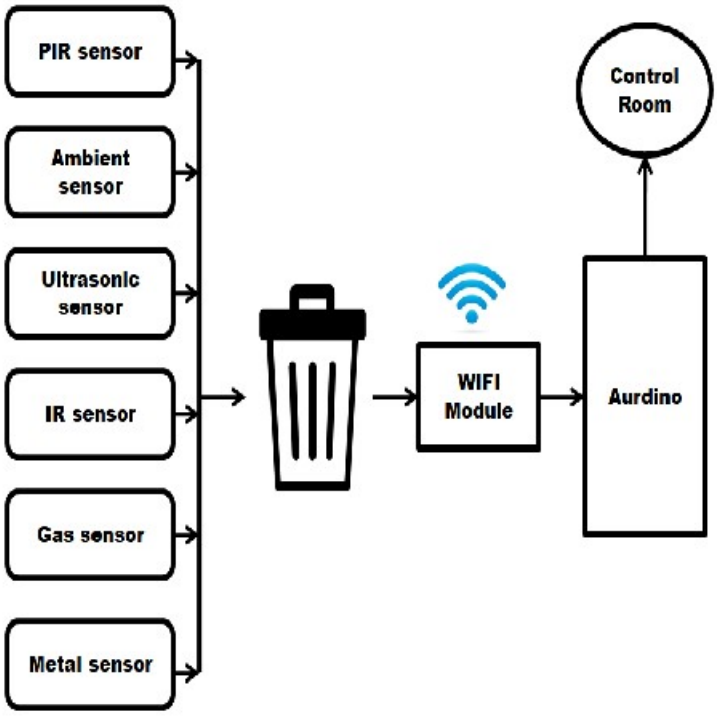
MSME IDEA HACKATHON 2.0

PROJECT PROPOSAL

1. Project Title:	IoT Based Brainy Bins for Crowded Environment
2. Project Theme:	Waste Management
3. Project Duration in Months:	2 years
4. Total Cost:	Rs.9 Lakhs
5. Objective of the Project : (Max. 150 words)	• To design IoT based Smart bins with automated opening/closing to segregate the bio degradable and non bio degradable wastes • To pass the information to the control room regarding the level of the dust bins • To enable easy locate of the dustbin during night • To design efficient dustbins in crowded areas where less man power is required.
6. Project Proposed Design (Max. 150 words)	The design is basically an automated smart bin that uses sensors to detect various wastes and classify them as bio degradable and non biodegradable wastes. The PIR sensor is used to detect the movement of human being. The ambient sensor controls the brightness of the bin .The ultrasonic sensor monitors the level of the bin .A motor is attached to the ultrasonic sensor which helps to open and close the bin by detecting the level of wastