for rapid and accurate identification of surviving humans. The authors proposed a simulated autonomous robot system that could be used to evaluate different detection and rescue strategies.The survey discussed various sensor technologies that could be used in the robot, such as cameras, microphones, and gas sensors, and explored their advantages and limitations. The authors also reviewed different algorithms and methods for detecting and localizing humans, such as image processing, sound localization, and motion detection. The authors concluded that a simulated autonomous robot system could be a valuable tool for evaluating and improving human detection and rescue strategies in destructed environments. They also emphasized the need for further research and experimentation to refine the system and evaluate its performance in realistic scenarios. Additionally, they highlighted the importance of ethical considerations and the need to prioritize human safety in such missions.

3.The survey highlighted the growing demand for GPS-GSM based tracking systems in various industries, such as transportation, logistics, and security. The authors discussed the advantages of using GPS and GSM technologies for tracking, such as real-time location updates, remote monitoring, and improved security. The survey discussed different components of a GPS-GSM based tracking system, such as GPS receivers, GSM modems, and microcontrollers, and explored their functionality and integration. The authors also reviewed different approaches for transmitting and receiving location data, such as SMS, GPRS, and internet-based protocols. The authors concluded that GPS-GSM based tracking systems could provide an effective and efficient solution for location tracking and monitoring in various industries. They also emphasized the need for further research and development to improve the accuracy and reliability of these systems, particularly in challenging environments such as urban canyons and indoor spaces.

4.The survey highlighted the challenges of rescuing trapped victims, including the need for remote sensing and communication, limited accessibility, and the risk of further injury or collapse. The authors proposed that robots could be a valuable tool for improving the safety and efficiency of such rescue missions. The survey discussed various types of robots that could be used for interacting with trapped victims, such as legged robots, wheeled robots, and snake-like robots, and explored their advantages and limitations. The authors also reviewed different sensors and communication technologies that could be used in the robots, such as cameras, microphones, and haptic feedback.

The authors concluded that robots could play a significant role in interacting with and rescuing trapped victims in emergency situations. They also emphasized the need for further research and development to improve the reliability and robustness of these systems, particularly in challenging environments. Additionally, they highlighted the importance of addressing ethical considerations, such as privacy and informed consent, when implementing such systems.

5. The survey highlighted the challenges of detecting and rescuing earthquake victims, including the need for rapid and accurate identification of victims in remote or inaccessible locations. The authors proposed that an earthquake victim detection system could be a valuable tool for improving the efficiency and effectiveness of rescue missions. The survey discussed various types of sensors that could be used in the detection system, such as accelerometers, acoustic sensors, and thermal sensors, and explored their advantages and limitations. The authors also reviewed different machine learning algorithms that could be used to process and analyze the sensor data, such as neural networks, support vector machines, and decision trees. The authors concluded that an earthquake victim detection system could provide an effective and efficient solution for detecting and locating victims in disaster situations. They also emphasized the need for further research and development to improve the accuracy and reliability of these systems, particularly in challenging environments. Additionally, they highlighted the importance of addressing ethical considerations, such as privacy and informed consent, when implementing such systems.

6. According to the hardware components, the prototype for human detection robot functions
properly. The basic principle is represented by the design, in which the robot estimates obstacles andmoves in accordance with the passage. As the robot moves, it covers a large amount of ground, reducing the need for numerous

sensors. It will be simple to save large groups of people at catastrophe areas with this technology. The approach is a simple and cost- effective way to detect humans. This will also be utilised to detect humans in the field of battle.

11. **Rationale for taking up the project: (150 words)**

There are many different kinds of catastrophe in natural and man-made disaster: earthquake, flooding, hurricane and they cause different disaster area like collapsed building, landslide or crater. During these emergency situations, and specially in urban disaster, many different people are deployed (policeman, fire fighters and medical assistance). They need to cooperate to save lives, protect structural infrastructure, and evacuate victims to safety. In these situations, human rescuers must make quick decisions under stress, and try to get victims to safety often at their own risk. They must gather determine the location and status of victims and the stability of the structures as quickly as possible so that medics and firefighters can enter the disaster area and save victims. All of these tasks are performed mostly by human and trained dogs, often in very dangerous and risky situations. This is why since some years; mobile robots have been proposed to help them and to perform tasks that neither humans dogs nor existing tools can do. Robots were achieving relatively good progress in other fields such as education, industry, military, and medicine and have proven their robustness and efficiency in most of what they are designed for. Therefore, robots are expected to play an important role in replacing the human factor in many of these fields. Even the disaster field seems to be very challenging for robots, robots have already invaded this field like many other fields.

12. **Proposed Objectives of the project**

- To propose a robotic vehicle that moves in the disaster prone area.
- To make the detection by rescue teamsless time consuming and more easier.
- To develop a prototype of Human Detection Robot which works efficiently according to the given scenario.
- To program the robot that avoids the block position and moves along the open way.
- As the robot can move, it covers lot of distance that reduces the use of many sensors or many robots.
- When the robot finds a human, it can notify the users by producing continuous beeps.

13. **Methodology planned for the proposed objectives**:

(a) Arduino programming
(b) Prototype construction

14. **Expected output of the project:**

The use of sensors, such as infrared or ultrasonic sensors, coupled with microcontroller technology enables accurate and efficient detection and interaction with humans in disaster situations. By leveraging robotics technology, human detection robots can enter hazardous areas and provide real-time information to first responders and emergency teams. This can significantly reduce the time and resources required for search and rescue missions, ultimately increasing the chances of survival for victims. Human detection robots have the potential to revolutionize disaster management and search and rescue operations.

15. **Work plan:***(detailing time schedule for each proposed objective may clearly be indicated.)*:

Literature Review and study of concepts – 2 months
Simulation work -1 months
Design , Implementation and validation of results -3 months

16. **Expected impact/ outcomes:**

The use of sensors, such as infrared or ultrasonic sensors, coupled with microcontroller technology enables accurate and efficient detection and interaction with humans in disaster situations. By leveraging robotics technology, human detection robots can enter hazardous areas and provide real-

time information to first responders and emergency teams. This can significantly reduce the time and resources required for search and rescue missions, ultimately increasing the chances of survival for victims. Human detection robots have the potential to revolutionize disaster management and search and rescue operations.

17. Suggested post project activities:

1.Improving sensor capabilities: Advances in sensor technology can lead to the development of more sophisticated sensors that can detect a wider range of human vital signs and environmental conditions, such as gas levels, air pressure, and temperature. This can increase the accuracy and efficiency of human detection in disaster situations.

2.Enhancing autonomy: Increasing the autonomy of human detection robots can reduce the need for human intervention and improve their effectiveness in disaster situations. This can be achieved by integrating machine learning algorithms and artificial intelligence technologies to enable robots to learn and adapt to changing environments.

3.Multi-robot coordination: The use of multiple robots working together can enhance the capabilities and efficiency of human detection and rescue operations. Developing techniques for coordinating the actions of multiple robots can improve their ability to navigate complex environments and collaborate with each other to achieve common goals.

4.Miniaturization: Developing miniaturized human detection robots that can navigate tight spaces and access hard-to-reach areas can improve their effectiveness in disaster situations, particularly in urban environments.

5.Integration with other technologies: Integrating human detection robots with other technologies, such as drones and unmanned aerial vehicles, can enhance their range and effectiveness in disaster situations.

18. Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):

- Based on the Literature Survey the proposed work is implemented in simulation
- After that it will be tried in real time

19. Budget estimates: (Please provide details in each item)

Budget	Amount
a)Materials/Consumables(Pleasespecify)	4800.00
b)Labor(Describe)	3000.00
c)Travel(Describe)	500.00
e) Miscellaneous (Please specify)	500.00
Total	8800.00

UNDERTAKING FROM THE INVESTIGATOR

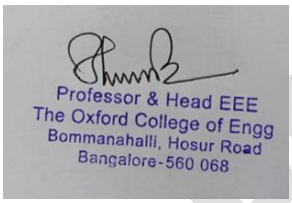
PROJECTTITLE:**"HUMAN DETECTION ROBOT FOR DISASTER MANAGEMENT"**

52. I/We agree to abide by the terms and conditions of TOCE
53. I/We did not submit this or a similar project proposal elsewhere for financial support.
54. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Date: 14-05-2022

Place: Bangalore

RECOMMENDATION



Head of the Department:

THE OXFORD COLLEGE OF ENGINEERING

(Recognized by the Govt. of Karnataka, Affiliated to Visvesvaraya Technological University, Belagavi&
Approved by A.I.C.T.E. New Delhi, Accredited by NBA New Delhi and Recognized by UGC under section 2(f))
Bommanahalli, Hosur Road, Bengaluru –560068.
✆: 080 -30219601/602/604/736, Fax: 080 – 25730551/ 30219629 E-mail: engprincipal@theoxford.edu Web: www.theoxford.edu

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:17/05/2023

GENERAL INFORMATION

1. **Name and USN of the Student: Rahul Rajesh 1OX18CS059, Navya S 1OX19CS064,**

   Prathiksha S 1OX19CS071, Shweta R 10X19CS096

2. **Branch/ Semester/: CSE 8th SEM**

3. **Project Title: Smart lock using facial detection**

4. **Abstract:**As privacy and security are prominent challenges in the information system, there is a critical need to change the security measures of the system in today's era of automation and smart gadgets. It is challenging to put total faith in the system's conventional and basic security safeguards. Finding out who enters or leaves the property is the most crucial feature of any home security system. Facial data can be utilized as a person's biometric feature in place of passwords or pins to monitor this. The goal of this project is to create a smart door that guards the gateway using the features of a user's faces. A camera module captures a real-time picture of the user before unlocking the door. The system sends the captured image to the cloud. The system also compares the received image to the image data that has already been saved. If the images match, the door unlocks. Else, the owner can manually identify the user at the door with the captured image and unlock the door manually.

5. **Duration of the Project: 3 months**

6. **Total cost of the project: 27572**

7. **Faculty Supervisor Details: Ms. Asha kumari, Assistant professor, The Oxford college of engineering**

TECHNICAL DESCRIPTION

8. **Description of the problem:(150 words):** In the present era, everyone has their own space where they store their belongings with the aid of security to maintain their privacy and to keep others from violating their personal space. Traditional locks, however, have a number of drawbacks, such as the possibility of being picked or being opened quickly if the combination is known. A loss of goods and valuables could result from this. Elderly folks finding it difficult to carry their keys with them as they leave the house is another issue that has been noted. Diversely abled individuals may also be affected by this. Doors that were made for regular humans might occasionally be difficult for physically challenged people to open.

9. **Review of work done: (250 words)**In this system, we have developed a methodology to implement the Smart Door Unlocking System using Face Recognition. The implemented system can accurately detect known faces and unlock the door for them. This majorly helps the elderly people and the differently-abled people as they might face difficulties unlocking a traditional lock system. Since the system uses facial detection, there is no necessity for carrying a physical key. The algorithm used in this project can be easily implemented and supports most lighting conditions. It also supports the commonly available cameras that are supported with the Raspberry Pi, thus it is forwards compatible if the user wants to upgrade the system. Since this system is of moderate cost, it is affordable by mostly anyone. The parts are also easily available in the market, thus if any parts are damaged, they can easily be replaced.

10. **Rationale for taking up the project: (150 words)**The project involves the implementation of a security system that uses facial detection to identify a home owner and allows them to unlock the door. The proposed system also has a smartphone counterpart which can allow the user to access the door, similar to a remote door controller and also view who has visited the home by taking pictures of unknown faces who have appeared in front of the camera.

11. **Proposed Objectives of the project**:The main objectives of our projectisto design and develop a"Smart Lock System Using Facial Detection" which includes:
    - Android Application for the User:
      An Android application is used for communicating with the user. The user can also check if there is any visitor at the door. They can also unlock the door manually.
    - Raspberry Pi System:
      The Raspberry Pi is a small computer that is capable of running applications for various IoT based projects. This component helps in running the OpenCV facial detection library. This helps in the detection of a visitor's face when they appear infront of the camera.
    - Cloud:
      Cloud computing is the on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user.In this project, the cloud is used to help the Raspberry Pi communicate with the Android application. It also runs an interactive website that helps provide an interface to the user.

12. **Methodology planned for the proposed objectives**: The system uses IoT, Cloud Computing and Android for implementation.

The hardware model of the project is implemented using the following components:

a. Raspberry Pi 4
b. Raspberry Pi Camera Module
c. Android Application
d. Cloud
e. Database for storing facial Data (preferably in the Raspberry Pi)
f. Electronic Door Lock

- First, an Android app is built using Android Studio. The app is used to capture an image of the user.
- Then, program the facial detection application and run it on the RaspberryPi server. This is implemented using **OpenCV**, a Computer Vision and Machine Learning library of Python.
- This library is used for implementing **Facial Detection**. This is used for authenticating the user.
- The facial data is matched with the registered users in the system. If a known user is recognized, then the door opens automatically. If the visitor is unregistered, a notification is sent to the owner.
- The data is pushed to the user's Android application with the help of the cloud.
- HTTPS request-response messages are used for this purpose.
- The server is connected to the cloud at all times so that it can facilitate with livestreaming the video feed from the Raspberry Pi's camera.
- The primary programming language used is Python.
- Python has many useful libraries that help in facilitating the various implementations of the project.
- The main library that is focused on this project is OpenCV, which is used for Facial Detection.
- Other libraries that are used are TensorFlow for performance monitoring, and model retraining.
- Java/Kotlin is used to develop the Android application that helps the user to interact with the user.
- The app loads data directly from the cloud and displays it to the user.
- HTML and CSS is used to program the webpage that is to be loaded by the Android application.

- This is stored on the cloud.
- HTML is used as it is a lightweight web development language and it also has a high signal to noise ratio as compared to other forms of communication.
    - Thus, reduces any latency in loading the data from the cloud to the application on the user's phone.
    - CSS is used to provide any additional visual effects that further provides readability and improves the overall experience of the user.

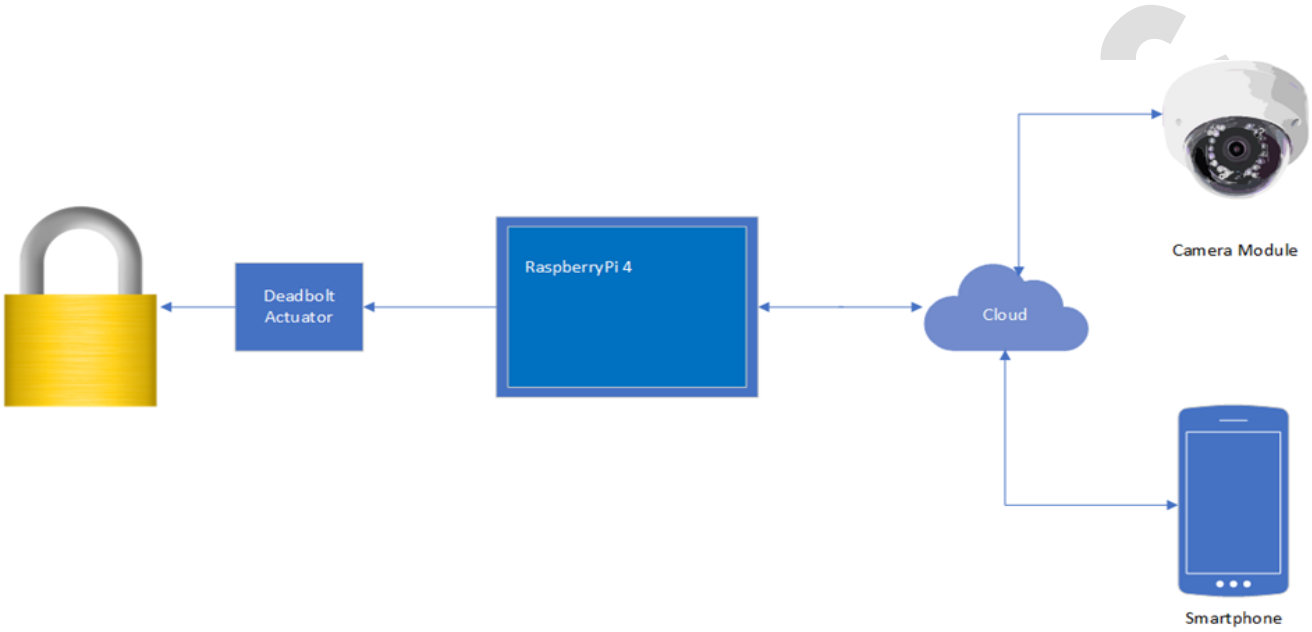


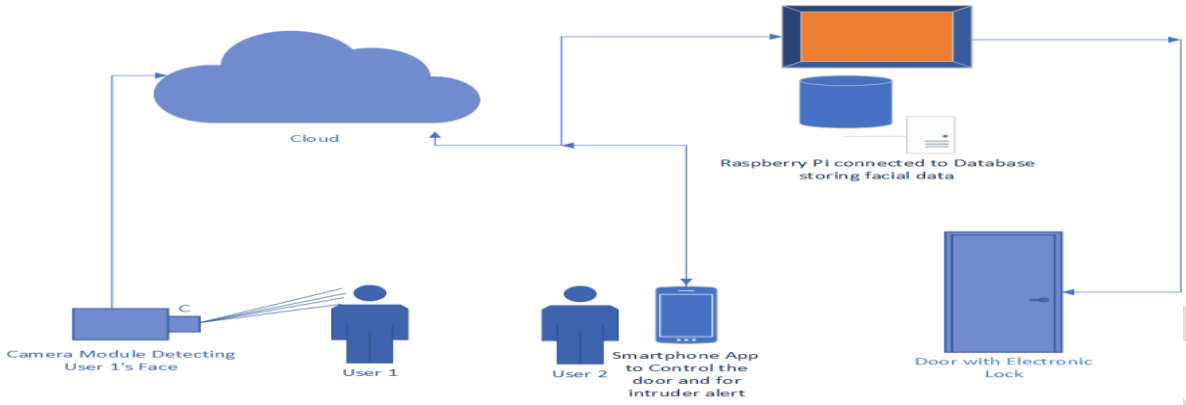
Fig: System Design Diagram

13. Expected output of the project: When the visitor stands in the field of view of the camera, their facial characteristics are analyzed by the system.

- The camera captures the image and sends it to the Raspberry Pi which runs facial detection.
- If there is a match in the facial data with the facial data stored in the database, the door automatically opens.
- If there is no match, then a POST signal along with a picture of the visitor is sent to the cloud.
- The cloud forwards this message to the user's Android smart phone.
- The smartphone then shows the user who has arrived at their door and allows the user to manually unlock the door if the user wishes to.
- This mechanism is useful if the user has not already stored a particular visitor's facial data and wants to grant them access.

The above diagram shows the working of the system.

- User 1 comes in the field of view of the camera.
- The camera scans the user's face and checks if they are registered or not.
- If they are registered to the system, then the door automatically unlocks.
- If they are not registered to the system, then a picture is sent to User 2's (home owner's) phone where they can manually identify the visitor and authenticate them.



14.Work plan:*(detailing time schedule for each proposed objective may clearly be indicated.)*: Working on the hardware part
Raspberry pi – 1 month
Working on the database – 1 month
Working on the android part and testing – 1 month

15.Expected impact/ outcomes: User 1 comes in the field of view of the camera.

- The camera scans the user's face and checks if they are registered or not.
- If they are registered to the system, then the door automatically unlocks.
- If they are not registered to the system, then a picture is sent to User 2's (home owner's) phone where they can manually identify the visitor and authenticate them.

16. Suggested post project activities: In a situation where if the phone gets lost or stolen, any unauthorised person can access the app on the phone if the phone is not secured. This can be tackled by using an app lock or the app requiring a passcode for every time the door has to be unlocked. Another enhancement is the addition of a notification system to the application. When a new image is uploaded into the database, a notification is to be sent to the user's phone through the application Another feature to improve would be the algorithm. We would like to improve the algorithm by making it more efficient and faster for recognizing known faces.

17. Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.): Patent

18. Budget estimates: (Please provide details in each item)

Sl. No.	Items	Amount in Rs.
71.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	
	Raspberry pi 4 8GB	14778.00
	Raspberry pi high quality camera	3989.00
	Lens for the camera	1999.00
	Micro SD card for Raspberry pi	359.00
	Web Hosting + Domain acquisition	2500.00
	12v DC Electronic door lock	500.00
	Black aluminium heat sink case with double fans for Raspberry pi	699.00
	Official USB type c	749.00
	Official micro-HDMI to Standard-HDMI cable-2m for raspberry pi	499.00
72.	Travel (details required)	500.00
73.	Labour cost (detailed breakup)	1000.00
	Total	27572.00

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE: Smart lock using facial detection

……

……

55. I/We agree to abide by the terms and conditions of TOCE
56. I/We did not submit this or a similar project proposal elsewhere for financial support.
57. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Date: …**17/05/2023**……

Place:…. Bangalore……

RECOMMENDATION

Head of the Department:

HEAD OF THE DEPARTMENT
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
THE OXFORD COLLEGE OF ENGINEERING
BENGALURU - 560 068

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:16/05/2023

GENERAL INFORMATION

1. **Name and USN of the Student:Ashwini L (1OX18CS009), Asma Sultana (1OX18CS010), Bharath Reddy E (1OX18CS023), Margaret (1OX18CS043)**
2. **Branch/ Semester/ CSE/8th Semester**
3. **Project Title:SMART STICK FOR TRAMMELS**
4. **Abstract:**

In Physical disability has affected many people's lives across the world. One ofthese disabilities that strongly affected some large category of people is visuallose. Blind people often face difficulties in moving around freely such as: incrossing the street, in reading, driving or socializing. They often rely on usingcertain aid devices to reach certain places or perform any other daily activitiessuch as walking sticks. Currently, blind people use a traditional cane as a toolfor directing them when they move from one place to another. Visuallyimpairment is a factor that greatly reduces the mobility of people. Currentlythe most widespread and used mean by the visually impaired people are thewhite stick, however it has limitation. With the latest technology, it is possibleto extend the support give to people with visual impairment during theirmobility. In this paper we proposed a system named voice aided electronicstick, whose objective is to give users the confidence to move around inunfamiliar environments. In this paper we proposed an idea of designingelectronic stick using Global System Messaging (GSM), Global PositioningSystem (GPS) and Ultra-sonic technology.

5. **Duration of the Project: 5 months**
6. **Total cost of the project:**Rs. **11742**
7. **Faculty Supervisor Details: Dr. E. Saravana Kumar**

TECHNICAL DESCRIPTION

8. **Description of the problem:(150 words)**

There are modern technologies that help people to practice their activities easily. We focused on the special needs categories which are blinds people. The third blind eye is a stick that makes blind people life easier. It helps them to walk and carry out their daily activities in an easy way and safety by using Internet of Things (IOT) and Artificial Intelligence (AI). From the research of human physiology 83% of information human being gets from the environment is via sight. The statistics by the World Health Organization (WHO) in 2011 estimates that there are 285 billionpeople in world with visual impairment, 39 billion of people are blind and 246 billion are with low vision. The oldest and traditional mobility aids for persons with visual impairments is the walking cane (also called white cane or stick).Historically, there are various types of assistive technologies that are currently available to blind or visually impaired people. One example is the smart phone, which addresses some of the concerns that the blind and partially sighted people needed in their daily life.

9. **Review of work done: (250 words)**

- A smart stick for blind which can give early warning of an obstacle using Infrared (IR) sensors. After identifying the obstacles, the stick alerts the visually impaired people using vibration signals. However the smart stick focused only for obstacle detection but it is not assisting for emergency purposes needed

by the blind. And also the IR sensors are not really efficient enough because it can detect only the nearest obstacle in short distance.

- The smart white cane, called Blindspot that combines GPStechnology, social networking and ultrasonic sensors to help visually impaired people to navigate public spaces.The GPS detects the location of the obstacleand alerts the blind to avoid them hitting the obstacle using ultra-sonic sensors. But GPS did not show the efficiency in tracing the location of the obstacles sinceultra-sonic tells the distance of the obstacle.

- A smart stick using laser sensors to detect the obstacles and down curbs. Obstacle detection was signalized by ahigh pitch "BEEP" using a microphone. The design of the laser cane is very simple and intuitive. The stick can only detects obstacle, but cannot provide cognitive and psychological support. There exists only beep sound that triggers any obstacle and there is no any assistance to direct them. Central Michigan University (2009) developed an electronic cane for blind people that would provide contextual information on the environment around the user. They used RFID chips which are implanted into street signs, store fronts, similar locations, and the cane reads those and feeds the information back to the user.

- The device also features an ultrasound sensor to help to detect objects ahead of the cane tip.The Smart Cane, which has an ultrasonic sensor mounted on it, is paired with a messengerstyle bag that is worn across the shoulder. A speaker located on the bag strap voice alerts when an obstacle is detected and also directs the user to move in different direction.

10. Rationale for taking up the project: (150 words)

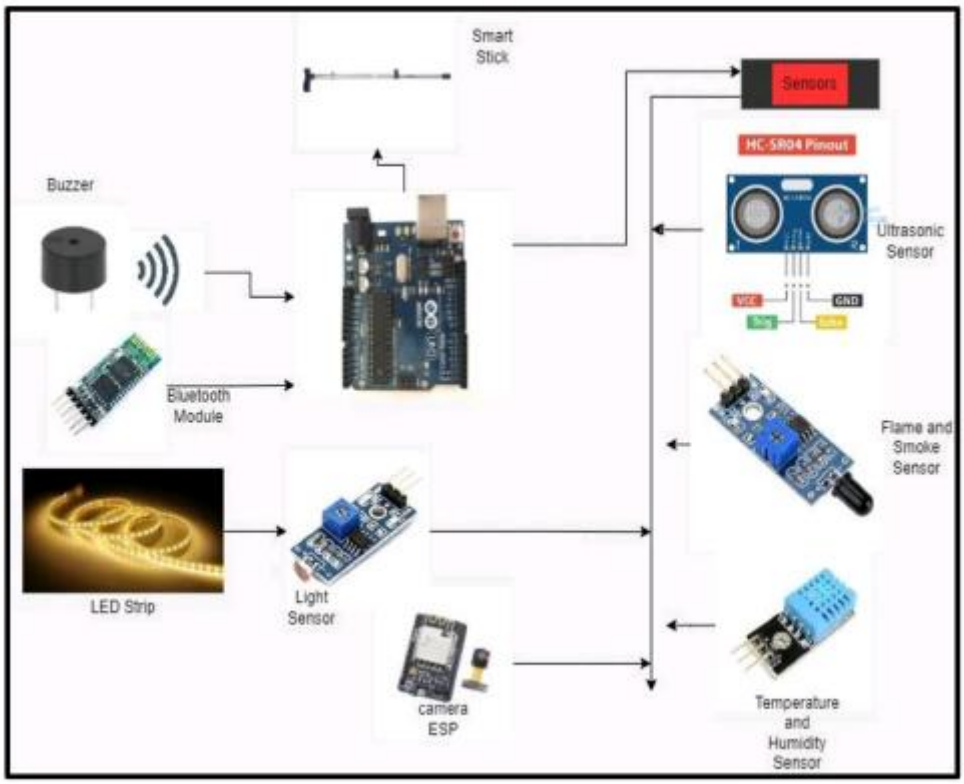
The smart phones allow those people to listen to voice mails and even write and send emails. Another example is the laser or ultrasonic technology. In this technology, energy waves are emitted ahead and it is reflected from obstacles in the path of the user and detected by a matching sensor. Thus, the distance tothe obstacle is calculated according to the time variance between the two signals. Recently there has been a lot of electronic travel aids designed to helpthe blind people to navigate safely and independently. To identify the position and location of the blind person, those solutions rely on GPS technology. Suchsystem is suitable to be used in outdoors to trace the exact location of the blind people whenever there is any emergency occurs. This location is traced in the forms of coordinates. On the other hand, to enhance the means that assist blind persons to navigate quickly and safely in an unfamiliar environment, various projects were introduced using different technologies like Radio-frequency identification RFID),GPS,Ultrasonic, Laser and GSM

11. Proposed Objectives of the project

- To provide voice based assistance along with different alert systems
- To aim at easing the navigation availing real time GPS assistance
- To implement image processing assistance
- To implement smart stick that sense light intensity

12. Methodology planned for the proposed objectives:

This project aims at designing an assistive device that will be useful primarily for the visually impaired trammels, to provide support and help them make decisions as they are often dependent on supplementary assistance for navigation. Various sensors alongside the alert devices like vibrator, buzzer, and also Bluetooth module will be used to implement the features.
A live GPS navigation model implemented with no constraints on routes and destinations. Image Processing will be used to detect the path holes, foot path, roads and obstacles if any on the way, to prevent the collisions. The upshot of these will be on an Android application.
As a result, this is detecting the light intensity, by differentiating the day and night, that is it will allow it to Glow in the Dark, Solar panels are used to reduce the battery consumption.



13. **Expected output of the project:**
    - A web based and Android based application to assist users
    - No constraints on routes and destinations
    - Detection of Path holes, stairs, and Foot path
    - Light Sensing

14. **Work plan:***(detailing time schedule for each proposed objective may clearly be indicated.)*:

    Month 1: Examining existing water distributed systems

    Month 2: Focusing on hardware and software's required for implementing projects.

    Month 3: Designing front layer and implementing hardware modules

    Month 4: Testing porotype and redesigning for faults.

    Month 5: checking working style of prototype.

15. **Expected impact/ outcomes:**
16. **Suggested post project activities:**

    To help visually Blind people this system will help with deployed microcontroller and sensors with the help of gsm based transmission and will detects the obstacle closest to the blind and activate the physical sense to them. The paper analyzed the existing electronic aids for blind people and does not discuss any implementation results. Based on the limitations in existing aids, this paper proposes an enhanced assisting electronic aid using latest technology like GPS, GSM and biomedical authentication stick for the visually impaired people. Also, this project aims to develop emergency trigger alert system along with design.

17. **Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):Patent**

18. **Budget estimates: (Please provide details in each item)**

Sl. No.	Items	Amount in Rs.
74.	Level Sensors (2 Nos)	3000

75.	LED Strip	534
76.	Arduino Board (Nano)	600
77.	Light Sensor	120
5.	Vibrators	230
6.	Buzzers	150
7.	Flexible Stick	600
8.	ESP32 Camera	900
9.	Humidity and Temperature Sensor	1150
10.	Connecting Wires	180
11.	LCD with 12 C Adapter	400
12.	Switch and Bluetooth Module	300
13.	Solar Panels	500
14.	9V battery	300
15.	Ultrasonic Sensor	278
16.	Assembling charges	2500
	Total	11742

UNDERTAKING FROM THE INVESTIGATOR

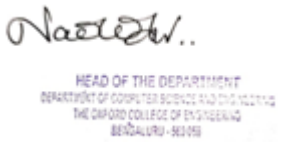
PROJECTTITLE:**SMART STICK FOR TRAMMELS**

58. I/We agree to abide by the terms and conditions of TOCE
59. I/We did not submit this or a similar project proposal elsewhere for financial support.
60. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Date: …16/05/2023……

Place:…Bangalore…….

RECOMMENDATION



Head Of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:15/05/2023

GENERAL INFORMATION

1. **Name and USN of the Student:**Narendra M S 1OX19CS063 Nikhil G Mendon 1OX19CS065

   Samad Saad 1OX19CS086 Bharathraj R 1OX20CS400

2. **Branch/ Semester/ CSE/8th Semester**
3. **Project Title:IOT BASED ADULTERATION DETECTION AND PESTICIDE SPRAYINGUSINGROBOT**

4. **Abstract:**

This paper presents an engineering solution to the current human hazards involved in the spraying potentially toxic chemicals to the fruits and vegetables. How robotics can be applied to various fields of agriculture. One of the most important occupations in a developing country like India is agriculture. It is very important to improve the efficiency and productivity of agriculture by replacing laborers with intelligent machines like robots using latest technologies. The paper proposes a new strategy to replace humans in various agricultural operations like detection of presence of chemicals in the fruits and vegetables, spraying of pesticides, spraying of fertilizers, etc. There by providing safety to the farmers and precision agriculture. The developed system involves designing a prototype which uses simple cost effective equipments like microcontroller, mobile camera, various motors and terminal equipments. Which indicates that this system is very much useful for adulteration detection of fruits and vegetables and also for spraying healthy fertilizers?

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5. **Duration of the Project: 5 months**

6. **Total cost of the project:24,500**

7. **Faculty Supervisor Details:Prof Lenish Pramiee**

TECHNICAL DESCRIPTION

8. **Description of the problem:(150 words)**
   These problems can be solved by implementing our project in real time.

   The mainobjective of our project is to design and develop a “Adulteration Detection And Pesticide Spraying Using robot” which Includes:

   The spraying of pesticides is a common agricultural practice used to protect crops from pests and diseases. However, the use of pesticides can also have negative effects on the environment, including soil and water contamination, harm to non-target species, and potential risks to human health. Therefore, the problem statement for spraying of pesticides can be framed as how to balance the need for pest control with minimizing environmental harm and ensuring the safety of human and non-target species. This involves addressing issues such as proper pesticide selection and application, implementing best management practices, and promoting sustainable agricultural practices. The adulteration of fruits is a serious issue that can have significant health implications for consumers. Adulterants may include chemical additives, artificial coloring,

and low1quality fruits. Currently, there is a lack of efficient and reliable methods for detecting fruit adulteration in real-time, which can lead to fraudulent practices in the food industry. Therefore, the problem statement for detection of adulteration in fruits using IoT can be framed as how to develop an accurate and cost-effective system that utilizes IoT sensors to detect fruit adulteration in real-time. The ultimate goal is to promote food safety and prevent fraudulent practices in the fruit industry.

9. Review of work done: (250 words)

- Studied about the Arduino IDE is also highly extensible. Developers can write and install their own libraries and add-ons to extend the functionality of the IDE. This makes it easy to add support for new hardware or to create custom libraries for specific projects.

- MIT App Inventor is a free, cloud-based tool that allows users to create mobile applications for Android devices. It was developed by a team at the Massachusetts Institute of Technology (MIT) and is aimed at making app development accessible to everyone, regardless of their programming experience..

- DroidCam is a mobile application that allows users to use their Android phone as a wireless webcam or microphone for their computer. The app is developed by Dev47Apps and is available for free on the Google Play Store.

- ThingSpeak is an open-source Internet of Things (IoT) platform that allows users to collect, analyze, and act on data from sensors and other IoT devices. The platform was developed by MathWorks, a company known for its software products for engineers and scientists.

- The Esp8266 is a series of low-power microcontrollers with integrated Wi-Fi and dual-mode Bluetooth. Perhaps the closest Arduino board comparable to the Esp8266 is the Arduino Zero, a 32-bit microcontroller designed for IoT purposes. .

10. Rationale for taking up the project: (150 words)

- Pesticides are commonly used in agriculture to control pests and diseases that can damage crops and reduce yields. However, the overuse of pesticides can have harmful effects on the environment and human health. In recent years, there has been growing interest in using IoT-based systems to optimize pesticide use and reduce the negative impact of pesticides. People who do not get water has to walk miles together or has to pay more money to the borewell water that is distributed to their house through tractor or Water trucks. Overall people of these localities face a lot Water Scarcity and suffer a lot.

- IoT-based pesticide spraying robots offer several advantages over traditional methods of pesticide application. They can spray pesticides in a precise and targeted manner, reducing the amount of pesticide required and minimizing the risk of over-spraying. They can also operate autonomously, which reduces the need for human intervention and improves efficiency.

Comparison of Manual Spraying and Robotic Spraying

- Manual spraying and robotic spraying are two different methods used for applying pesticides in agriculture. Here are some comparisons between these two methods:

- ➢Efficiency : Robotic spraying is more efficient compared to manual spraying. A robotic sprayer can cover a larger area in less time and with greater precision, while manual spraying is time-consuming and requires more labour.

- ➢Safety : Robotic sprayers can improve safety in the agricultural industry by reducing the exposure of workers to harmful chemicals. Manual spraying can expose workers to pesticides, which can lead to health problems.

- ➢Sustainability : Robotic spraying can promote sustainability by reducing the amount of pesticides needed and minimizing their impact on the environment. Manual spraying can result in excess pesticide use and contamination of soil and water sources.

11. Proposed Objectives of the project

The major objectives are the attributes which the device must meet. They are:

➢To reduce human effort in the agricultural field with the use of small machine.

➢To perform all operations at single time, hence increases production and saves time.

➢It should perform all operations on command.

➢It should be safe and simple to control.

➢It should be reliable.

➢It should be durable and economical.

➢To reduce human effort within the agricultural field with the employment of small robot.

➢To perform all the operations at single time, hence increases production and decrease idle time.

➢To complete great amount of labour in less time.

➢Farmer can control the robot through remote by sitting at one side and operate easily.

➢The usage of solar may be utilized for Battery charging. because the Robot works within the field, the rays of the sun may be used for solar energy generation.

➢To reduce the dependence on grid power, the solar energy is employed and therefore a battery is placed to store the energy and use it whenever required.

12.**Methodology planned for the proposed objectives**:

MODULE 1 – Estimating Hardware and their Functionality

MODULE 2 - Analysis and Circuit Diagram Sketching

MODULE 3 – Building/Fabricating the Prototype

Setting Up the ESP32 Dev Module

Sketching

Connecting the Device to ThinkSpeak App

Testing the Output Through Serial Monitor

MODULE 4 – Final Fabrication, Testing, Output and Results

STAGE 1: Final Fabrication

STAGE 2: Testing

STAGE 3 : Calculating ERROR % & Publishing Graphs

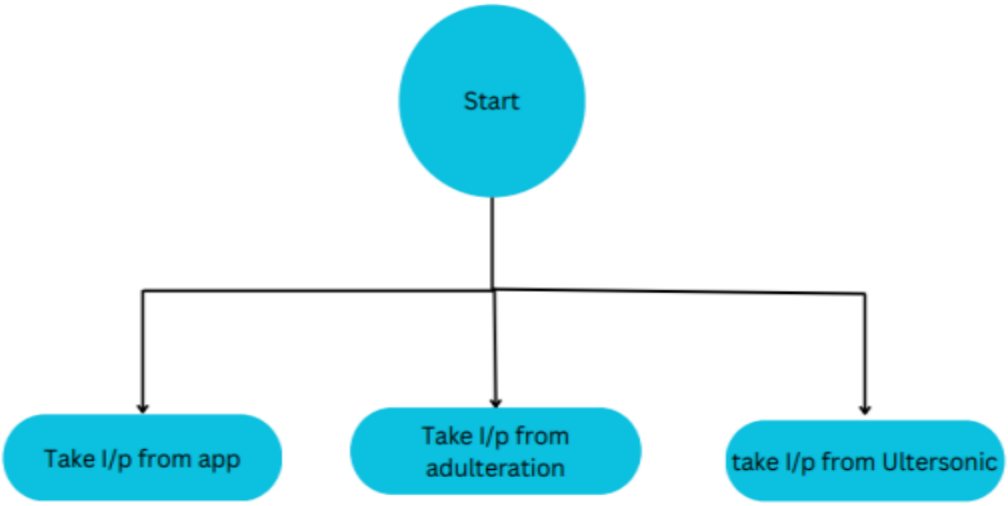

Figure 4.2: Flow Diagram of Level-0

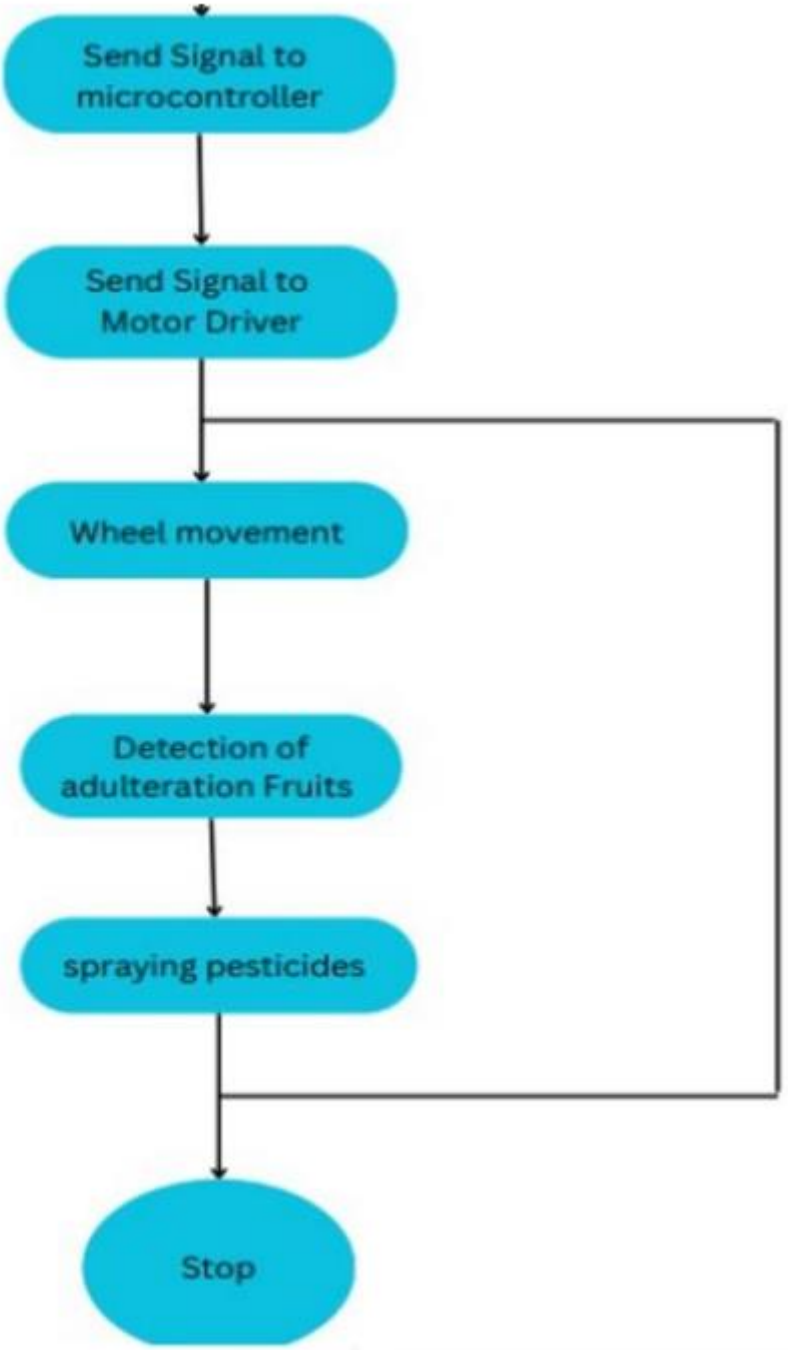

Figure 4.3: Flow Diagram of Level-1

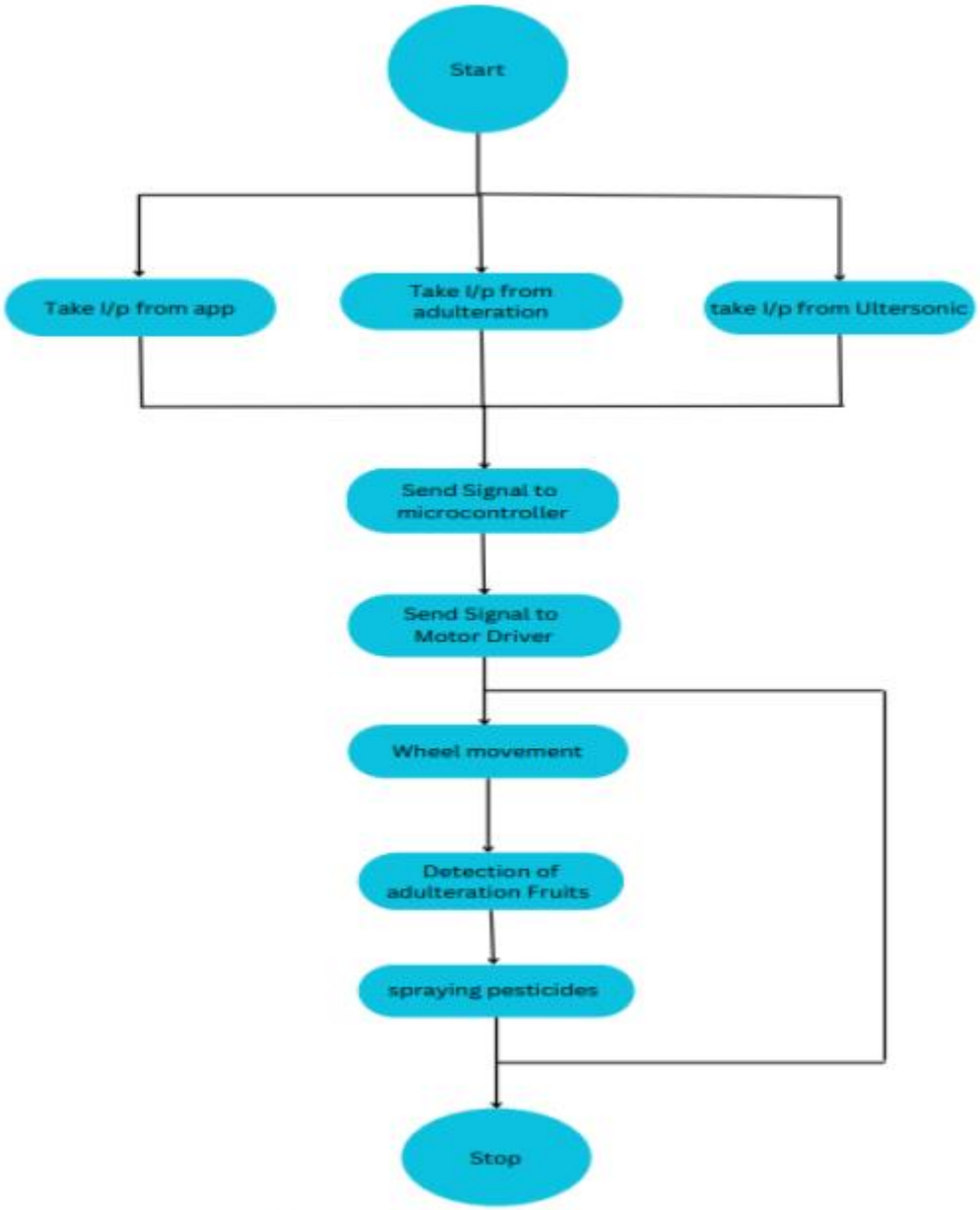

Figure 4.4: Flow Diagram of Level-2

13. Expected output of the project:

App Inventor includes a built-in database component called TinyDB, which allows apps to store and retrieve data locally on the device. This feature enables the development of apps that save user preferences, store data for offline access, and facilitate data management. MIT App Inventor offers an accessible and user-friendly environment for creating Android applications.

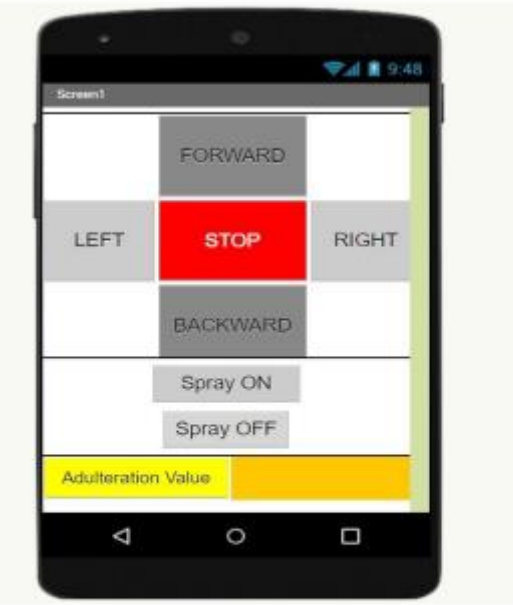

Figure 4.11: MIT App Inventor

MathWorks is the primary developer of the ThingSpeak app platform, actively supporting and evolving the platform to meet the needs of the IoT community and facilitate data-driven applications and projects.

Figure 4.10: ThingSpeak App

Step 1: Installing Arduino IDE

- Arduino IDE is an open source, hence we were able to download it from their official website: https://www.arduino.cc/en/software
- Once downloaded the following instructions were followed to install the software.

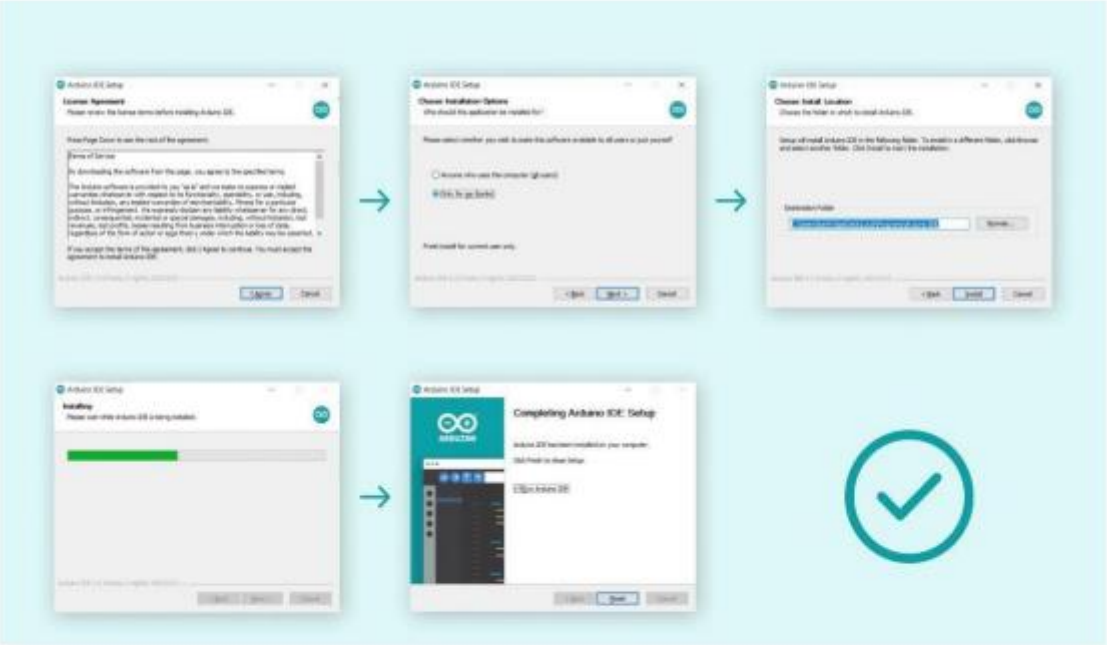

Figure 4.5: Installation Process

Figure 4.6: Basic Interface of Arduino IDE

Step 2: Setting up the ESP8266 Dev Module

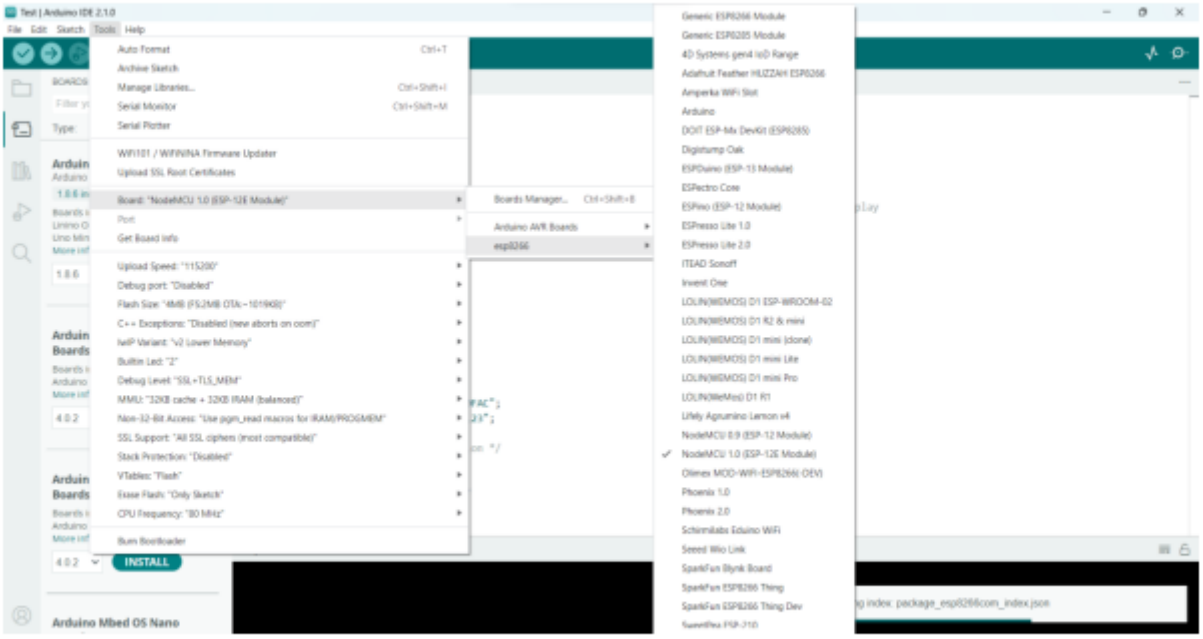

Figure 4.7: Setting up the ESP8266

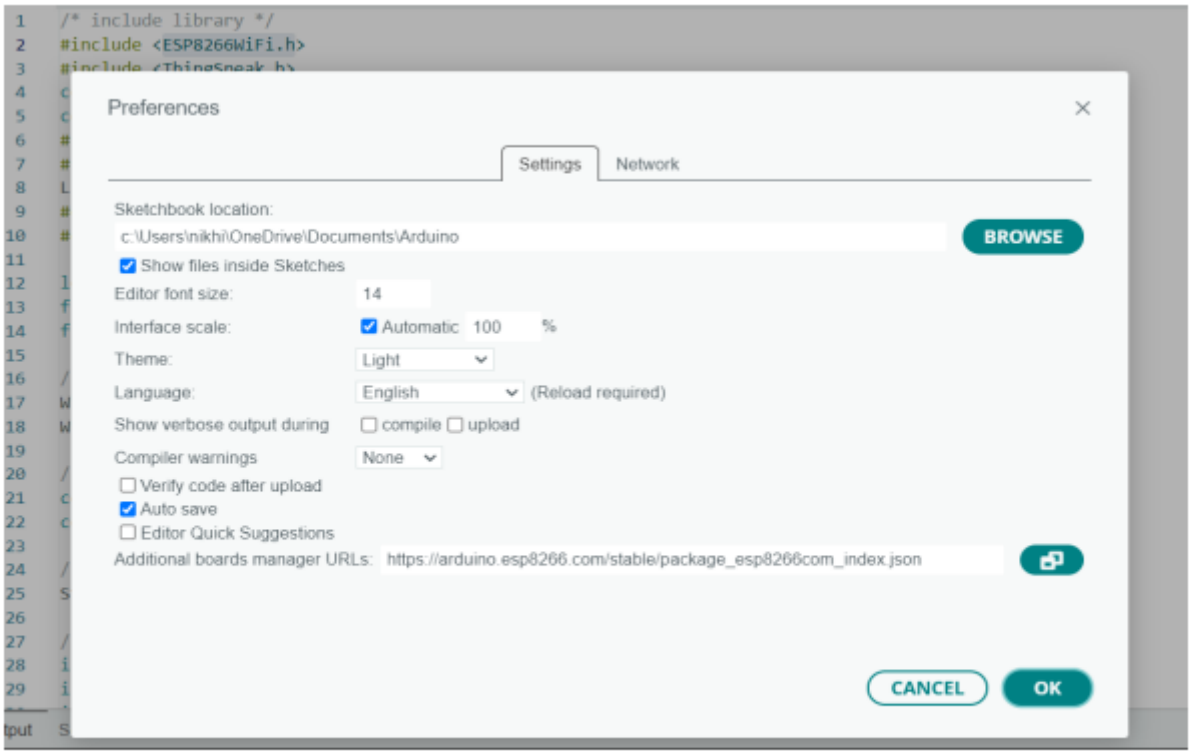

Figure 4.8: Preferences -> Additional Boards Manager URL

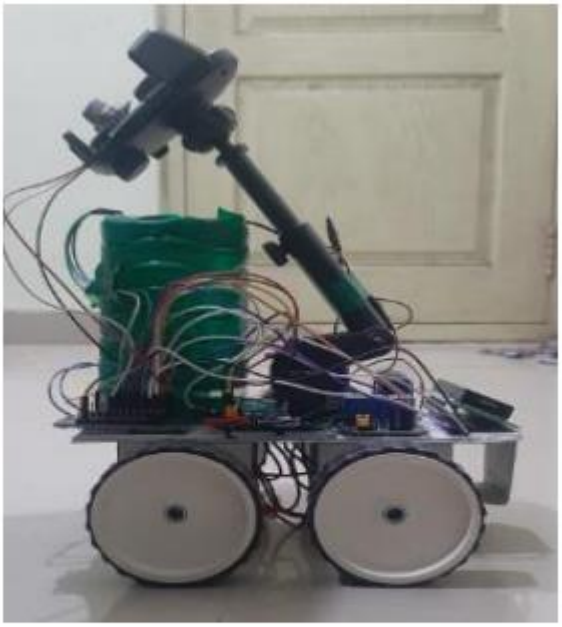

Figure A: Robot Prototype

14. Work plan:*(detailing time schedule for each proposed objective may clearly be indicated.)*:

Month 1: MODULE 1 – Estimating Hardware and their Functionality

Month 2: MODULE 2 - Analysis and Circuit Diagram Sketching

Month 3: MODULE 3 – Building/Fabricating the Prototype
Month 4: MODULE 4 – Final Fabrication, Testing, Output and Results

Month 5: STAGE 1: Final Fabrication
STAGE 2: Testing
STAGE 3 : Calculating ERROR % & Publishing Graph

15. Expected impact/ outcomes:

1. The distances and areas covered by the actuation setup

2. The distances and areas covered by the sprayer

The distances and areas covered by the actuation setup:

The position of the Nozzle is with the help of the combination of Horizontal and Vertical actuation, this combination is referred as the actuation setup. This is done so as to increase the work volume of the robot.Robot's movement The robot is run by 4 DC Motors which are connected to Arduino which in turn is connected to a smartphone application via Bluetooth. The robot motion is controlled by the smartphone application. The maximum speed of the Robot when fully loaded with all the components is 1.43 m/s. The High torque DC Motors are preferred which have a speed rating of 250 RPM.

3. Battery performance The difference between the conceptual design and the prototype is that the conceptual design has two Electrically operated Actuators. (One horizontal and One vertical) And so the power consumption varies between the two designs and hence the calculation of battery performance for the designs are done separately. Battery backup is chosen as the parameter to evaluate the battery performance. Battery backup is the amount of time for which the battery can power the entire robot before getting fully discharged. Battery backup is defined on the ratio of Battery Capacity to the Maximum current draw of the robot. Since all the electrical components are powered by the battery. The Maximum current draw will be the sum of the currents drawn by individual components. The capacity of the chosen battery is 4.5 Amps which is more than enough for powering all the components..

16. Suggested post project activities:

Robots may also run on PLC and SCADA with automatic systems. In this paper, overview of mechatronics approach of our multipurpose agriculture robot for precision Agriculture in India and worldwide development is reviewed. The prevention of food adulteration act looks to prevent the adulteration of the food and beverage items to be fit for human consumption, except water and drugs.

17. Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):Patent

18. Budget estimates: (Please provide details in each item)

Sl. No.	Items	Amount in Rs.
78.	➢ Motor Driver L298N ➢ ESP8266 Node MCU ➢ Two-Channel Relay ➢ 12V DC Motors ➢ Submersible Motor ➢ 9V HP Battery ➢ 12V Rechargeable Sealed Lead Acid Battery ➢ Liquid Crystal Display (16*2) ➢ Connecting Wires	5000 5000 3000 1000 4000 500 4000 500 500
79.	Travel	500
80.	Labour cost	500
	Total	24,500

✆: 080 -30219601/602/604/736, Fax: 080 – 25730551/ 30219629 E-mail: engprincipal@theoxford.edu Web: www.theoxford.edu

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:**IOT BASED ADULTERATION DETECTION AND PESTICIDES SPRAYING USING ROBOT**

61. I/We agree to abide by the terms and conditions of TOCE
62. I/We did not submit this or a similar project proposal elsewhere for financial support.
63. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Date: ……15/05/2023……

Place:……Bangalore…….

RECOMMENDATION

HEAD OF THE DEPARTMENT
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
THE OXFORD COLLEGE OF ENGINEERING
BANGALORE - 560 019

Head Of the Department:

THE OXFORD COLLEGE OF ENGINEERING

(Recognized by the Govt. of Karnataka, Affiliated to Visvesvaraya Technological University, Belagavi&
Approved by A.I.C.T.E. New Delhi, Accredited by NBA New Delhi and Recognized by UGC under section 2(f))
Bommanahalli, Hosur Road, Bengaluru –560068.
✆: 080 -30219601/602/604/736, Fax: 080 – 25730551/ 30219629 E-mail: engprincipal@theoxford.edu Web: www.theoxford.edu

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission: 17-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student:**Pallavi K M(1OX19CS067) Rushali S(1OX19CS080) Thrisha(1OX19CS110)

   Varsha N(1OX19CS115)

2. **Branch/ Semester/:** CSE/8TH Semester

3. **Project Title:**IOT Based Multi Parameter Patient Monitoring System

4. **Abstract:**The IoT-based completely affected character health monitoring device is a regular progressiveterm given to any clinical machine that has internet capability and may diploma one or extrahealthcare records of a affected character who is related to the device together with heartbeat,body temperature, humidity, blood pressure, steps, etc. The machine can record, or transmitand alert the medical doctor if there may be an abrupt exchange with inside the affectedcharacter's health. The IoT-based completely health monitoring device is used in which theaffected character and medical doctor for related health experts are at one in every of a typelocation. For example, a affected character can stay at a one in every of a type location andpreserve his or her routine existence and a medical doctor can show the affected character'shealth. Based on the received records from the affected character health expert can prescribethe fantastic treatment or take straight away motion in case of an emergency. In this project,we have got were given related temperature sensor, heartbeat sensor to Arduino and with thehelp of the ESP8266 Wi-Fi, the module sends the records to Thing speak Internet of thingsplatform. If there may be an abrupt exchange with inside the affected character's health, anSMS alert may be sent to the family member and attending medical doctor.

5. **Duration of the Project: 1 year**

6. **Total cost of the project:4536/-**

7. **Faculty Supervisor Details:**Prof. Manasa S M,
   Assistant Professor,
   Dept.of CSE.

TECHNICAL DESCRIPTION

8. **Description of the problem:(150 words):** The aim of this project is to develop an IoT-based multi-parameter patient monitoring system that can continuously monitor and track vital health parameters of patients in real-time. The existing manual monitoring methods in healthcare settings are often time-consuming, prone to errors, and requireconstant human presence. Therefore, there is a need for an automated system that can accurately and efficiently monitor multiple health parameters of patients remotely.

9. **Review of work done: (250 words):** an IoT-based multi-parameter patient monitoring system designed to measure BPM (heart rate), temperature, SpO2 (oxygen saturation), and humidity offers several significant advantages in healthcare settings.Firstly, such a system enables continuous and remote monitoring of patients, providing real-time data on vital parameters. This allows healthcare professionals to closely track a patient's health status without the need for frequent manual checks,

enhancing patient comfort and reducing the burden on medical staff.Secondly, the integration of IoT technology allows for seamless connectivity between monitoring devices and centralized data management systems. This enables the secure and efficient collection, storage, and analysis of patient data, facilitating data-driven decision-making and personalized care.Additionally, the inclusion of multiple parameters such as BPM, temperature, SpO2, and humidity provides a more comprehensive understanding of a patient's condition. By monitoring these vital signs simultaneously, healthcare providers can detect potential abnormalities or patterns that may indicate underlying health issues or the effectiveness of ongoing treatments.Overall, an IoT-based multi-parameter patient monitoring system holds tremendous potential to revolutionize healthcare by enabling remote monitoring, centralized data management, comprehensive assessment of vital signs, early detection of health issues, and adaptable deployment. By harnessing the power of IoT technology, healthcare providers can deliver more effective, personalized care and enhance patient outcomes in an increasingly connected world.In this paper we have presented a health monitoring system using IOT where temperature and pulse values of a person can be monitored and stored in cloud platform. Further some more parameters like oxygen levels, blood pressure etc of an individual can also be stored in the cloud platform using which one can estimate about the health condition of a person.

10. **Rationale for taking up the project: (150 words):** The Internet of Things (IoT) has become increasingly significant in various industries and sectors. It offers numerous benefits, such as improved operational efficiency, real-time monitoring, and data-driven insights. By taking up an IoT project, you can tap into this growing trend and leverage its potential to enhance processes and deliver valuable outcomes.IoT projects generate a vast amount of data from various connected devices and sensors. By leveraging ThingSpeak, you can effectively collect, store, and analyze this data to derive valuable insights. Data-driven decision making can lead to optimized processes, proactive maintenance, improved resource allocation, and enhanced overall operational efficiency.

11. **Proposed** Objectives of the project: The objective of an IoT-based multi-parameter patient monitoring system designed to measure temperature, SpO2 (blood oxygen saturation), and BPM (heart rate) is to develop a comprehensive solution that leverages IoT technology to provide accurate and real-time monitoring of these vital parameters. The system aims to ensure precise measurement of temperature, SpO2, and BPM, enabling early detection of abnormalities and deviations from normal ranges. By analyzing the collected data, the system seeks to provide meaningful insights to healthcare professionals, facilitating informed decision-making and personalized treatment plans. Additionally, the system aims to offer remote monitoring capabilities, seamless integration with healthcare systems, robust data security, and a user-friendly interface to enhance patient care, improve outcomes, and optimize healthcare delivery in measuring temperature, SpO2, and BPM Monitoring.

12. **Methodology planned for the proposed objectives**:ThingSpeak integrates with other IoT platforms and services, making it easy to connect and exchange data with third-party systems. It supports integrations with popular platforms like MATLAB, IFTTT, Twilio, and more, enabling you to create complex IoT workflows and automation.

13. **Expected output of the project:**The ultimate target of the project is to build a smart heart rate and body temperature monitoring device based on IoT. Users can take extra care of their health or older parents or grandparents or seek family members. Users can check the current status of this device from anywhere anytime. They can share data with a doctor. The doctor can heart rate and body temperature and make some instant decisions based on those data. The development of the project is a low-cost portable pulse rate monitor that uses a pulse sensor that will form the basis of a portable and cheap heart rate monitor. This prototype would benefit users by monitoring their pulse rate at home or anywhere.
14. **Work plan:***(detailing time schedule for each proposed objective may clearly be indicated.)*:
    i. Project Initiation Phase
    ii. Research and Requirement Gathering
    iii. Design and Configuration
    iv. Integration Setup
    v. Workflow and Automation Development
    vi. Testing and Quality Assurance

vii. Documentation and Training
viii. Deployment and Evaluation
ix. Ongoing Maintenance and Support
x. Project Closure

15. Expected impact/ outcomes: The primary expected outcome of the project is to develop a robust IoT-based patient monitoring system that can continuously and wirelessly monitor multiple vital parameters of patients in real time. The system will provide accurate and timely data on vital signs such as heart rate, blood pressure, respiratory rate, oxygen saturation, and temperature.

16. Suggested post project activities: To ensure the accuracy of the heart rate monitor, multiple tests can be performed on more people with different ages and weights. More the parameters of important signs should be added to extend the worth of the project for patients. These will embrace pressure, temperature device, vital sign and different parameters. Implement pulse measurements and different parameters victimisation the mobile camera along with different integrated sensors to get these parameters on demand if the patient has begun to indicate some symptoms or anomalies. Using different ECG types of equipment and comparing the results to those that we get a better results. A microcontroller (MCU for microcontroller unit) it's necessary to send a bearing signal along with the measured information once a heart failure is detected and therefore the buzzer isactivated. The management signal should alter the GPS, explain to the applying to sendAssociate in Nursing SMS containing the measured information and therefore the position of the

15. Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.): Patent

16. Budget estimates: (Please provide details in each item)

Sl. No.	Items	Amount in Rs.
81.	Arduino Uno 1*16 LCD Display Jumper Cables NodeMCU Temperature and Humidity sensors MAX30100 Pulse Oximeter Sensor Heart-Rate Sensor ESP8266 Node MCU cable	650 180 180 649 71 108 1339 190 169
82.	Travel	500
83.	Labour cost	500
	Total	4536

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:

IOT Based Multi Parameter Patient Monitoring System

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65. I/We did not submit this or a similar project proposal elsewhere for financial support.
66. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of

Student: Pallavi K M, Rushali S, Thrisha,Varsha N

Date: 17-05-2022

Place:Bengaluru

RECOMMENDATION

HEAD OF THE DEPARTMENT

Head of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:18-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student:**Chetana Panda 1OX19CS023

   Hemant Raj Singh 1OX19CS034

   Jampana Darsh Raju 1OX19CS037

   Jino Thomas 1OX19CS038

2. **Branch/ Semester/ :CSE / VIII**

3. **Project Title:"LOCATING AND DETECTING TOXIC GASES IN MANHOLES"**

4. **Abstract:**We are learning about more life-threatening casualties as industrialization progresses. Physical labor is used to clean sewage systems. Critical situations have increased dramatically in recent years, finally leading to the fatalities and quick deaths of workers in sewers and manholes. These reports of deaths and environmental issues are spreading at an alarming rate. Sewage gas is a mixture of toxic and hazardous gases. It mostly contains a wide range of carbon, nitrogen and sulphur oxides, ammonia, and methane emitted by industrial wastes and domestic residues. Because gases are confined in manholes for extended periods of time, they grow toxic and can be lethal if proper precautions are not taken.

   Most of the time, we don't bring these difficulties to light, but if they aren't addressed, they can lead to disastrous occurrences. Workers put their lives at danger by going inside manholes to help everyone. Statistics suggest that many people have died as a result of gas poisoning from the hazardous gases in these tunnels. Pits connecting to subterranean supply systems are critical to their maintenance because they affect communication networks, water supply networks, gas supply networks, and power networks, among other things. A hole while necessary for municipal operations, may be one of the safest and most dangerous assets. After doing research with these issues, we have built an IoT based man-hole system that monitors gases. These broken manholes are threat to public safety. So, this research work is used as accident avoiding by saving lives of the people.

5. **Duration of the Project:**5 months

6. **Total cost of the project:**Rs.5500

7. **Faculty Supervisor Details:**Prof. L.Manjula

TECHNICAL DESCRIPTION

8. **Description of the problem:**
   The problem statement of toxic gases in manholes is that workers who enter manholes or sewer systems are at risk of exposure to hazardous gases, which can lead to serious health effects or even death. Toxic gases such as hydrogen sulphide, methane, and carbon monoxide are commonly found in manholes, and exposure to high concentrations of these gases can cause respiratory problems, loss of consciousness, and even death. The lack of proper ventilation, inadequate safety protocols, and limited access to gas detection equipment contribute to the problem. Therefore, there is a need for effective gas detection and monitoring systems, improved safety

protocols, and training for workers who enter manholes to prevent exposure to toxic gases and ensure their safety.
Critical situations have significantly increased in recent years, sometimes even resulting in worker fatalities or instantaneous deaths in manholes and sewers. The number of these fatality reports and environmental worries has been rising alarmingly. A mix of poisonous and hazardous gases make up sewage gas. It primarily contains a wide range of carbon, nitrogen, and sulphur oxides, ammonia, and methane that are produced as a result of all the industrial wastes and home wastes. Due to gases being poisonous after being confined in manholes for a long time, they can be lethal if the proper safety measures aren't implemented.

9. **Review of work done:**Manholes are amongst the most unprotected areas in the world. To combat this, we developed an affordable device that can help the social workers detect the gas levels and send the details of infected manholes to the government. Our device successfully warns employees about varied gas levels in the manhole and aids in the prevention of future mishaps. It is a high-performance monitoring system that does its work efficiently and safely. Moreover, it will help reduce the tragedies due to gas poisoning from manholes and to be alert for any hazardous gas outburst.

10. **Rationale for taking up the project:**

- Manholes are underground structures that provide access to various underground infrastructure such as pipes, water pipes and power lines. These places can be dangerous due to pollution. Carbon dioxide in manholes can be produced from many sources, including sewage, chemicals, and decomposed radioactive materials in natural gas.

- Some of the common gases found in manholes are methane, carbon monoxide, hydrogen sulphide and ammonia. Methane is a flammable gas formed by the decomposition of organic materials in sewage.

- It is also a by-product of oil drilling and can enter manholes from nearby pipelines. Carbon monoxide is a colourless, odourless gas produced by the breakdown of fuels such as gasoline, natural gas and propane. Hydrogen sulphide is a rotten egg-like gas formed as a result of the decay of organic materials. Ammonia is a common gas in manufacturing facilities and can be found in manholes near manufacturing facilities.

- Exposure to toxic gases in manholes can cause various health problems such as difficulty breathing, unconsciousness and even death.

- Methane and other flammable gases can also cause fire or explosion. Since pollutants in manholes are generally colourless, odourless and tasteless, personnel entering these areas should be appropriately trained in gas recognition and management. Workers should be equipped with appropriate personal protective equipment such as respirators and gas detectors.

- To prevent contaminants from being released into test wells, it is important to manage the ground well and prevent poisons and other sources of contamination. Employers should have clear procedures for accessing manholes and responding to emergencies.

- They must also provide their employees with regular safety training and ensure they have access to the necessary equipment and resources.

- As a result, toxic gases in manholes pose a serious safety hazard to workers and the public. To minimize these risks, it is important that steps are taken to prevent the release of harmful gases and that workers are properly trained and equipped to be safe in these locations.

11. **Proposed Objectives of the project :**

- The objective of our project is to develop an IoT device that gives real-time statistics of the concentration of various gases in manholes and also to help locate the manholes by sharing their latitudes and longitudes.
- Not only will this device detect toxic gases, but it will also send the data of the infected manhole to the respective authorities for further action.
- The data would be sent over the internet and also plan on storing it in a real-time database.

- With the help of sensory and systemic intelligence, we will be able to detect shutters within the drainage system and the application of the device will also be able to give the latitude and longitude of the particular manhole where the device is installed.
- This will help the authorities in locating the manholes accurately.
- This device has been developed to assist authorities and also to supress the health hazards caused by the toxic manholes.

12. Methodology planned for the proposed objectives:

After a hefty amount of research in the field of sensors and power supply units we were able to conclude upon which sensors would be best suited for our project.All in all we were able to finally settle to a particular model for our hardware components.Often the product is ruined due to incorrect programming language chosen for implementation or unsuitable method of programming.The most important details in this text are the three major implementation decisions that have been made before the implementation of this project: Analysis of the hardware components ,Fabricate the prototype, Implementation of any software is always preceded by important decisions regardingselection of the platform, the language used, etc.Implementation should be perfect mapping of the design document in a suitable programming language in order to achieve the necessary final product. Often the product is ruined due to incorrect programming language chosen for implementation or unsuitable method of programming. It is better for the coding phase to be directly linked to the design phase in the sense if the design is in terms of object-oriented terms, then implementation should be preferably carried out in an object-oriented way. The implementation involves:

13. Careful planning.

- Investigation of the current system and the constraints on implementation.
- Training of the team in the newly developed system.

In this stage, the design or design changes are introduced and made operational in a specific situation. Implementation of any software is always preceded by important decisions regarding selection of the platform, the language used, etc. these decisions are often influenced by several factors such as real environment in which the system works, the speed that is required, the security concerns, and other implementation specific details. There are three major implementation decisions that have been made before the implementation of this project. They are as follows:

- Analysis of the hardware components
- Fabricate the prototype
- Selection of the programming language for development of the application
- Coding guideline to be followed.

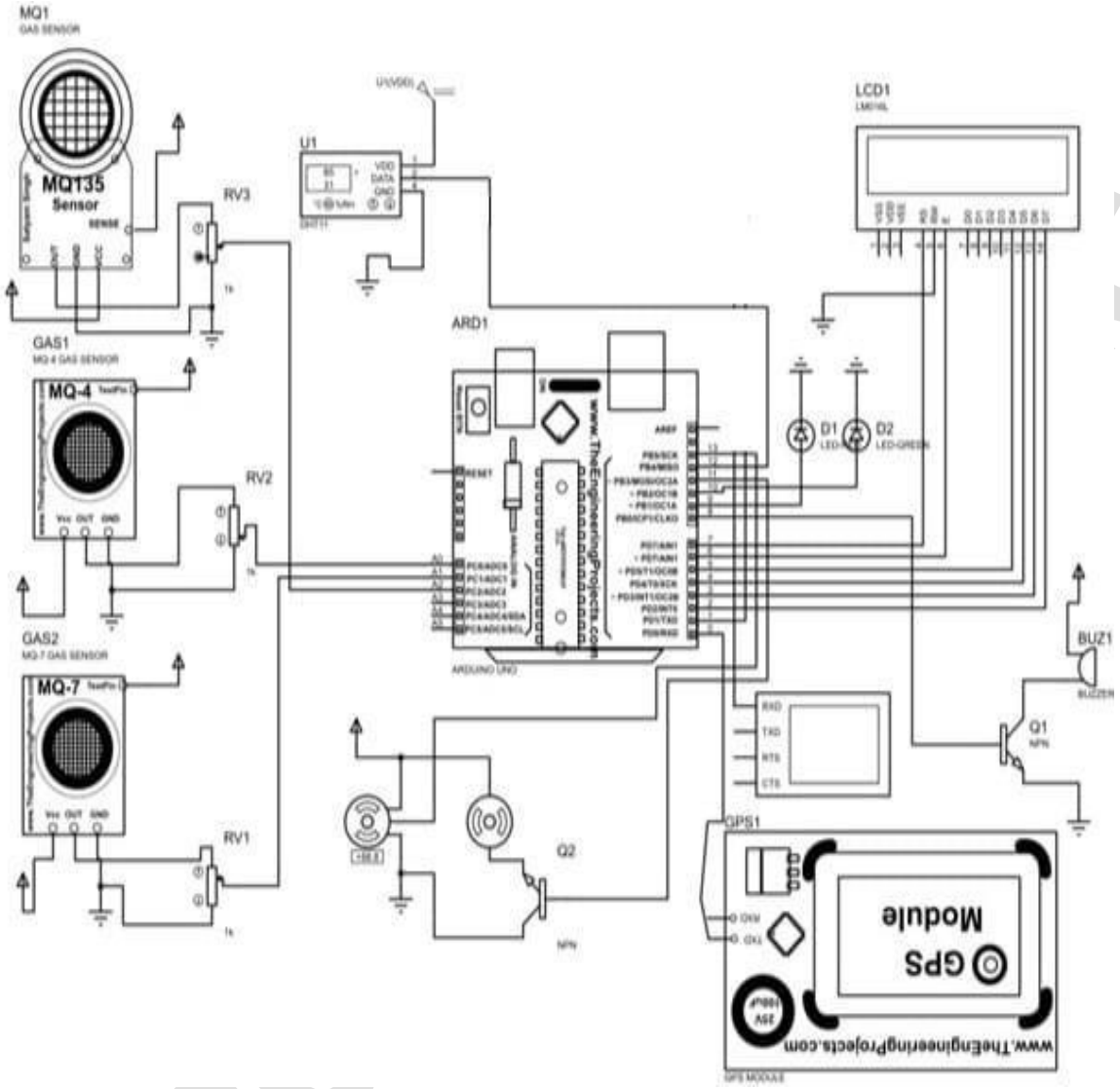
DESIGN CONTEMPLATION

The reason for the design is to arrange the arrangement of the issue determined by the necessities report. This stage is the initial phase in moving from issue to the arrangement space. As such, beginning with what is obliged; outline takes us to work towards how to full fill those needs. The configuration of the framework is maybe the most basic component influencing the nature of the product and has a noteworthy effect on the later stages, especially testing and upkeep. Framework outline depicts all the significant information structure, document arrangement, yield and real modules in the framework and their Specification is chosen. The preliminary design, or design consideration includes, often bridges a gap between design conception and detailed design, particularly in cases where the level of conceptualization achieved during ideation is not sufficient for full evaluation. This stage is the initial phase in moving from issue to the arrangement space.

SYSTEM ARCHITECTURE

The architectural configuration procedure is concerned with building up a fundamental basic system for a framework. It includes recognizing the real parts of the framework and interchanges between these segments. The beginning configuration procedure of recognizing these subsystems and building up a structure for subsystem control and correspondence is called construction modelling outline and the yield of this outline procedure is a portrayal of

the product structural planning. The proposed architecture for this system is given below. It shows the way this system is designed and brief working of the system.



System architecturediagram

14. **Expected output of the project:**
Expected output of the proposed project containsdifferentfunctionalities:

Sensors:

- The functional requirements of this project would consist of sensors, actuators, mobile phone with active network connection.
- The device would require diverse connections for connectivity and the best choice could be wireless options like Bluetooth, Wi-Fi, ZigBee, etc.
- The device should also accommodate GPS functionality to track the device or the end user using the devices.

Actuators:

- The device should also contain visual or auditory modules to alert the user in case of emergency or any anomaly observed in the readings.
- We could also use motors for automatically closing any nearby manholes in case of increased concentration of toxic gases.

Indicators:

- The device would contain an LCD display, LED lights and a buzzer for auditory indication.
- Analysis:
- Create a functional set of REST APIs which would return the current reading of the sensors from the device.
- A database functionality could also be implemented to store the previous data, analyze the data and warn the end user in case of any abnormality.

Application:

- The application should be able to provide alerts or notifications to the other workers outside the manhole and also to alert the residents around that area.

15. **Work plan:**

- Month 1: Examining existing manholes and learnt about the range of toxic gases.
- Month 2: Focusing on hardware and software's required for implementing projects.
- Month 3: Designing front layer and implementing hardware modules
- Month 4: Testing prototype and redesigning for faults.
- Month 5: Checking working style of prototype.

16. Expected impact/ outcomes:

- A thorough experimentation of the prototype is necessary so as to check the accuracy, calibration and efficiency of the sensors. The experimentation would also shed light on other factors such as proper working of UI, accurate data transfer to the system, data storage in cloud and so on.

Gas readings

- The readings of all the acquired sensors were taken and examined for testing and assurance purposes. These readings were taken under real life conditions and under natural environment imitating the toxic gases of manholes. The readings were found to be accurate; the readings were also found reflecting during change of environment and changes in toxicity level of gases accordingly.
- Manholes are amongst the most unprotected areas in the world. To combat this, we developed an affordable device that can help the social workers detect the gas levels and send the details of infected manholes to the government. Our device successfully warns employees about varied gas levels in the manhole and aids in the prevention of future mishaps. It is a high-performance monitoring system that does its work efficiently and safely. Moreover, it will help reduce the tragedies due to gas poisoning from manholes and to be alert for any hazardous gas outburst.

17. **Suggested post project activities:**

In the future, we can try and add various other harmful gas detectors, sprinkler systems to go off during a fire, continuous live data feed to a designated system, escape path lighting system to light up the nearest escape path in case of an emergency, increase ventilation to remove harmful gases quicker, add email service to notify agencies via electronic mail.The mobile application can also be more sophisticated with features such as FAQ, emergency plans and contact, chat bot. It could also have a SOS service to send location and all the current stats to emergency help services and notify them in case of any disaster.

18. **Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):Patent**

19. **Budget estimates: (Please provide details in each item)**

MQ135 MQ4 MQ9 Arduino uno WIFI ESP8266 Liquid crystal display ESP8266 MQ3	1650 236 257 649 71 108 1339 190
Travel	500
Labour cost	500
Total	5500

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:**LOCATING AND DETECTING TOXIC GASES IN MANHOLES**

67. I/We agree to abide by the terms and conditions of TOCE
68. I/We did not submit this or a similar project proposal elsewhere for financial support.
69. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of

Student: Chetana Panda, Hemant Raj Singh, Jampana Darsh Raju, Jino Thomas

Faculty: Prof Manjula

Date: **18-05-2022**

Place:Bengaluru

RECOMMENDATION

HEAD OF THE DEPARTMENT
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
THE OXFORD COLLEGE OF ENGINEERING
BENGALURU - 560 068

Head of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:18-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student:Abhishek C (1OX18CS002), Banu Priya U (1OX18CS015), Darshan P (1OX18CS020), G Pavan Kumar Reddy (1OX18CS024)**
2. **Branch/ Semester/ CSE/8th Semester**
3. **Project Title:SUPERVISION OF WATER DISTRIBUTION USING ANDROID AND IoT**
4. **Abstract:**

In India, scarcity of water has been a major crisis in past decades. Though the availability of fresh water in India is manageable, the water shortage in India is about 209 m3 per person. When compared to other developing countries India is having well available water resources, but the problem here is the method by which they are distributing water is not approachable. There are so many places in India where people have to walk miles together to get water. Apart from this, there are places where water is plentiful, but water circulation is not done efficiently and properly. Keeping the above crises in mind we have developed a project that would solve most of the Water Shortage problems that are faced due to irregular water circulation. We will develop a full working system that would understandably explain the system. Some of the main features of our projects are we will develop an Android Application to control the water circulation effectively, secondly, through IoT, we will connect the circulation system to the Android Application. The project manager or the system head will be having the Android Application on their smartphone. They will choose the preferred area to which the water must be circulated and decide to which extent the water will be circulated. Once the head gives the instruction and the timings water circulates to the preferred area. The best part is that once the head decides the place and time the residencies of the preferred area will receive an SMS stating the timings of Water Circulation. Once the residents receive the water, they have to pay the water usage bill within the given duration.

5. **Duration of the Project: 5 months**
6. **Total cost of the project:33,390**
7. **Faculty Supervisor Details: Dr. Raghu R**

TECHNICAL DESCRIPTION

8. **Description of the problem:(150 words)**

These problems can be solved by implementing our project in real time.

The main objectives of our project is to design and develop a “Centralized Water Distribution System” which includes:

Android Application for the lineman:

An Android Application will be developed to the lineman associated with a particular area. Through this application the lineman can provide the instructions to Central Water Distribution Centre about the street to which water needs to be circulated and duration of this process. He can provide this instruction to the center anywhere through this application even if he is out of station. This eradicates the Water unavailability to the people if lineman is out of station. It also eliminates the problem of waste of time and energy of the lineman to manually going to pump and valves and turning them on.

Central Water Distribution Center:

Developing a Central Water Distribution Center that receives the instruction provided by the lineman's android application and act accordingly. This center acts as a connection between the Android Application and the hardware components. It receives the signal from the lineman which indicates duration and street of water distribution, process this signal and performs water circulation to the given street for given period of time. This eliminates the problem of unknown Water leakage in the distribution, running of pump in the entire duration of time, manual switching on and off of the valves, intimation of Water circulation to the people, wastage of Water due to damage in the flow of pipe or any other problem, corruption, wastage of man power and time.

9. Review of work done: (250 words)

- Studied about REFlex Water architecture which is used and deployed in Brazilian water system community.
- Things Speak IoT platform for the earliest response to a leak detection.
- Smart Rain Barrel (SRB) using IoT architecture. Smart Rain Barrel includes a rain barrel expanded by an exhaust valve, centrally controlled unit.
- IoT-based remote monitoring of water and controlling of the water flow.
- IoT for remote water consumption monitoring, detection of leakages, and warning the users in case of interruptions in water distribution.
- Wireless Sensor Networks (WSN) and the IoT for the burst detection of water pumps and motors, and leakage of water.
- The IoT-enabled framework to analyse, monitors, reports, maintains and distribute quality water.

10. Rationale for taking up the project: (150 words)

- In India, the Water available for usage is either wasted in Water available areas by letting of the not required water to sewage or the people of remote localities does not get water for usage only.
- People who do not get water has to walk miles together or has to pay more money to the borewell water that is distributed to their house through tractor or Water trucks. Overall people of these localities face a lot Water Scarcity and suffer a lot.
- This problem can be eradicated by the design of proper system.
- Our project mainly deals with the problem faced here, that is the concept of lineman whose work is to provide water to the residence of the area. This lineman where he/she has manually turn on the water pump, he himself has to go near the valve associated with a street and manually turn on the valve to provide water to the residencies of the street.

Main problem of this distribution method are:

- Firstly, the lineman himself has to manually turn on the Water pump used to pump water from water reservoir, which is waste of time as the lineman has to travel to location of the pump.
- Once the pump is on, the lineman has to come to the each of the valves associated with a street and turn on the valves manually through his hands. The chances are that the lineman can forget which street's valve is on or off which might lead to unwanted flow of water. Secondly it is waste of time and energy of the lineman.
- The pump has to remain in running state for the entire duration of time where the valves can be turned on or off. This is waste of electricity and hence reduces the durability of the pump.
- Suppose if the lineman is out of station or he isn't well, then there is not water for the residences of the entire street which would result in water unavailability for water usage of the people.
- One main problem with these kinds of system is corruption. The lineman asks people to provide money in order to circulate water to their street.

- If there is any damage in the pipes for water circulation, the entire water flowing from the pump will go waste. The fact is that in these system technicians take a lot of time to analysis and solving these damages which in turn is a loss for the residencies.

- Very importantly the people of the street are not intimated about Water circulation to their street, the lineman comes and turns on the valves anytime, due to which majority of the people may not get their portion of water.

11. Proposed Objectives of the project

The main objective of our project is to overcome the existing water distribution system by providing the manager a way to control the water distribution using Android instead of going to the main station and switching on the motor. The user can control the main system of distribution of an area through android application, by doing so the user can control, schedule, stop, monitor circulation of water to an area. Once an instruction is passed on the system receives the instructions and acts accordingly. Basically we are using the client and server scheme to control water distribution. The main goal of the project is to circulate water equally to all the residencies of an area or locality so that every user will get water without fail

12. Methodology planned for the proposed objectives:

- As discussed above we are using the two of the leading technologies IoT and Android for implanting our project which is best suited for our society.

- We use Android to develop an Android application to the lineman through which we send the information to the Central Water Distribution System.

- We use IoT (Internet of Things) to develop an interactive Central Water Distribution System.

The hardware model of our project is developed by using

- Waterflow pipes

- Water pumps

- Pressure Transducers

- Solenoid Valves

- Water reservoir

The detailed Methodology used is provided below:

Development of Android Application:

The software that is used to develop Android application is “Android Studio”. This software is chosen because it has wide range of libraries, compatibility, modules for interfacing and communicating which are essential requirement for our project.We use “Java/ Kotlin” as the primary programming language to code anddesign our Android Application.

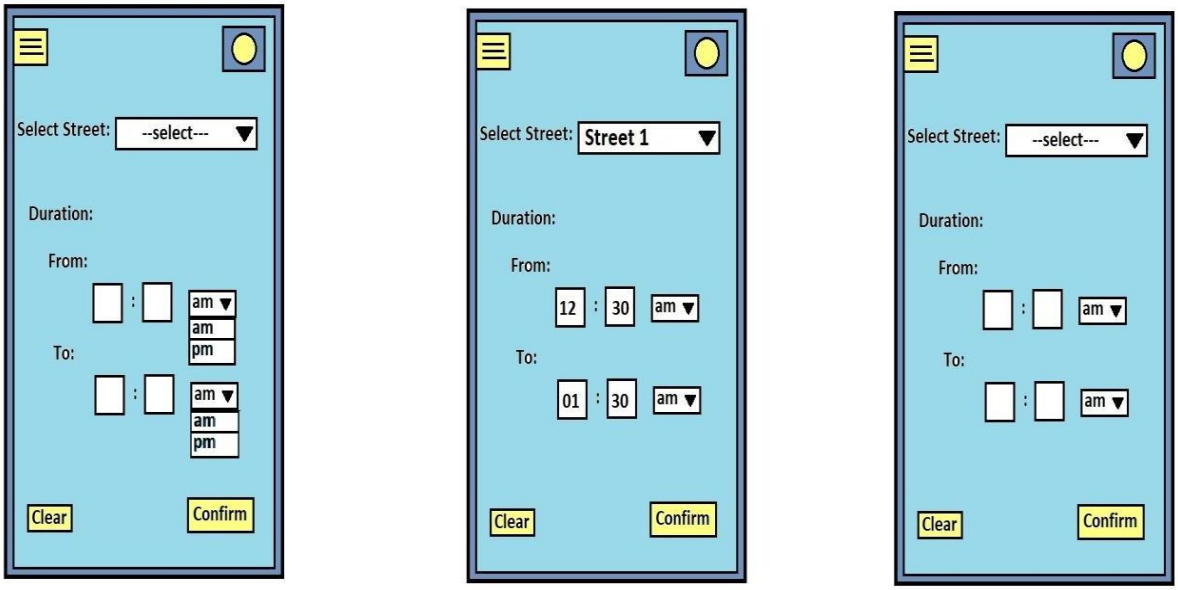


Figure 1. Android Interface

Development of Central Water Distribution Center:

As discussed Central Water Distribution Center is the interface between Android Application and Hardware Component.

It receives the signal from the lineman's Android Application which contains the information about the street and duration of the Water Circulation, processes it and circulates water as instructed.

It connects to components of hardware like the Water pump, Water Pressures transducers, Solenoid Valves.

Pressure transducers are used here to check if there is constant pressure throughout the pipe and Solenoid valves are used to on and off the valves as required.

As the Central Water Distribution Center receives signal through the Android Application it does the following actions:

- Turns on the Water Pump to take water from the Water Reservoir.
- Turns on the valve associated with the street mentioned by the lineman.
- If the pressure is same throughout the pipe, indicates there is no leakage or any other problem for water flow, then continue the process.
- It will sense the pressure throughout the given duration of time and if there appears a pressure difference between one point and the other point then, abort the process, turn off the valve associated with the street and turn off the Water pump.
- If aborted, then immediately send a message to the lineman stating the problem.
- Inform the residencies about the problem.

Figure 2 represents the position of Central Water Distribution Center in our project.

In the figure, as mentioned the Central Water Distribution Center is interfaced with a Water Motor Pump and the area.

In this figure we have assumed an area which is associated to the lineman consisting of three streets i.e., STREET 1, STREET2, STREET3.

The Waterflow pipes are all connected to individual homes of the street and also to the main water pump.

The Key Words used in the figure are:

S: Solenoid Valves associated with each street initially all the valves will be off.

P: Pressure transducers to sense the pressure between one end of the pipe to the other end.

H: Represents houses present in each street.

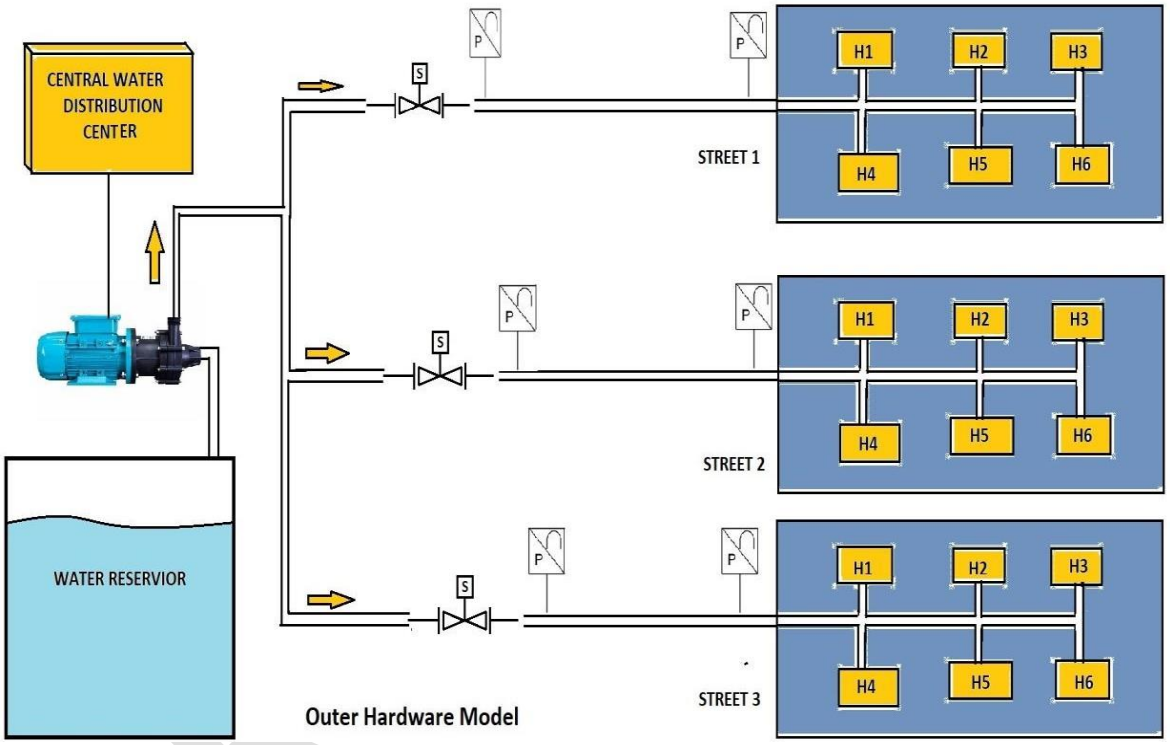


Figure 2: Structure of the Outer Hardware Model.

13. Expected output of the project:

The final representation of our project is show through the working of hardware model. The hardware model includes:

- Central Water Distribution Center
- Water pump
- Water reservoir
- Solenoid Valves
- Pressure Transducers
- Waterflow pipes

The outcome of our project is explained below:

As soon as the lineman confirms the street and duration of Water circulation a signal will be transferred from lineman's Android Application to the Central Water Distribution Center.

The ESP8266 receives the message and provides it to the Arduino Uno which process the signal referring the program dumped to the Arduino.

Assumptions made: Street 1 is selected for Water Circulation and the duration of flow is from 12:30pm to 01:30pm.

As the lineman confirms the street1 and duration from 12:30pm to 01:30pm a signal is transmitted to the Central Water Distribution Center.

There the signal is processed and based on the signal information following action takes place if there is no pressure difference between the two pressure transducers in a single waterflow pipe of a street

- An intimation message is sent to residencies of Street 1 as soon as confirmed.
- Initially all the Solenoid valves of all streets are closed.
- The Water pump is turned On and water is drawn from Water reservoir. This water is circulated through the Waterflow pipe connected to each of the street's Solenoid valves.

Based on the signal provided, STREET 1's solenoid valve is opened to transfer water to the street1's waterflow pipes. Remaining valves are closed.'

- The pressure transducers are turned on to record the pressure difference between two points of the Waterflow pipe.
- The water is circulated to each house in the street without any disturbance.

After 01:30pm following action will be performed:

- The central water distribution center provides signal to turn off the pressure transducers.
- Once the pressure transducers are off, the water pump is turned off and stopping the water pumping from Water reservoir.
- Later the STREET 1's solenoid valve is closed to stop the flow of water to the street 1's waterflow pipe. Along with these all other valves are in closed state only so that next time there is no confusion of open or close.
- Once all these process are done a successful message will be sent to the lineman's Android Application. Later a successful entry is entered into Central Water Database automatically once a successful message is generated.
- Along with this a successful entry is stored in lineman's mobile's local memory. This is done to retrieve entries once the lineman selects all entries from the option bar of working screen.
- All of these processes are repeated for a new signal and confirmation from lineman.

If there is consistent pressure drop between the two Pressure Transducers which is calculated by the program given to Arduino Uno board, then following actions are performed:

- The STREET 1's solenoid valve is closed first, stopping the flow of water in the Street 1's waterflow pipe.
- Later the Water Pump is turned off thereby stopping the pumping of Water from Water reservoir to Waterflow pipe.

- Later an error message is generated by the Arduino Uno's program and is sent to lineman's Android Application through ESP8266 Wi-Fi module. The message format is provided in figure 10.
- Once an error message is received to lineman's Application an error
- entry is entered into the Central Water Database.
- Along with this, an error entry is also entered in the lineman's local storage. This is used to retrieve all entries required in the all entries field in the option bar.

The pressure difference might be a cause due to the following reasons:

- There is a leakage in the Waterflow pipe.
- The Water pump is not pumping the Water from the Water reservoir in a required pressure.
- There is blockage in the Waterflow pipe blocking the Waterflow

14. Work plan:*(detailing time schedule for each proposed objective may clearly be indicated.)*:

Month 1: Examining existing water distributed systems

Month 2: Focusing on hardware and software's required for implementing projects.

Month 3: Designing front layer and implementing hardware modules

Month 4: Testing porotype and redesigning for faults.

Month 5: checking working style of prototype.

15. Expected impact/ outcomes:

Supervision of Water Distribution is a new way of circulating water with the help of modern technologies like IoT and Android. An attempt has been made for a smart water distribution on a prototype basis with only few end users, transducers and valves. The same idea can be extended to many distribution tanks and consumers. The proposed system can be used in remote areas. The data collected from Android platform over a database can be used for further analysis like consumption forecasting, lineman's activity, residential details. The transducers will be controlled by the Central Water Distribution Centre. Man power is reduced in the distribution team. The lineman can control the activities of the Water Distribution System through his Android Application. By successful implementation of this project water crisis can be reduced and future usage of water can be maintained by the management and distribution team.

16. Suggested post project activities:

- In order to avoid the problems faced by the people of the residences of an area and mainly in order to track whether Water is properly and timely circulated to the people of the state this Database is used.
- Once a lineman confirms the street and duration of Water circulation, the signal will be passed to the Central Water Distribution Centre, and also along with this an entry will be made in the Central Water Database.
- These entries are basically the street number, area, duration and status of the Water Circulation which are stored under the lineman's directory or table.If the Water was circulated to the residencies properly without any problem or leakage, then the status will be marked as success.
- Else if there was any problem in Water distribution like leakage or pump pressure reduced or anything, then firstly an error message will be sent to lineman's Android Application along with this the status in the Database related to this activity will be marked as Unsuccessful.
- This is used for the reference of the assumed Central Board of Water to analyse the work of the lineman. Another important point is that these kind of entries are also stored in thelineman's local storage i.e., the mobile storage of the lineman.
- This is used to retrieve information about all water circulation that has been done till now and the status of the circulation.Doing this will have a proof of work done by the lineman and to check whether the problem faced by people was solved or not.

17. **Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):Patent**

18. **Budget estimates: (Please provide details in each item)**

Sl. No.	Items	Amount in Rs.
84.	Arduino Uno	650
	5v Single Channel Relay Module	800
	ESP8266	480
	1*16 LCD Display	180
	Pressure Transducers	19,800
	Solenoid Valves	5,700
	1/2hp Self Priming Mono Block Pump	3,500
	Jumper Cables	180
85.	Travel	500
86.	Labour cost	500
87.	½ an inch CPVC pipe	600
	Other components (pipe colar, T joint, etc.,)	500
	Total	33,390

✆: 080 -30219601/602/604/736, Fax: 080 – 25730551/ 30219629 E-mail: engprincipal@theoxford.edu Web: www.theoxford.edu

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:**SUPERVISION OF WATER DISTRIBUTION USING ANDROID AND IoT**

70. I/We agree to abide by the terms and conditions of TOCE
71. I/We did not submit this or a similar project proposal elsewhere for financial support.
72. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of

Student: Abhishek C, Banu Priya U, Darshan P, G Pavan Kumar Reddy

Faculty: Dr. Raghu R

Date: 18-05-2022

Place:Bengaluru

RECOMMENDATION

HEAD OF THE DEPARTMENT

Head of the Department:

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(RecognizedbytheGovt.ofKarnataka,AffiliatedtoVisvesvarayaTechnologicalUniversity,Belagavi&
ApprovedbyA.I.C.T.E.New Delhi,AccreditedbyNBANewDelhiandRecognizedbyUGCundersection2(f))
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✆: 080-30219601/602/604/736,Fax:080–25730551/30219629 E-mail: engprincipal@theoxford.eduWeb: www.theoxford.edu

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Dateof submission:18-05-2022

GENERALINFORMATION

1. **Name andUSNoftheStudent:**Arpita[1OX19CS012],ChandanaNC[1OX19CS022], DeepikaBR[1OX19CS028] EdigaVamshikrisna[1OX19CS030]
2. **Branch/Semester/:**CSE/8THSemester
3. **ProjectTitle:**CropProtection FromWild AnimalsUsingEmbedded EdgeAI
4. **Abstract:**Surveillance plays a major role in many fields be it at home, hospitals, schools, public places, farmlandsetc. It helps us to monitor a certain area and prevent theft and also provides proof of evidence. In the case offarmlands or agricultural lands surveillance is very important to prevent unauthorized people from gaining access tothe area as well as to protect the area from animals. Various methods aim only at surveillance which is mainly forhuman intruders, but we tend to forget that the main enemies of such farmers are the animals which destroy thecrops. This leads to poor yield of crops and significant financial loss to the owners of the farmland. This problem isso pronounced that sometimes the farmers decide to leave the areas barren due the farmlands as well as providessurveillance functionality. to such frequent animal attacks. This system helps us to keep away such wild animalsfrom.
5. **DurationoftheProject:1year**
6. **Totalcost oftheproject:5536/-**
7. **FacultySupervisorDetails:**Prof.SathyaM, Assistant Professor,Dept.ofCSE.

TECHNICAL DESCRIPTION

8. **Description of the problem: (150 words):**The aim of this project is to develop wildlife population is increasinglythreatened because human behaviour is changing the natural system through aggressive resource acquisition andlandscape changes. In addition, the urbanization of our society has reduced the interaction between humans andwildlife, and many outdoor recreation activities have decreased in popularity. As a result of this problem, oursociety has caused more problems for wildlife, while also reducing the focus on wildlife species and naturalecosystems.Thishascreatedamajorbarriertoeffectivemanagementofnaturalresourcesandwildlifeconservation. Studying and monitoring wildlife can be achieved by meansof non-invasive sampling techniquessuch as the camera trapping approach [14,4,8]. This method captures digital images of wild animals, using smalldevices composed of a digital camera and a passive infrared sensor. Camera trapping helps the biologist to sampleanimalpopulations andtoobservespeciesfor conservation purposes.
9. **Review of work done: (250 words**): In this project, the performances are measured in terms of false alarm andmisdetection errors in classifying detected objects. It shows the classification results from a sequence acquired inlaboratory, by simulating a waiting room environment. The results obtained from sequences acquired in waitingrooms of two Italian railway. A false alarm is presented whenever a change not related to an abandoned object isclassified as it was an abandoned object. A misdetection happens whenever an abandoned object is classified as itwas not. On the basis of these definitions, it is possible to obtain the performances of the system in the differentconsideredenvironments.

Inthis paper,anew techniques todetect and analyseperiodicmotion as seenfrom both astatic andmoving

camera. By tracking objects of interest, we compute an object's self-similarity as it evolves in time. Forperiodic motion, the self-similarity measure is also periodic and we apply Time-Frequency analysis to detect andcharacterizetheperiodic motion.The periodicityisalsoanalyse usingthe2Dlatticestructuresinherentinsimilarity

matrices. Future work includes using alternative independent motion algorithms for moving camera video, whichcould make the analysis more robust for non homogeneous backgrounds for the case of a moving camera. Furtheruse of the symmetries of motion for use in classification of additional types of periodic motion is also beinginvestigated.

10. **Rationale for taking up the project: (150 words):** In this project, technique to study wildlife using automaticallytriggered cameras and producesgreatvolumesofdata. However, camera trapping collects imagesoften result inlow image quality and includes a lot of false positives, which must be detection before the postprocessing step.This paper presents a two-channelled perceiving residual pyramid networks (TPRPN) for camera trap imagesobjection. Our TPRPN model attends to generating high-resolution and high-quality results. In order to provideenough local information, we extract depth cue from the original images and use two-channelled perceiving modelasinputtotrainingournetworks.Finally,theproposedthree-layerresidualblockslearntomergealltheinformation and generate full size detection results. Besides, we construct a new high-quality dataset with the helpof Wildlife Thailand's Community and Mammal Organization. Experimental results on ourdataset demonstratethatourmethodissuperiortotheexisting objectdetectionmethods.

11. **Proposed Objectives of the project:** The objective of a project is to capture the image of the Animal usingcamera and detect if any other animal is with the animal folk so the farmer can take Suitable action based onthetype of theintruder.TodetectFireinforestandintimate.

12. **Methodology planned for the proposed objectives**:The objective is to detect Intrusion in the Field , Capture theimageandClassifyingThemUsingImageProcessing,takingSuitableactionbasedontheintruder,sendNotificationto farmers andForestOfficialsandtoDetectFirein forestandIntimate.

13. **Expected output of the project:** The image is captured by using a camera and which is then converted to a greyscale image to make it feasible for comparison with the existing data set values. The existing systems like barcode scanners and manually counting of livestock is not beneficial as it consumes a lot of time and the errormargin becomes high so to overcome such hurdles we have designed a real time system that performs such ataskwithefficiencyandiscosteffective.

14. **Workplan:** *(detailingtimeschedule foreachproposed objectivemayclearlybeindicated.)*:
    i. ProjectInitiationPhase
    ii. Research and RequirementGathering
    iii. Design andConfiguration
    iv. Integration Setup
    v. WorkflowandAutomationDevelopment
    vi. TestingandQualityAssurance
    vii. DocumentationandTraining
    viii. DeploymentandEvaluation
    ix. OngoingMaintenanceandSupport
    x. ProjectClosure

15. **Expectedimpact/outcomes:**Theprimaryexpectedoutcomeoftheprojectistodevelopsystemdesignedshowninthebloc kdiagramperformsthedetectionandcountingoftheWildAnimals.Theraspberrypiisusedtomakethesystemportableandaff ordablebybothsmallscaleandlargescalelivestockproducers.

16. **Suggested post project activities:**A sub server unit can be used in between the transmitter unit and main receiverunit to make the whole process take comparatively less time to alert the forest officer to take preventive action.The system can also be upgraded with low-power elements, higher versions of Zigbee in order to make thesystem run for longer periods with increased efficiency.With the advancement in the portable computers likeraspberry pi in regards with the memory, processing speed, and networking capabilities the accuracy andperformanceofthissystem canbeimprovedsignificantlysinceawiththecurrentspecificationsoftheraspberrypi3b+theutilizationofresourcesbyth edeeplearningalgorithm ishighwhichhinderstheperformance and thereby reducing the accuracy to a certain level and the temperature on the processor reachestemperature that are harmful for the processor itself so with a better cooling systems like heat sinks attached tothe processorcan increase the performance significantly becausewhen the processorreachesathresholdtemperatureitundergoesthermalthrottlingwhichshutsdownthesystemimmediately.

17. Suggestedplanofactionforutilizationofexpectedoutputsfrom theproject(commercialization/entrepreneurship /patentetc.):Patent

15. Budgetestimates:(Pleaseprovidedetailsineachitem)

Sl.No.	Items	Amount inRs.
1.	ArduinoUno 1*16LCDDisplay JumperCables NodeMCU TemperatureandHumiditysensors MAX30100PulseOximeterSensor Heart-RateSensor ESP8266 NodeMCUcable	650 180 180 649 71 108 1339 190 169
2.	Travel	1000
3.	Labourcost	1000
	Total	5536

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Approvedby A.I.C.T.E.New Delhi,AccreditedbyNBANewDelhiandRecognizedbyUGCundersection2(f))
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UNDERTAKINGFROMTHE INVESTIGATOR

PROJECTTITLE:**CROPPROTECTION FROMWILDANIMALS USINGEMBEDDEDEDGEAI**

1. I/ We agree toabide bythe termsandconditionsofTOCE
2. I /Wedidnotsubmitthisor asimilar projectproposalelsewhereforfinancialsupport.
3. I / We have explored and ensured that equipment and basic facilities will actually be available as and when required for thepurposeoftheproject.

Name&Signatureof

Student: **Arpita ChandanaNC DeepikaBR EdigaVamshi krisna**

Faculty:**Ms.SathyaM**

Date:**18-05-2022**

Place:Bengaluru

RECOMMENDATION

HEAD OF THE DEPARTMENT
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
THE OXFORD COLLEGE OF ENGINEERING
BENGALURU - 560 068

HeadOftheDepartment:

THEOXFORDCOLLEGEOFENGINEERING

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ApprovedbyA.I.C.T.E.NewDelhi,AccreditedbyNBANewDelhiandRecognized byUGCundersection2(f))
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FORMATFORPROPOSALUNDERINSTITUTIONALSEEDMONEYFOR INNOVATIVERESEARCHPROJECT

Dateofsubmission: 18.5.23

GENERALINFORMATION

1. **Name and USN of the Student:** Suhas K (1OX19CS103), Sarvesh P (1OX19CS092), Surya Peket (1OX19CS104),Sanjana HB(1OX19CS090)

2. **Branch/Semester/:**BachelorofComputerScienceandEngineering,8thSemester

3. **ProjectTitle:** AutonomousAirCaliber Detectorusing AndroidandIoT

4. **Abstract:** In this study, a novel real-time air quality monitoring and purification approach using cost-effective IoTdevices is presented. The proposed setup makes use of affordable air-quality nodes that have been equipped with gassensorsandWi-FimodulesthatuploadthemostrecentandongoingmeasurementsofairconcentrationtotheThingSpeak Cloud. During software development, a lightweight algorithm and a cloud storage system were incorporatedto reduce the system's energy consumption. A visual and numerical interface for the measurement data is also readilyavailable in the ACADIA Android application. The proposed method might enhance the immediate surroundings andinspire neighborhood action to improve the air. Identifying efficiently decreasing pollution sources can be aided by real-time monitoring and purification. Nevertheless, the system's affordability may make it accessible to a wider population,including those living in low-income areas where air pollution istypically worse. Overall, this paper provides aninsightfulandnewanswerto theproblemofairpollutionandhasenormouspotentialforfurther studyandimprovement.

5. **DurationoftheProject:** 3-4Months

6. **Totalcostoftheproject:**Rs11000

7. **Faculty Supervisor Details:** Shruthi K Reddy, Assistant Professor, Department of Computer Science and Engineering,TheOxfordCollege of Engineering,email: shruthireddy1551@gmail.com

TECHNICALDESCRIPTION

8. **Description of the problem:** Air pollution is a serious problem that causes millions of deaths worldwide each year, withthe majority of deaths being due to pneumonia and chronic obstructive pulmonary disease (COPD). Air pollution iscaused by a range of sources, including industrial facilities, vehicles, and buildings. However, monitoring and measuringair pollution can be challenging, making it difficult to identify and eliminate the sources of pollution. To protect publichealth, effective air pollution monitoring and purification systems are needed that can detect and measure pollutants inreal-time, alert when levels exceed safe limits, and purify the air to reduce harmful substances. The Internet of Things(IoT) offers a promising solution by integrating with machine learning and deep learning algorithms to improve systemperformance.Thispaperdescribesthedesignanddevelopmentofsuchasystemanddemonstratesitsreal-worldapplication.

9. **Reviewofworkdone:**Theairpollutionmonitoringandpurificationsystemdesignedinthisprojectprovidesacomprehensive solution to address the challenges of air pollution. The system's dispersed network of air quality sensorscollectsvariousdatapoints,suchastemperature,humidity,PM2.5,andCO2,providingamorecompletepictureoftheair quality. The sensors' data is transmitted wirelessly through an IoT device and processed by a server, making the dataeasilyaccessible tousersthroughanAndroidapp.

   Thesystem'sabilitytoperformpredictiveanalyticsusingmachinelearningalgorithmsisasignificantadvantage,providing valuable insights into future air quality trends. Additionally, the app's customizable features, including theability to set up alerts for specific air quality parameters and display only certain types of data, make the system moreuser-friendlyandflexible.Theinclusionoffeaturesforcalibratingthesensorsandperformingregularmaintenanceonthesystemensures that the systemremainsreliableandaccurate.

This is particularly important in ensuring that the system's data is trustworthy and provides accurate information to users.This project provides a promising solution to address the challenges of air pollution. The system's comprehensiveapproach,includingthedispersednetworkofairqualitysensors,IoTdevice,server,andAndroidapp,offersareliableandeffectivewaytomonitorandpurifytheair.Thesystem'spredictiveanalytics,customizablefeatures,andmaintenance and calibration features make it a valuable tool for protecting public health and reducing air pollution'sharmfulimpacts.

10. **Rationale for taking up the project:** The rationale for taking up this project is that theproject aims to address thecritical issue of air pollution, which is responsible for millions of deaths worldwide each year. The project's main goal isto develop an air pollution monitoring and purification system that can detect and measure pollutants in real-time, alertwhen levels exceed safe limits, and purify the air to reduce harmful substances. The project uses a unique approach ofusing a dispersed network of air quality sensors connected to an IoT device and server, which processes and makes thedata available through an Android app. The app's customizable features and predictive analytics using machine learningalgorithms make the system more flexible and user-friendly. Additionally, the project includes features for calibrating thesensors and performing regular maintenance on the system to ensure its reliability and accuracy. The project's overallobjectiveisto provideacomprehensivesolution to addressairpollution challengesand protectpublichealth.

11. **Proposed Objectives of the project:** The system consists of a dispersed network of air quality sensors that can measurethings like temperature, humidity, PM2.5, CO2, and more. These sensors are connected to an IoT device, such as anArduino, which collects and transmit the sensor data wirelessly. The IoT device is connected to a local network, such asthrough Wi-Fi, and it sends the sensor data to a server for storage and processing. The server then processes the sensordata and makes it available to users through an API. Users can access the processed sensor data through an Android app,which allows users to view the current air quality data from the sensors in real time, as well as historical data and trendsover time. The system has the capability to perform predictive analytics, using machine learning algorithms to forecastfuture air quality trends based on current and historical data. The app provides alerts if the air quality exceeds certainthresholds.TheAndroidappalsoallowsuserstocustomizetheirairqualitymonitoringexperience,bysettingupalertsfor specific air quality parameters or by choosing to display only certain types of data. To ensure the reliability andaccuracy of the system, we include features for calibrating the sensors and for performing regular maintenance on thesystem.

12. **Methodology planned for the proposed objectives**: To develop an effective air pollution monitoring and purificationsystem, a comprehensive methodology is required. The methodology can be divided into five main components, startingwith data collection and system maintenance. This involves installing and calibrating air quality sensors at variouslocations and ensuring regular maintenance of the sensors and IoT devices to ensure accurate data collection.
    Protocolsformaintenance,calibration,andreplacementofsensorsandIoTdevicesshouldalsobeestablishedtoensurethesystem'sreliabilityandaccuracyovertime.

    Thesecondcomponentisfiltrationandcollection,whichinvolvesimplementingairfiltrationsystemstoremovepollutants from the air. Air samples are collected using the air quality sensors and IoT devices, and proper storage andhandling of air samples are ensured for further analysis. The third component is data transmission, which uses wirelesscommunication protocols to transmit data from the air quality sensors to the IoT devices. Secure and reliable datatransmission isessentialtoensure theaccuracyof thedata collected.

    The fourth component is data processing, which involves using machine learning algorithms to process the data collectedfrom theair quality sensors.The dataisanalyzed to identifytrendsandmakepredictionsaboutfuture airquality.
    The final component is data archiving and data broadcasting, which involves storing the processed data in a secure andaccessible database. The data is made available to the public through a user-friendly interface, such as an Android app.Regularbackups and updates tothe databaseandinterfaceareessentialto ensurethatthe datais up-to-dateandaccessibletothe public.

    Thismethodology providesa comprehensive approach to airpollution monitoring and purification, ensuring accuratedatacollection,analysis,anddisseminationtothepublic.Regularmaintenanceandcalibrationofthesystem'scomponents are crucial to maintaining the system's reliability and accuracy over time, making it a valuable tool inprotectingpublic healthandreducingtheharmfulimpactsofairpollution.

13. **Expected output of the project:**The expected output of an air pollution monitoring and purification system is toprovide accurate and reliable real-time data on air quality, identify trends, and make predictions about future air quality.The system should also provide alerts when air quality levels exceed safe limits and a user-friendly interface, such as anAndroidapp,tomakethedataaccessibletothepublic.Theairfiltrationsystemshouldeffectivelyremovepollutantsfrom the air, resulting in improved air quality and reduced health risks. Regular maintenance and calibration of thesystem's components should ensure its reliability and accuracy over time. Ultimately, the expected output of the airpollution monitoring and purification system should be to protect public health and reduce the harmful impacts of airpollution.

14. **Work plan:**

Thefollowingworkplan canbeusedtodevelopan airpollution monitoringand purificationsystem:

PlanningPhase:

- Definetheprojectscopeandgoals.
- Identifythetargetlocationsforinstallingairqualitysensors.
- Establishtheprojectbudgetand timeline.
- Determinetherequiredresourcesand personnel.

DesignPhase:

- Developadetailedsystemdesignfortheairpollutionmonitoringandpurificationsystem.
- Selecttheappropriateairqualitysensors,airfiltrationsystems,andIoTdevices.
- Developthenecessarysoftwareandalgorithmsfordataprocessingandanalysis.
- Designtheuser interfacefortheAndroidapp.

DevelopmentPhase:

- Installand calibrateairqualitysensorsatvariouslocations.
- Implementairfiltration systemsto removepollutantsfromtheair.
- DevelopandtesttheIoTdeviceandserverfordatatransmission andprocessing.
- Developand testtheAndroidapp fordatadisplay anduser interaction.

TestingPhase:

- Conductthoroughtestingoftheairpollutionmonitoringandpurificationsystem.
- Testthesystem'saccuracy,reliability,andfunctionality.
- Conductfield testingto ensurethesystem'sperformanceinreal-world conditions.

DeploymentPhase:

- Deploytheairpollutionmonitoringandpurificationsysteminthetargetlocations.
- Providetraining topersonnelon systemoperation and maintenance.
- Establishprotocolsforsystemmaintenance,calibration,andreplacement.

MonitoringandEvaluationPhase:

- Monitorthesystem'sperformanceandaccuracyovertime.
- Evaluatethesystem'simpactonairqualityandpublichealth.
- Collectfeedbackfrom userstoimprovethesystem'susabilityandfunctionality.

15. **Expected impact/ outcomes:** The impact of an air pollution monitoring and purification system can be significant andfar-reaching. By providing accurate and reliable data on air quality, the system can raise awareness of the dangers of airpollutionanditsimpactonpublichealth.Thesystemcanhelpidentifythesourcesofairpollutionandinformpolicymakersandcity plannersonhow toreduceharmfulemissions.

The system can also provide early warning signs when air quality levels exceed safe limits, allowing citizens to takeprotective measures to avoid exposure to pollutants. The outcomes of the project can be equally significant. The airfiltrationsystemcaneffectivelyremovepollutantsfromtheair,resultinginimprovedairqualityandreducedhealthrisks. The real-time data collected by the air quality sensors can inform citizens, policymakers, and city planners on theeffects of their actions on air quality. The predictive analytics generated by the machine learning algorithms can helpidentify future airqualitytrendsandinformdecision-makingon actionsto reduce air pollution.

16. **Suggestedpostprojectactivities:**

17. **Suggestedplanofactionforutilizationofexpectedoutputsfromtheproject(commercialization/entrepreneurship/patent etc.):**

18. Budgetestimates: (Pleaseprovidedetailsineach item)

Sl.No.	Items	AmountinRs.
1.	Materials/Consumables (Pleaseprovidedetailed breakupofmaterials/consumables)	10000
2.	Travel(detailsrequired)	500
3.	Labourcost(detailedbreakup)	500
4.		
	Total	11000

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ApprovedbyA.I.C.T.E.NewDelhi,AccreditedbyNBANewDelhiandRecognizedbyUGCundersection2(f))
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UNDERTAKINGFROMTHEINVESTIGATOR

PROJECTTITLE: AutonomousAirCaliber Detectorusing AndroidandIoT

1. I/Weagreeto abideby thetermsand conditionsofTOCE
2. I /Wedid notsubmitthisorasimilar projectproposalelsewhereforfinancial support.
3. I/ Wehaveexploredandensuredthat equipment andbasicfacilities willactuallybeavailable as andwhen requiredforthepurpose of theproject.

Name & Signature

ofStudent: Suhas K,

Sarvesh P, Surya

Peket, Sanjana HB

Faculty: Shruthi K Reddy

Date:18.05.2023

Place:Bengaluru

RECOMMENDATION

HEAD OF THE DEPARTMENT

Head ofthe Department:

THE OXFORD COLLEGE OF ENGINEERING
(Recognized by the Govt. of Karnataka, Affiliated to Visvesvaraya Technological University, Belagavi &
Approved by A.I.C.T.E. New Delhi, Accredited by NBA New Delhi and Recognized by UGC under section 2(f))
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FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:17/5/2022

GENERAL INFORMATION

1. **Name and USN of the Student:** Name:TEJAS M
   USN: (1OX18BT043),
   Name: Samuel Prince
   USN: (1OX18BT034)
   Name: Sanjay BR
   USN: (1OX18BT035)
   Name: Tejas HN
   USN: (1OX18BT042)
2. **Branch/ Semester :** Biotechnology,8th Semester
3. **Project Title: IN VITRO AND IN SILICO EVALUATION OF ANTI QUORUM SENSING ACTIVITY OF IPRIFLAVONE ON CLINICAL ISOLATES**
4. **Abstract:**

Microbial infection has become a global threat to multidrug resistance observable fact due to their biofilm forming capacity. Conventional treatment of infectious diseases with antibiotics kills or inhibits growth of bacteria, which in turn causes antibiotic stress, which encourages bacteria to develop resistance over time. Thus, there is indeed an emergency for alternative strategies to treat bacterial infections and to combat drug resistance. The discovery of communication (quorum sensing) regulating bacterial virulence, biofilm formation, colony forming unit, motility, sporulation and bioluminescence has gained the novel interest in recent days to tackle the bacterial infection without interfering with growth. Certain chemical compounds can interfere with quorum sensing (QS) system causing distortion in the bacterial communication. In the current study using *P. aeruginosa* and *K. pneumonia* clinical isolates, a synthetic derivative of natural flavone compound Ipriflavone was tested to act as potent anti-quorum sensing agent through *insilico* studies. Further, based on the results obtained from *insilico* studies various *invitro* studies were conducted on anti-microbial and anti-biofilm activity of *P. aeruginosa* and *K. pneumonia.* Results obtained from anti-biofilm studies revealed that a significant decrease in the biofilm formation across the concentration gradient (25, 50, 100, 125 µg/ml). Considering the results, it can be interpreted that Ipriflavone could be effectively used against biofilm forming *P. aeruginosa* and *K. pneumonia.*

5. **Duration of the Project:**9 Months
6. **Total cost of the project:** 12000
7. **Faculty Supervisor Details:**Ms. Salma Kausar, Assistant Professor, Department of Biotechnology, The Oxford College of Engineering

TECHNICAL DESCRIPTION

8. Description of the problem:(150 words)

Antimicrobial therapy against multi drug-resistant (MDR) *P. aeruginosa* and *K. pneumonia*biofilms is less efficient compared to the treatment of equal bacterial counts of free-floating planktonic cells, which has become a serious threat in hospital environment. The discovery of communication (quorum sensing) regulating bacterial virulence, biofilm formation, colony forming unit, motility, sporulation and bioluminescence has gained the novel interest in recent days to tackle the bacterial infection without interfering with growth. This mechanisms of bacterial sensing can be effectively blocked by natural or synthetic compounds by interfering with key steps of quorum sensing such as signal generation, signal accumulation or signal reception.

9. Review of work done: (250 words)

Gang Ming et.al., 2022 stated in their research that the TetR family regulators play vital roles in the transcriptional regulation of cell–cell communication using chemical languages. The AHL receptors regulate the AHLs biosynthesis in Gram-negative bacteria; while the GBL receptors control the GBLs biosynthesis in Gram- positive Streptomyces. Some orphan LuxR and pseudo GBL receptors respond to molecules more than just QS signals.

Hosny *et.al.*, 2021articulated that *K. pneumoniae* is one of the opportunistic *Enterobacteriaceae* that hampers the realization of the full potential of poultry production, resulting in significant production losses or even deaths. K. pneumoniae can thrive in a range of environmental niches through fecal shedding, including surface water, soil, and plant matter sewage; thus, it can pose a risk for the colonization of livestock and human.

Bakri W., 2021 in their research proclaimed that since the main component of QS is the production and detection of signal molecules, QQ can interfere with this system in different ways, either intracellularly or extracellularly. It includes the use of chemical inhibitors of AI biosynthesis, enzymatic degradation of AI, and application of QS antagonists (mimicking AIs). These strategies showed promising effect in vitro and in vivo, as well as synergistic effects with traditional antibacterial treatments by increasing bacterial susceptibility to antibiotics.

10. Rationale for taking up the project: (150 words)

QS systems regulate diverse functions which are required for bacterial cells to be productive, such as bioluminescence, production of biofilm, production of secondary metabolites, sporulation and upregulation of both biofilm-associated matrix and efflux pump genes, for this reason it plays critical role in multi-drug resistance of *P. aeruginosa* and *K. pneumoniae*. The limitations observed was the property of *P. aeruginosa* and *K. pneumoniae* infectionin hospitalized patients and immune compromised patients were untreatable with the existing antibiotics due to their multi drug resistance and biofilm forming capacity and also enhanced persistence on medical devices surfaces. Therefore, to address this limitation, quorum quenching could be an effective approach to treat *P. aeruginosa* and *K. pneumoniae* infections. Isolation and characterization of novel antimicrobial compounds is of high interest.

11. Proposed Objectives of the project

Overtime many of the microbes have gained resistanceagainst most of the antibiotics which are commercially available. For this reason, it is important to come out with a novel strategy which can potentially inhibit bacterial growth.

- Aimed to screen for potential Quorum quenching compounds.
- To identify and validate targets of quorum sensing mechanism by literature review and Kegg Pathway Database.
- To perform Insilico studies using Auto dock 4 (v4.2.6).
- To perform minimum inhibitory concentration studies by Kirby-Bauer method (Disc diffusion)
- To analyze the inhibition of biofilm formation.

12. Methodology planned for the proposed objectives:

Isolation and identification of biofilm-forming *P. aeruginosa* and *K. pneumoniae* strains:

A total of 20 clinical samples including urine, Puss, blood and sputum were collected from various hospitalized patients from May 2022 to June 2022in The Oxford Medical College, Hospital & Research Centre.The obtained samples were cultured on sheep blood agar and sub cultured on chrom agar (differential chromogenic agar) to obtain desires clinical isolates (*P. aeruginosa* and *K. pneumoniae*) based on the chromogen produced (red chromogen for *P. aeruginosa* and blueish green for *K. pneumonia*) by the clinical isolates. Based on the differentiation colonies of *P. aeruginosa* and *K. pneumoniae* were sub cultured onto MacConkey agar medium (MAC) followed by incubation at 37°C for 24 h.

Antibiotic susceptibility testing (Kirby-Bauer method):

Antibiotic susceptibility test was evaluated using the disc diffusion method according to Clinical and Laboratory Standards Institute procedure(CLSI). The susceptibility of *P. aeruginosa* and *K. pneumonia* isolates to imipenem (10 µg), ciprofloxacin (5 µg), ceftriaxone (30 µg), tetracycline (30 µg), amikacin (25 µg), gentamycin (20 µg), colistin (10 µg), and ceftazidime (30 µg) was studied on the Mueller-Hinton agar medium using Kirby-Bauer method. (Biemer et.al., 1973)

Standardization and MIC of Clinical isolates:

A single colony was picked and subcultured in LB broth for 16–18 h at 37˚C and 75 rpm continuous shaking to standardize the culture. 100 µL of the standardized *P. aeruginosa* and *K. pneumonia*inoculum, yielding a final bacterial concentration of approximately $1.5\times10^9$and 1×10^8 colony forming units (CFUs)/mL respectively.

Inhibition of biofilm:

Microtiter plate biofilm assay

Biofilm visualization by light microscope method

13. Expected output of the project: Inhibition of biofilm by Iprifavone**.**

14. Work plan:*(detailing time schedule for each proposed objective may clearly be indicated.)*:

Sl.No	Activities Planned	1Month	2Month	3Month	4-6Month	7-8 Month	9Month
01	Literature review						
02	Planning/ Designing						
03	Assembly/ Fabrication work						
04	Final Testing						
05	Result &Calculation / Conclusion						
06	PreparationofReport& Submission						

15. Expected impact/ outcomes:

- To overcome antibiotic resistance.
- To overcome multi drug resistance

- To identify molecular mechanism involved inquorum quenching/sensing.
- To innovate better treatment for opportunisticinfections.

16. Suggested post project activities: Applying Patent

17. Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.): Ipriflavone can be used as a potent drug in testing the Quorum phenomenon. Ipriflavone can be added with antibiotics to reduce the formation of biofilm.

18. Budget estimates: (Please provide details in each item)

Sl. No.	Items	Amount in Rs.
88.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	8000.00
89.	Travel (details required)	1000.00
90.	Labour cost (detailed breakup)	1000.00
91.	e) Miscellaneous (Please specify)-Glass wares	2000.00
	Total	12000.00

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UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:**IN VITRO AND IN SILICO EVALUATION OF ANTI QUORUM SENSING ACTIVITY OF IPRIFLAVONE ON CLINICAL ISOLATES**

73. I/We agree to abide by the terms and conditions of TOCE
74. I/We did not submit this or a similar project proposal elsewhere for financial support.
75. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of

Student

Faculty

Date: 17/5/2022

Place:TOCE

RECOMMENDATION

Dr. B. K. Manjunath
(Name & Signature of HOD with Seal)
Email id: dr.manjunath.toce@gmail.com
Contact No.: 94488 39887

Dr. B.K MANJUNATHA

Head of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:13/5/2022

GENERAL INFORMATION

1. Name and USN of the Student: PriyankaShivappaNaragunda(1OX18BT029)
ShreedeviH (1OX18BT037)
SushmaM (1OX18BT039)
Swathi KR (1OX18BT040)

2. Branch/ Semester/: Biotechnology,8th Semester

3. Project Title:"Designing of a cost effective, reliable, user-friendly and portable biogas plant for the production of biogas from biodegradable waste"

4. Abstract: In recent years there has been increased interest in diverting the food waste fraction of the municipal solid waste (MSW) from landfills, due to the high decomposition potential and production of methane as a final product. Recently, anaerobic digestion (AD) has been recognized as one of the best options for treating this waste stream since it results in two valuable final products, biogas and compost that may be utilized for electricity production and as soil fertilizer respectively [4]. Anaerobic digestion is a controlled biological degradation process which allows efficient capturing & utilization of biogas (approx. 60% methane and 40% carbon dioxide) for energy generation. Production of biogas by AD has many advantages. The biogas is a renewable energy source, reduces landfill also use the waste products in the landfill, dump sites and farms all over the country, allowing for the reduction of soil and water pollution, biogas production does not needs oxygen, reduces the green house effect & biogas production plants are easy to set up and needs little investment on a small scale

5. Duration of the Project:9 months

6. Total cost of the project:30,000

7. Faculty Supervisor Details: Ms. Salma Kausar M Assistant Professor, Department of Biotechnology, The Oxford College of Engineering

TECHNICAL DESCRIPTION

8. Description of the problem:(150 words): Municipal Solid Waste (MSW) is a waste produced by household, commercial and/or institutional activities. It is generally non hazardous . The quantity of MSW is a by-product of urban lifestyle and its quantity is increasing with rapid urbanization. Nowadays, MSW is increasing at a rate faster than urbanization. In India, ten years ago, there were 2.9 billion urban residents, each generating 0.64 kg/capita/day of MSW. Today, there are about 3 billion residents generating 1.2 kg/capita/day. It is estimated that by 2025, these numbers will increase to 4.3 billion urban residents with 1.42 kg/capita/day of MSW .

9. Review of work done: (250 words)

Bangalore city generates close to 4000 MTPD of solid waste. The per capita waste generation in Bangalore city is 0.4 kilograms per capita per day. Most of the municipal waste is generated in residential and market areas. In order to comply with MSW rules, the Bruhat Bangalore Mahanagara Palike (BBMP) has setup processing and disposal facilities on a public private partnership (PPP) model. As on date over 3000 MTPD processing and disposing facilities are in operational. The combination of technologies for processing MSW is an attempt for sustenance and viability as per

the BBMP. Some of the existing installed treatment facilities are not operating to their full potential for various reasons which need to be analyzed.

10. Rationale for taking up the project: (150 words)

- The present study establishes a reliable, portable, eco-friendly and cost effective AD for biogas production
- The portable biogas plant can be used at apartment for the conversion of biodegradable wastes produced in the houses and the biogas can be used for the generation of electricity
- The unit can be scaled up for the digestion of large volume of biodegradable wastes (metric tons)
- Scaled up unit can be used for digestion of biodegradable wastes generated in the each wards of a city by setting up wardwise digesters, their by electricity required for street light illumination can be generated

11. Proposed Objectives of the project

i) To design a cost effective, reliable, user-friendly and portable biogas plant for the production of biogas from biodegradable waste

ii) Standardization of feed nature for optimized AD process

iii) To optimize the AD process for production of biogas in short duration of time using different methanogenic organisms

Check optimization of gas production at lab scale

12. Methodology planned for the proposed objectives:

i) Construction and fabrication of the digester plant:

Step 1:Manually operated crusher will be fabricated with the arrangements of bevel gears and blade

Step 2:Two plastic/fiber tanks will be used for digester and gas purifier (50 liters)

Step 3:The inlet and outlet ports will be drilled as per the requirement

Step 4:Then the crusher, digester and gas purifier will be assembled by using PVC pipes and gate valves

Step 5:The pressure gauge will be fitted in the purifier tank to monitor the production of methane gas.

Step 6:Finally all the air leakages will be arrested by using M.C. seals and plaster of Paris

ii) Substrate Collection: The substrate used for the production ofbiogas will be collected from the Madivala market, college canteen and hostel.

iii) Sample Preparation: Following collection of the biodegradable organic waste it is fed into the crusher and equal amount of cow dung will be added.

iv) Feeding and Operating to Steady State: After feeding the mixed waste into the digester the valves at the openings are closed. The organic loading rate (OLR) under the operation condition will be determined using a standard method. The digester will be operated at room temperature varying from 25 ˚C to 36 ˚C and pH range of 5.5 to 8.5 throughout the experiment with constant feed 7 Kg of biodegradable waste.

v) Determination of physical characteristics of the feed: The physical characteristics (total solids; volatile solids; moisture content and ash content) will be analyzed by a standard method. The temperature and the pH in each digester will be measured at the start. The slurry will be sampled at start-up and at the end of the digestion for the total solids (TS), volatile solids (VS), ash content and moisture content determination.

vi) Indicators of Efficiency: The performance of the reactor and conversion efficiency of feedstock will be estimated from the following parameter:

a) **TS/VS Lost:** Initial TS/VS of the feedstock will determined before feeding into the reactor. After destructive sampling, the final TS/VS will be determined. The difference between the initial (mass of TS/VS fed) and final TS/VS (residual TS/VS in the digested feedstock) will be indicate the quantity of TS/VS lost.

b) TS/VS to Gas: The TS/VS lost was determined after destructive sampling as mentioned above. It was presented as liters of biogas produced per gram TS/VS lost. This gave an index of process efficiency.

c) Characterization of methane gas produced will be done by GC/MS analysis

vii) Comparative study of biogas production: Apart from cow dung the biogas will be produced using different starting mixture of methanogenic organisms collected from leachates from KCDC, Bangalore and the yield of biogas will be compared with the biogas produced by using cowdung.

viii) Optimization of biogas production: The production biogas using anaerobic digester will be optimized for various parameters such as (a) Source of methanogenic organisms (b) Nutrients (c) Nitrogen source (d) Temperature (e) pH

13. Expected output of the project: Development of the Eco friendly and portable biogas plant.

14. Work plan: *(detailing time schedule for each proposed objective may clearly be indicated.)*:

Sl.No	Activities Planned	1Month	2Month	3Month	4-6Month	7-8 Month	9Month
01	Literature review						
02	Planning/ Designing						
03	Assembly/ Fabricationwork						
04	Final Testing						
05	Result &Calculation/ Conclusion						
06	PreparationofReport& Submission						

15. Expected impact/ outcomes:

The present proposal provides an insight into the following aspects

- Demonstrates a suitable method for developing a simple, portable, safe, cost effective and eco-friendly production of biogas
- Will help in reduction of land fill
- Will results in reduction of soil and water pollution
- Reduces the green house effect

Helps in solving the issues of garbage disposal

16. Suggested post project activities: Applying Patent, Community installation

17. Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):

Commercial marketing of the biogas unit for kitchen waste recycling, and development of FYM .Installation in gated communities and societies for recycling.

18. Budget estimates: (Please provide details in each item)

Sl. No.	Items	Amount in Rs.
92.	Construction and fabrication of anaerobic digester	16000.00
93.	Sensors for biodigester (pH, temperature, moisture and gas)	8000.00
94.	Consumables	3000.00
95.	Labour cost	3000.00
	Total	30,000.00

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Approved by A.I.C.T.E. New Delhi, Accredited by NBA New Delhi and Recognized by UGC under section 2(f))
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Web: www.theoxford.edu

UNDERTAKING FROM THE INVESTIGATOR

1. PROJECTTITLE:**"Designing of a cost effective, reliable, user-friendly and portable biogas plant for the production of biogas from biodegradable waste"**

1) I/We agree to abide by the terms and conditions of TOCE

2)I/We did not submit this or a similar project proposal elsewhere for financial support.

3)I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of

Student

Faculty

Date: 13/5/2022

Place:Bangalore

RECOMMENDATION

Dr. B. K. Manjunath
(Name & Signature of HOD with Seal)
Email id: dr.manjunath.toce@gmail.com
Contact No.: 94488 39887

Dr. B.K. MANJUNATHA

Head of the Department:

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:12/5/2022

GENERAL INFORMATION

1. **Name and USN of the Student:**Mohasina Anjum
   USN No.: 1OX18BT020
   Name: Afrah Raihan
   USN No.: 1OX18BT001
   Name: Debleena Bose
   USN No: 1OX18BT009
   Name: Jemima Saji
   USN No: 1OX18BT015
2. **Branch/ Semester/:**Biotechnology,8th Semester
3. **Project Title:**Integrated remediation strategy for repurposing of industrial wastewater
4. **Abstract:**
   The Aim of the project is to perform integrated remediation for repurposing of industrial waste water.Our methodology involves designing an integrated bioreactor for the efficient removal of contaminantsfrom industrial waste water. The model consists of three tanks connected in series: Electroremediation tank. Adsorption tank, Bioremediation tank. The Electro remediation tank receives theindustrial effluent. This tank consists of the electrodes connected to the current and voltage supply. Theelectrodes will be selected based on quality of the effluent as the electrodes are replaceable. The Electroremediation process will be optimized by certain parameters such as Distance between the electrodes, Natureof the electrode, COD and Decolorization percentage. The Adsorption tank is connected to the Electroremediation tank through a pipe which carries the electro remediated water. The tank consists of differentgrades of adsorbents such as activated charcoal, peanut shell powder and spent tea leaves. Further degradation will be carried out in the Bioremediation Tank using the fungal strain NR-2 and the PotatoDextrose Broth will be used as a growth medium. The degradation process will be analyzed using HighPerformance Liquid Chromatography (HPLC) and color removal efficiency.
5. **Duration of the Project:6 months**
6. **Total cost of the project:20,000**
7. **Faculty Supervisor Details:Dr.K.Valarmathy, Associate Professor, Department of Biotechnology, The Oxford College of Engineering**

TECHNICAL DESCRIPTION

8. **Description of the problem:(150 words):**
   Industrial waste water is byproduct from the manufacturing of commercial products. As water isused in the production process it can pick up a variety of contaminants that require removal toacceptable levels before discharge from an industrial facility. Waste water released from industriesare harmful to environment. One of the alternative ways to overcome the environmentalcontamination caused by waste water is integrated remediation strategy for treating industrial
   waste water
9. **Review of work done: (250 words)**.

Manjunatha B.K, et.al. , 2016 determined an effective fungal consortium for the bioremediation of Poly Aromatic Hydrocarbons (PAHs) and crude oil. The hydrocarbon utilization capabilities of the potent isolated strains were studied for test hydrocarbons like benzene, toluene, naphthalene, paraffin and crude oil as model hydrocarbons for a period of 10 days. Degradation process was assessed by measuring percentage of TPH in residual oil, biological oxygen demand (BOD), chemical oxygen demand (COD), total plate count, UV spectrophotometric analysis and GC-MS studies. The study revealed that, among 45 isolated strains from PAHs/crude oil contaminated soil; four strains showed maximum degradation of crude oil & PAHs.18s rRNA sequencing was used to identify the strains and, was identified as *Aspergillus terreus, Aspergillus aculeatus, Scedosporium boydii and Aspergillus sp.* The degradation process for this consortium was further optimized using Response Surface Method (RSM). The fungal isolates were also screened for biosurfactant production, Immobilization of the isolates on sodium alginate beads will be used as model of bioremediation studies.

Christian Larroche, et.al. , 2007 studied that the water contaminated by oil products is becoming a majorproblem in water supplies as these organic compounds cause hazards for human health. Different types ofaerobic and anaerobic bioreactors have been widely used for water cleanup from organic pollutantssuch aspetroleum hydrocarbons. Many studies report that aerobic biofilm processes are a very efficient method formonoaromatic hydrocarbons removal from contaminated water as they are able to reduce up to99% of thepollutants from water, but generally these works do not discuss possible pollutantloss through gas stripping.On the other hand, some research is related to the ability of anaerobicbioreactors for monoaromaticstreatment and results have shown that anaerobic immobilized reactors are able to remove monoaromaticcompounds from water with maximal efficiencies between 95–99%. But here again, no data are foundabout the amount of volatile organic compounds that can be found inthe biogas. Also, the data generatedwhen a solid biomass support (activated carbon, polyurethane, etc.) ispresent in the medium do not take

care about possible solute sorption phenomena. This paper reviews various propertiesof monoaromaticcompounds including benzene, toluene, ethylbenzene and mixtureof xylenes. The sources of pollutants,various analytical methods suitable for identification and quantitative measurement of monoaromatics, andknowledge gained on the true removal rates **by aerobic and anaerobic bioreactors are reviewed an discussed in this study.**

10. Rationale for taking up the project: (150 words)

- As industries release a lot of effluents in the rivers ,oceans, lake which are harmful to both aquatic life andthe life on land, it is necessary to treat the waste before they are released thus our bioreactor can be usedfor degrading the harmful contaminants present in the waste making it less toxic or non toxic.
- Our bioreactor is not only used in any one specific industry it can be used in any type of industry.
- It can be used to degrade any type of effluent using any type of strain or a microbial consortium.
- As a lot of work has not been done on an integrated bioreactor it will be an advantage for us to work on itand patent it.

11. Proposed Objectives of the project

The Objectives are as follows:

1: To design integrated reactor system for removing toxic metabolites through sequential reactor.

2: To construct three phase reactors for efficient remediation.

Phase 1: Sedimentation tank

Phase 2: Adsorption and Bioremediation tank

Phase 3: Electro remediation and repurposing of water

3: To periodically test the effluents in each phase.
4: To test the remediated water for BOD, COD, DO and microbial count

12. Methodology planned for the proposed objectives:

The model will consist of three tanks connected in series:

1. Sedimentation tank
2. Adsorption and Bioremediation tank
3. Electro remediation tank

Step1: The Sedimentation tank will be connected to an inlet pipe, from where the industrial effluents along with oil spill waste will be introduced in the tank. The effluents will be allowed to settle down for a few days

Step 2: The Adsorption and the Bioremediation tank will be connected to the Sedimentation tank through a pipe which will carry the clear effluent. The appropriate Adsorbent material was selected like orange peel powder, spent tea leaves, activated charcoal, peanut shell powder. The Fungal strains will be selected from the R&D Centre and will be immobilized by a suitable immobilization technique for increasing the biomass cell reusability and to decrease the cost of the process. The tank will be supplied with Adsorbent material, fungal strains and the effluent from the CST tank. A supply of nutrition and carbon will be given to the bacterial strains for a few days. The supply would be limited after a few days which will cause the strains to look for carbon around it, which will be present in the effluents. After which the degradation begins. Then the degradation process will be analyzed based on various parameters such as Ph, Temperature, Retention time, Agitation speed, Inoculum size.

Percent decolorization was calculated using the formula:

Decolorization (%) = $[(A_0 – A_f)/A_0] \times 100$

where A_0 is the initial dye absorbance at the dye's λ_{max} and A_f is the final absorbance at the dye's λ max.

Removal Efficiency was calculated using the formula:

Removal Efficiency (%) = $[(C_0 – C_i)/C_0] \times 100$

where C_0 is the initial dye concentration and C_i is the final concentration.

Step 3: The Electro remediation tank will receive the degraded effluent. This tank will consist of the electrodes connected to the current and voltage supply the electrodes will be selected based on quality of the effluent as the electrodes are replaceable. The Electro remediation process will be optimized by certain parameters such as Distance between the electrodes, Nature of the electrode

13. Expected output of the project: An Integrated Bioreactor system for removal of pollutants from industrial effluents

14. Work plan: *(detailing time schedule for each proposed objective may clearly be indicated.)*:

Sl.No	Activities Planned	1Month/ Week	2Month/ Week	3Month/ Week	4Month/ Week	5Month/ Week	6Month/ Week
01	Literature review						
02	Planning/ Designing						
03	Assembly/ Fabricationwork						
04	Final Testing						
05	Result &Calculation/ Conclusion						
06	PreparationofReport& Submission						

Expected impact/ outcomes:

- Integrated remediation process for repurposing of industrial waste water.
- Cost effective, eco-friendly, efficient technology to treat any industrial effluents
- Water conservation process through repurposing of waste water.
- Conversion of waste water into safe and reusable water

15. Suggested post project activities:Applying Patent

16. Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):

The global Industrial wastewater treatment market size is estimated to be USD 12.8 billion in 2021 and is projected to reach USD 16.6 billion by 2026, at a CAGR of 5.3% between 2021 and 2026.Growing industrialization across the globe is a main factors that provide new growth opportunities for industrial wastewater treatment manufacturers. Morerover, stringent government regulations depleting freshwater resources, and rising support for sustainable development support the growth of treatment unit

17. Budget estimates: (Please provide details in each item)

Sl. No.	Items	Amount in Rs.
96.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	12000.00
97.	Travel (details required)	2000.00
98.	Labour cost (detailed breakup)	1000.00
99.	e) Miscellaneous (Please specify)-Glass wares	5000.00
	Total	20000.00

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Approved by A.I.C.T.E. New Delhi, Accredited by NBA New Delhi and Recognized by UGC under section 2(f))
Bommanahalli, Hosur Road, Bengaluru –560068.
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Web: www.theoxford.edu

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:Integrated remediation strategy for repurposing of industrial wastewater

2. I/We agree to abide by the terms and conditions of TOCE

3. I/We did not submit this or a similar project proposal elsewhere for financial support.

4. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

K. Valarmathy
(Name & Signature of Project Guide with Seal)
Email id: dr.valarmathyk@gmail.com
Contact No.: 9739672705

Dr. B.K. Manjunath
(Name & Signature of HOD with Seal)
Email id: dr.manjunath.toce@gmail.com
Contact No.: 94488 39887

Date: 12/5/2022

Place:Bangalore

PRINCIPAL
The Oxford College of Engineering
Bommanahalli, Hosur Road
Bengaluru-560 068

PRINCIPAL

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission:15/5/2022

GENERAL INFORMATION

1. **Name and USN of the Student:**MUHAMMED RUSSAL HAMEED NN
   USN No.: 1OX18BT021
   Name: SYED FAIZ AHMED
   USN No.: 1OX18BT041
   Name: TUSHAR LN
   USN No: 1OX17BT0
2. **Branch/ Semester/:**Biotechnology,8th Semester
3. **Project Title: TENDER COCONUT HUSK WASTE-A POTENTIAL SOURCE OF XYLOOLOGOSACCHARIDES FOR PREBIOTIC APPLICATION**
4. **Abstract:**The present study demonstrates the application of alkali treatment coupled with steam for the extraction of xylan followed by its enzymatic hydrolysis for the production of xylooligosaccharide (XOS) from tender coconut husk . The chemical analysis of the husk revealed the presence of hemicelluloses, along with cellulose, lignin and ash demonstrating its suitability for XOS extraction. Application of 20% of NaOH coupled with steam treatment for 60 min enabled the fractionation of approximately 82% xylan from the husk. Response surface methodology was employed to optimize the different variables IE., enzyme concentration, pH, temperature and time for the extraction of XOS from xylan, where in, enzyme concentration and temperature were the influential variables affecting xylose yield and enzyme concentration, temperature, time and pH were influential variables affecting xylobiose yield significantly. FTIR analysis of the husk also confirmed the presence of hemicelluloses, whereas, the presence of xylan was also confirmed in the extracted mass. In nutshell, the present study was successful in establishing the suitability of coconut husk for extraction of xylan and XOS which can be further used as a prebiotic.
5. **Duration of the Project:9 months**
6. **Total cost of the project:11,000**
7. **Faculty Supervisor Details:Dr.K.Valarmathy, Associate Professor, Department of Biotechnology, The Oxford College of Engineering**

TECHNICAL DESCRIPTION

8. **Description of the problem:(150 words):**Tender coconut shell is the toughest and heaviest single item among the biodegradable waste the BBMP of Bangalore city collects every day.the husk is a major part (50%) of the fruit ; mainly composed of 26% of water soluble substances , 39.31% of cellulose, 16.15% of hemicellulose and 28.48% of lignin. The presence of considerable amount of hemicellulose makes the coconut husk a suitable substrate for the produc- tion of an oligosaccharide with prebiotic potential known as XOS
9. **Review of work done: (250 words)**

- **(**Senior et al., 2007) Lignocellulosic (LCM) material is composed of three polymers namely, lignin of phenolic nature cellulose composed of glucose units linked through β1-4 linkage to form a linear polymer. Hemicelluloses a variety of monomers including xylose, glucose, arabinose, rhamnose and mannose branched result in a heteropolysaccharide.
- (Dobrev et al., 2007) The dominant components of the peel of citrate fruits alcohol-insoluble solids are cellulose, hemicellulose, and pectic substances, with proteins occurring only in small amounts.
- Hemicellulose, the most abundant polysaccharide from plant source is a base material for preparation of several value added products
- Xylan are the second most plentiful hemicellulosic polymers, comprised of xylose units.

10. Rationale for taking up the project: (150 words)

- Xylooligosaccharides (XOS) have been used for animal nutrition and healthimprovement due to their potential biological functions, such as antioxidant,anti-inflammatory and antimicrobial effects. Xylooligosaccharides (XOS) areconsidered as functional oligosaccharides and have great prebiotic potential.
- The prebiotic, xylooligosaccharides, selectively feed for beneficial bacteria suchas Bifidobacteria and Lactobacilli within the digestive tract and have been shownto effectively increase Bifidobacteria counts.
- Supplementation of xylooligosaccharides has been shown to help promote healthyblood sugar and lipid levels already in a healthy range.
- As a lot of work has not been done on a Xylooligosaccharides production fromtender cocunut husk it will be an efficient method for conversion of waste intoproduct and commercialization it.
- (Wu Q.,et al.,2019) These are naturally present in fruits, vegetables, bamboo, honey and milk and can be produced at industrial scale from xylan-rich materials. Of particular interest are those sources of residual origin, such as forestal, agricultural or industrial wastes of lignocellulosic nature.The growing commercial importance of these non-digestible oligosaccharides is based on their beneficial health properties, particularly the prebiotic activity.
- Processing of residual vegetable biomass as raw material offers economic and ecological benefits, since it is a bio renewable, widely distributed and abundant resource.
- The XO are stable over a wide range of pH and temperatures have the ability of producing lower available energy and for achieving significant biological effects at low daily intakes.
- These are non-cariogenic, save insulin secretion from the pancreas and stimulate intestinal mineral absorption. Moreover, the XO cause prebiotic effects when ingested as part of the diet through the modulation of colonic micro flora.

11. Proposed Objectives of the project

- Processing of tender coconut husk
- Extraction of Xylan
- Enzymatic treatment to produce Xylooligosaccharides
- Optimization of Process Parameters
- Purification ,Characterization and prebiotic studies on isolated Xylooligosaccharides

12. Methodology planned for the proposed objectives:

Raw Material Collection and Its Compositional Analysis :

The tender coconut husk waste will be collected from the local vendors of south Bangalore and it will be manually dried in a tray drier in trays at 55°C till constant weight. Thereafter, the dried husk and pea stalks will be ground to powder form using lab scale grinder followed by sieving using sieve shaker to get the uniform particle size and will be used as a raw material for the extraction of xylan. The dried husk powder and pea stalks will be subjected to quantitative analysis of moisture, ash content as per AOAC and the cellulose, lignin, and hemicellulose contents will be determined

according to the method of Van Soest *et. al.*,(1991).For the qualitative analysis, the dried husk will also be subjected to FTIR

Xylan Extraction and its FTIR Analysis:

Xylan will be extracted using different concentration of sodium hydroxide (0, 4, 8, 12, 16 and 20%), by taking 0.5 g of powdered tendered coconut husk with the solid to liquid ratio of 1:10. Alkali treated material will be autoclaved at 121°C, 15 psi pressure for different time periods (30, 45 and 60 min). The alkali solubilized xylan will be acidified (pH 5.0) with glacial acetic acid followed by the precipitation with ice-cold rectified spirit. The precipitated xylan will be dried in air drier at 60 °C until constant weight is achieved. The xylan so obtained after drying will weighed and converted into powder using lab scale mixer and will be stored in room temperature in air-tight pouches for further use. On the basis of the relative yield, the best concentration of sodium hydroxide along with steam will be followed for the production of xylan in bulk which will be further used for FTIR analysis and XOS extraction.

Optimization of Process Parameters for XOS Production and its Analysis:

As enzymatic process will be preferred for XOS production as compared to other extraction processes. The substrate i.e. alkali solubilized xylan will be subjected to enzymatic hydrolysis by crude xylanase with the fixed volume made up to 10 ml using sodium citrate. To study the effect of different variables such as crude xylanase enzyme concentration, pH ,temperature and incubation time on the conversion of xylan to XOS, total 30 runs will be conducted as designed by response surface methodology (RSM) .Mathematical relationship of responses (xylose and xylobiose) and variables i.e. enzyme concentration, pH, temperature and time will be approximated by a quadratic model equation. The spectrophotometric quantification of xylose and xylobiose will be performed using dinitrosalicyclic acid (DNS) as per the standard procedure. For the qualitative analysis, the best treatment on the basis of xylobiose yield is dried in tray drier in a trays at 55 °C until constant weight and will be subjected to FTIR analysis.

Purification Characterization and prebiotic studies on isolated Xylooligosaccharides:

Effect of Xylooligosaccharides on the Growth of *L. rhamnosus* strain will ,be employed to investigate the effect of XOS on bacterial proliferation. IMO(Indigenous microorganisms) and GOS(Galacto oligosachharides) will be used as positive controls.MRS media will be used. Samples will be plated to count the number of resulting colonies. The number of colonies in MRS medium with no added xylooligosaccharide will be defined as having a proliferation level of 100%.

Statistical Analysis:

Data obtained from the xylan extraction will be analyzed using GraphPad Prism software. Results will be expressed as means ±SEM (Structural equation modelling). Differences between the means will be tested for Differences between the means will be tested for statistical significance using a 2-way ANOVA and followed by Bonferroni post hoc test. The significance level is set at 5% ($p < 0.05$) for all calculations. Statistical software package Design will be used for regression analysis of the experimental data obtained from optimization of process parameters for XOS production to get working parameters and to generate polynomials and the contour plots. A second-order polynomial equation will be established based on analysis of variance and optimum variables will be found using Design-Expert software optimization toolbox. Standard deviation, R2 values will be analyzed. The mathematical model will be generated during RSM implementation will be validated by conducting check point studies. The response value in each case is the average of triplicate experiments.

13. Expected output of the project: Xylooligasaccharides in powdered form

14. Work plan: *(detailing time schedule for each proposed objective may clearly be indicated.)*:

Sl.No	Activities Planned	1Month	2Month	3Month	4-6Month	7-8 Month	9Month
01	Literature review						

02	Planning/ Designing						
03	Assembly/ Fabricationwork						
04	Final Testing						
05	Result &Calculation/ Conclusion						
06	PreparationofReport& Submission						

Expected impact/ outcomes:

- A value addition for tender coconut husk waste.
- Potent Prebiotic of Commercial value.
- Potential source for startups in prebiotics

15. Suggested post project activities:Applying Patent

16. Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):

"Xylooligosaccharides (XOS) Market" 2021 will register a 4.1% CAGR in terms of revenue Over the next five years and the global Market Size will reach 135.7 Million USD by 2026, The high demand for Xylooligosaccharides (XOS) which is used in various applications such as Medicine and Health Products, Food and Drinks, Feed and Others will drive the Xylooligosaccharides (XOS) market.

17. Budget estimates: (Please provide details in each item)

Sl. No.	Items	Amount in Rs.
100.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	5000.00
101.	Travel (details required)	3000.00
102.	Labour cost (detailed breakup)	2000.00
103.	e) Miscellaneous (Please specify)-Glass wares	1000.00
	Total	11000.00

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Web: www.theoxford.edu

UNDERTAKING FROM THE INVESTIGATOR

5. PROJECTTITLE:**TENDER COCONUT HUSK WASTE-A POTENTIAL SOURCE OF XYLOOLOGOSACCHARIDES FOR PREBIOTIC APPLICATION**

76. I/We agree to abide by the terms and conditions of TOCE

77. I/We did not submit this or a similar project proposal elsewhere for financial support.

78. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name of the students with USN No.	**Signature with date**
1 MUHAMMED RUSSAL HAMEED NN (1OX18BT021)	
2 SYED FAIZ AHMED (1OX18BT041)	
3 TUSHAR LN (1OX17T043)	

K. Valarmathy
(Name & Signature of Project Guide with Seal)
Email id: dr.valarmathyk@gmail.com
Contact No.: 9739672705

Dr. B. K. Manjunath
(Name & Signature of HOD with Seal)
Email id: dr.manjunath.toce@gmail.com
Contact No.: 94488 39887

Date: 15/5/2022

Place:Bangalore

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Bengaluru-560 068

PRINCIPAL

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

GENERAL INFORMATION

Date of submission: 16-05-2022

1. **Name and USN of the Student:**

   1)Name:Abhishekpatil
   USN No:1OX19CV002
   2)Name: Timmayya
   USN No:1OX18CV046
   3)Name: Sangamesh
   USN No:1OX18CV036
   4)Name: Akshay kumar
   USN No:1OX18CV005

2. **Branch/ Semester**/ -BE VIII

3. **Project Title:**HighQuality Concrete Block Using Photovoltaic Panels

4. **Abstract:**

High quality concrete block using photovoltaic panel is an innovative technology that could soon be implemented to solve issues such as energy consumption and global warming. In India, non-renewable resources such as coal are predominantly used for electricity production. However, by utilizing surplus solar energy, we can significantly reduce greenhouse gas emissions and reduce our carbon footprint. This project aims to make a concrete block using monocrystalline panel of size 37cmX28cmX20cm, with 10cm of conventional concrete of grade M25 and 5cm side wall and panel is fixed, The remaining upper part of 5cm is filled with transparent concrete and connection is given to the panel so that the electricity can be generated . After completion, the current produced by the monocrystalline panel is measured by using an ammeter, and the maximum load that mould can bear will is tested in compression test. Based on the results, we can determine the type of pavement this concept can be applied.

5. **Duration of the Project**: 3months

6. **Total cost of the project:**Rs 7500

7. **Faculty Supervisor Details:**Gayathri R ,Department of Civil Engineering

TECHNICAL DESCRIPTION

8. Description of the problem:

As the global population continues to grow, the demand for electricity has increased tremendously, leading to greater use of fossil fuels and resultant environmental challenges. However, solar energy or panels have the potential to curb this problem by providing clean, renewable energy that does not generate greenhouse gases. Solar energy or panels are becoming increasingly popular due to their high energy efficiency and significant environmental benefits. Solar panels harness energy from the sun, which is then converted into electricity through photoelectric cells. These challenges demand strategies to improve the technology, reduce costs and enhance the efficiency and reliability of solar electricity generation to make it a viable and sustainable source of energy for future

9. Review of work done: (250 words)

The top transparent layer is done using Acrylic rods which transmits light as well as cost effective.It helps to transmit more amount of sunlight to solar panel. The top and base layer are moulded properly and cured for 28 days to gain more strength.Solar energy will be transmitted through the transparent concrete to the Monocrystalline solar panel . When sunlight falls on the Monocrystalline solar panel, the cells absorb the energy, and through a complicated process create an electric field. This electric field comprises voltage and current and generates power which is governed by the equation P (power) = V (voltage) x I (current). This power can be used directly to power devices that run on direct current (DC)/we should check the amount of current produced using ammeter .Then the mould has to be taken for compressibility test to check how much maximum load it can bear.

10. Rationale for taking up the project: (150 words)

This project will be a great solution for global warming in future.The demand for electricity for the growing population can be highly satisfied by this project as India has the surplus amount of solar energy.Blocks containing Monocrystalline panel can be connected in series. It will produce electricity to satisfy our minimum expectation

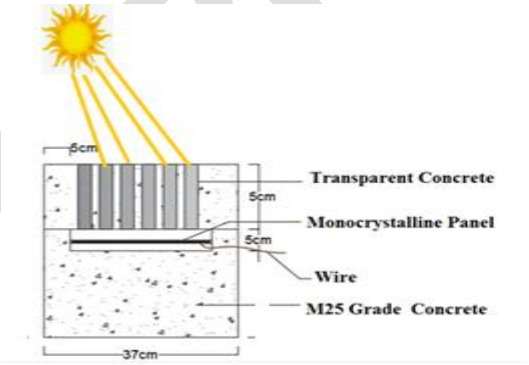
11. Proposed Objectives of the project

The main objective of high-quality concrete block using photovoltaic panels are

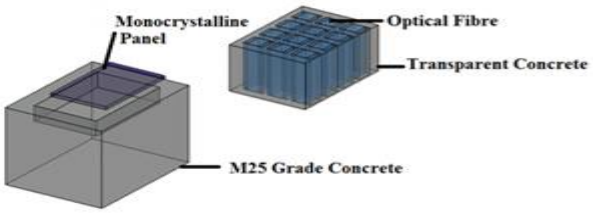
1. To replace normal concrete road/Pavement by High quality photoelectric concrete.
2. To extract electricity from the high-quality concrete block using solar energy.
3. To study the property of concrete and transparent concrete.
4. To reduce the use of non-renewable sources like coal for the production of electricity.
5. To reduce the amount of greenhouse like co2 emitted from thermal power plant.

12. Methodology planned for the proposed objectives:

In thjsproject concrete block of size37cmX28cm is moulded by inserting a monocrystalline photovoltaic panel. The top layer should be a transparent concrete



C/S of Block



3D View

High Quality Concrete Block Using Photovoltaic Panels

Phase I

i)Conventional concrete of gradeM25, size 28cmX37cm is moulded and cured for 28days.

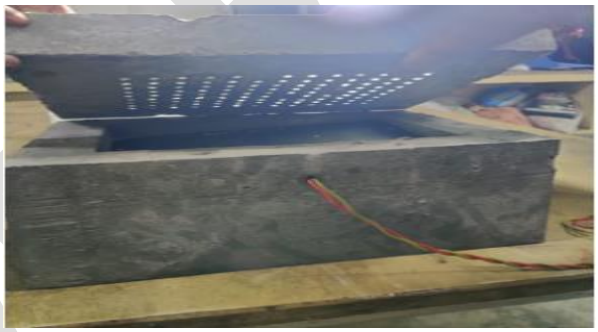
ii)The top layer of the high quality concrete block is a transparent concrete using optical fiber of 6mm dia.


iii) The base layer is a M25 grade concrete with side wall .


iv)The top and base layer of the High Quality Concrete block will be cured for 28 days .

PhaseII

i)Monocrystalline Photovoltaic panel (18cm X 27cm)is paced between the side wall of base layer with proper wire connection.

ii)The top transparent layer if plastered with the base layer.

When sunlight falls on the Monocrystalline solar panel, the cells absorb the energy, and through a complicated process create an electric field. This electric field comprises voltage and current and generates power which is governed by the equation P (power) = V (voltage) x I (current). This power can be used directly to power devices .

Phase III

i)The Conventional Concrete and High Quality Concrete Block is tested in UTM to find its compressive strength.

ii)Ammeter is connected to the wire connection given to the High Quality Concrete Block .The amount of current produced also calculated.

13. **Expected output of the project:**
The Compressive strength of High quality Concrete block will reach 75% of the compressive strength of Conventional Concrete block.So High Quality Concrete Block will be an alternate for Conventional Concrete pavement

14. **Work plan:***(detailing time schedule for each proposed objective may clearly be indicated.)*:

1.Moulding Conventional Concrete block and High Quality Concrete Block base
2.Moulding Top layer of High Quality Concrete Block.
3.fixing Solar Panel with proper wire connection
4.Plastering Top anf base layer of High Quality Concrete Block.
5.Measure the amount of current produced using milli Ammeter
6.Do the Compressive strength for High Quality Concrete Block and Conventional Concrete

15. **Expected impact/ outcomes:**
Development of innovative product: High Quality Concrete Block Using Photovoltaic Panelscan be alternative to Concrete road/Pavement. Blocks containing Monocrystalline panel can be connected in series. It will produce electricity to satisfy our minimum expectation.

Solar Road /Pavement

Societal Technology: Using the surplus solar energy in India we can significantly reduce the amount of greenhouse gases produced by not relying on non-renewable resources. In this way, we can reduce our carbon footprint and will help to reduce the progression global warming

16. **Suggested post project activities:**
High Quality Concrete Block Using Photovoltaic Panelscan be alternative to Concrete road/Pavement.
17. **Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):**
Using the surplus solar energy in India we can significantly reduce the amount of greenhouse gases produced by not relying on non-renewable resources. In this way, we can reduce our carbon footprint and will help to reduce the progression global warming

18. **Budget estimates: (Please provide details in each item)**

Sl. No.	Items	Amount in Rs.
104.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	6000
105.	Travel (details required)	500
106.	Labour cost (detailed breakup)	1000
107.		
	Total	7500

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:

.....HighQuality Concrete Block Using Photovoltaic Panels.....
.....

79. I/We agree to abide by the terms and conditions of TOCE
80. I/We did not submit this or a similar project proposal elsewhere for financial support.
81. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of

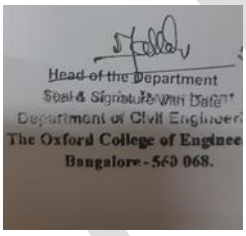
Student

Faculty

Date: ……

Place:……Bangalore…….

RECOMMENDATION



Head Of the Department:

PRINCIPAL

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission: 16-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student:**

   Purnashree M
   1OX19CV023

   Sneha Raj Thomas
   1OX19CV028

   Suchitra C Gowda
   1OX19CV029

   Teja K P
   1OX19CV032
2. **Branch/ Semester/: CIVIL ENGINEERING / VII**
3. **Project Title:EXPERIMENTAL STUDY ON MECHANICAL AND DURABILITY PROPERTES OF NATURAL LIGHTWEIGHT SELF-CLEANING CONCRETE**
4. **Abstract:**

The increase of sustainability in the world has led to a greater concern of the environmental impact of using concrete in construction. Self-cleaning concrete is attractive because of its self- cleaning abilities and its eco-friendly nature. The use of this contemporary cement composite in urban and interurban areas can reduce maintenance cost and ensure a cleaner environment. The use of waste materials such as coconut shell saves natural resources and dumping spaces, and helps to maintain a clean environment. The present work explores the study of the various mechanical and durability properties such as compressive strength, tensile strength, water permeability test and sorptivity test of the lightweight concrete with the partial replacement of coarse aggregate with coconut shells and pumice stones in 10%, 20% and 30% respectively, M25 grade of size (150x150x150) mm. The test results obtained from this shows that the lightweight concrete can be used for construction work, but due to the use of natural aggregates the water permeability is more and hence it is preferably used for partition walls, facades and other aesthetic purposes. The self-cleaning properties of the concrete is examined by the applications of nano-liquid TiO2 and sodium alginate as single, double, and triple layer coating on the hardened concrete surfaces. Rhodamine B dye discoloration test is used to determine their self-cleaning ability, as per the results obtained both the chemicals show good self-cleaning ability and hence can be used on the exterior surfaces of any structures.

5. **Duration of the Project: 6 MONTHS**
6. **Total cost of the project:7000**
7. **Faculty Supervisor Details:Harshitha N (Assistant Professor Civil Dept)**

TECHNICAL DESCRIPTION

8. Description of the problem:(150 words)

The increase of sustainability in the world has led to a greater concern of the environmental impact of using concrete in construction. Self-cleaning concrete is attractive because of its self- cleaning abilities and its eco-friendly nature. The use of this contemporary cement composite in urban and interurban areas can reduce maintenance cost and ensure a cleaner environment.

9. Review of work done: (250 words)

The present work explores the study of the various mechanical and durability properties such as compressive strength, tensile strength, water permeability test and sorptivity test of the lightweight concrete with the partial replacement of coarse aggregate with coconut shells and pumice stones in 10%, 20% and 30% respectively, M25 grade of size (150x150x150) mm. The test results obtained from this shows that the lightweight concrete can be used for construction work, but due to the use of natural aggregates the water permeability is more and hence it is preferably used for partition walls, facades and other aesthetic purposes. The self-cleaning properties of the concrete is examined by the applications of nano-liquid TiO2 and sodium alginate as single, double, and triple layer coating on the hardened concrete surfaces. Rhodamine B dye discoloration test is used to determine their self-cleaning ability, as per the results obtained both the chemicals show good self-cleaning ability and hence can be used on the exterior surfaces of any structure

10. Rationale for taking up the project: (150 words)

Extraction and processing of natural aggregates is also a major concern for the environment. Therefore, the use of waste material as an alternative for natural aggregate in concrete production not only protects environment but also makes concrete a sustainable and environment friendly construction material.With increasing concern over the excessive exploitation of natural aggregates, synthetic lightweight aggregate produced from environmental waste is a viable new source of structural aggregate material. Self-Cleaning Concrete is an innovative construction material that has been developed in the past decades providing the "self-cleaning" ability of concrete surfaces, by retaining their light colour for longer durations, along with the property to remove airborne toxins, particularly nitrogen oxides

11. Proposed Objectives of the project:

The main objective of our project is to determine the mechanical properties of lightweight self-cleaning concrete.

The sub-objectives are

1. Experimental study on strength characteristics of M25 grade concrete mix with coconut shell will be employed with the replacement of 10%, 20% and 30% of natural light weight coarse aggregate.
2. To conduct experimental investigation on lightweight self-cleaning concrete on its mechanical and durability properties.
3. To determine the self-cleaning ability of lightweight concrete blocks by retaining their colour for longer duration along with the property to remove airborne toxins.

12. Methodology planned for the proposed objectives:

The study is conducted to analyse the mechanical and durability properties of concrete when the natural light weight coarse aggregate is partially replaced with waste coconut shell and to determine the self-cleaning property of the lightweight concrete.

- The natural coarse aggregates will be replaced with coconut shell as 10%, 20% and 30% by weight for M25 grade concrete.
- Nano-Liquid TiO2 will be mixed with fresh concrete with dosages of 2.5, 5.0, 7.5 ml.
- Similarly, another casting is prepared and sodium alginate is added.
- These castings are tested for compressive test, water absorption test, split tensile test, durability test (water permeability test, sorptivity test).
- The self-cleaning ability of the concrete is determined by Rhodamine B discolouration test, where the Tio_2 coated castings are again coated by RhB dye and exposed to sunlight for 2 hours until the discolouration occurs.
- Similarly, the sodium alginate added casting is also coated with RhB and the discolouration is tested.
- If the block regains its original colour this implies that the block has absorbed air bone toxics.

13. **Expected output of the project:**

The proposed outcome of the present study is to achieve :

- Lightweight self-cleaning concrete.
- Self-cleaning helps in reduction of toxic air borne. It also helps to maintain the colour of the block or any other component.
- Light weight reduces the dead load of the structure.

14. **Work plan:***(detailing time schedule for each proposed objective may clearly be indicated.)*:

- The various tests conducted on different materials used in the mix
- The mix design for the work is calculated using the code book IS-1O262-2009
- Casting of the various moulds are carried out and cured for 28 days
- The initial mechanical testing on concrete is perform like compression test and spilt tensile
- The test for self- cleansing

15. **Suggested post project activities:**

Further studies can be carried out for different testing on the durability of concrete.
Different test for the self- cleansing like the new technology ie, x-ray spectrum study

16. **Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):**

17. **Budget estimates: (Please provide details in each item)**

Sl. No.	Items	Amount in Rs.
108.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	5000
109.	Travel (details required)	1000
110.	Labour cost (detailed breakup)	500
111.	Miscellaneous	500
	Total	7000

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:

EXPERIMENTAL STUDY ON MECHANICAL AND DURABILITY PROPERTES OF NATURAL LIGHTWEIGHT SELF-CLEANING CONCRETE

82. I/We agree to abide by the terms and conditions of TOCE
83. I/We did not submit this or a similar project proposal elsewhere for financial support.
84. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name & Signature of

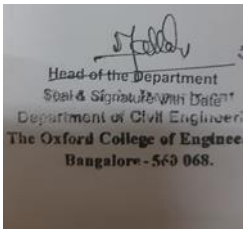
Student

Faculty

Date: ……

Place:…….

RECOMMENDATION



Head Of the Department:

PRINCIPAL

FORMAT FOR PROPOSAL UNDER INSTITUTIONAL SEED MONEY FOR INNOVATIVE RESEARCH PROJECT

Date of submission: 17-05-2022

GENERAL INFORMATION

1. **Name and USN of the Student: ARUNA P and 1OX19CV006**
2. **Branch/ Semester/ CIVIL /8**
3. **Project Title: "Treatment Of Municipal Wastewater By Column Filtration Using Anthracite Biochar"**
4. **Abstract:**Biochar-based column filtration systems (BCFS) for municipal wastewater treatment have gained attention in the last decade. Biochar as a stable carbon-rich material shows incredible potential to handle water/wastewater contaminants.Upon subjecting the sewage water to the biochar, a reduction of 81.11%, 77.55%, 62.94%, 50%, 50% and 50% were observed for the pH, Total Hardness, Chlorine, TS, TDS and TSS respectively with a optimum hydraulic retention time was found to be 4th day of feeding. The sewage pH also changed from alkaline to neutral. The pollutant removal efficiency of BCFS ranged between 50% and 81.11%. The observed results indicated that sewage sludge biochar can effectively treat sewage wastewater.
5. **Duration of the Project: 6months**
6. **Total cost of the project: 6500/-**
7. **Faculty Supervisor Details:Name: Prof. / Dr. / Mr. / Mrs. KAVYA S K**
   Email id :para.kavya@gmail.com
   Contact No. :9902063609

TECHNICAL DESCRIPTION

8. **Description of the problem:(150 words)**Problems concerning water sanitation stem from the rise in urban migration and the practice of discharging untreated wastewater. Effects of inadequate treatment can be detrimental to a community on economic, cultural and health-levels. The costs of poorly managed domestic waste are very high. Problem with the current treatment technologies is they lack sustainability. The conventional centralized system flushes pathogenic bacteria out of the residential area, using large amounts of water and often combines the domestic wastewater with rainwater, causing the flow of large volumes of pathogenic wastewater. This study is a conduct to investigate the potential of treating wastewater by column filtration using anthracite biochar.
9. **Review of work done**:Fabricated the column and treated the wastewater through biochar. In the process of treating wastewater for 4th day it is reduction more than 2nd day of HRT then the process is being continued for optimization for

6th day of HRT where it is increases pollutant concentration. Hence the optimum HRT was found on 4th day which is of 96 hours. The efficiency of column filter was good during the study**.**

10. **Rationale for taking up the project: (150 words) :** The conventional centralized system flushes pathogenic bacteria out of the residential area, using large amounts of water and often combines the domestic wastewater with rainwater, causing the flow of large volumes of pathogenic wastewater. This study is a conduct to investigate the potential of treating wastewater by column filtration using anthracite biochar.

11. **Proposed** Objectives of the project The study is to Treat the Municipal Wastewater by ColumnFiltration Using Anthracite Biochar in economical way and reuse of wastewater.

12. **Methodology planned for the proposed objectives**:COLUMN FILTER FABRICATION : The Wastewater is Batch wise feeding into the inlet tank, the column filter is fabricated andthe acrylic sheet of 5mm thick were used. The details of the column filter are as follows

    1) Outer Diameter =150mm
    2) Inner Diameter =140mm
    3) Total length = 600mm

    The column filter is fabricated with a suitable packing material. The height of the column filteris 600 mm and diameter is 150mm. The porous plates of different sizes 4mm, 3mm, 2mm areprovided to hold the packing materials inside the column filter. Perforation plates are providedat 100mm from top and 200mm from bottom. CPVC pipes are provided at the top of inletwhich is of 25mm and bottom outlet length of 60mm.

    Column filter is kept for acclimatization for 10 days to remove the suit. The process is started with 0,2,4 and 6 days as HRT.In the process of treating wastewater for second day HRT it is decreased in the pollutantconcentration as compared to the initial wastewater.

13. **Expected output of the project:**

14. **Work plan:***(detailing time schedule for each proposed objective may clearly be indicated.)*:

The project is planned according to each specific task over a period of 6 months as follows,

Work Plan/Month	6 Months		
Months	Feb-Apr	May-July	July-Aug
Collection of wastewater			
Fabrication of column Filtration			
Evaluation of efficiency of treated wastewater			
Report Preparation & Presenting the work in a conference			

15. **Expected impact/ outcomes:**Reduction in pollutant Concentration of wastewater by using biochar as filter media

16. **Suggested post project activities:**Water treatment is any process that improves the quality of water to make itappropriate for a specific end-use.

17. **Suggested plan of action for utilization of expected outputs from the project (commercialization / entrepreneurship / patent etc.):Commercialization**

18. Budget estimates: (Please provide details in each item)

Sl. No.	Items	Amount in Rs.
112.	Materials / Consumables (Please provide detailed breakup of materials / consumables)	3000
113.	Travel (details required)	1000
114.	Labour cost (detailed breakup)	500
115.	Miscellaneous (Please specify)	2000
	Total	6500

UNDERTAKING FROM THE INVESTIGATOR

PROJECTTITLE:: **"Treatment Of Municipal Wastewater By Column Filtration Using Anthracite Biochar"**

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85. I/We agree to abide by the terms and conditions of TOCE

86. I/We did not submit this or a similar project proposal elsewhere for financial support.

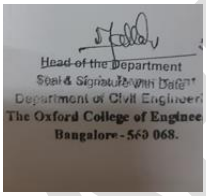
87. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project.

Name of Faculty: Kavya S K

Date:

Place:…TOCE…….

RECOMMENDATION



Head of the Department: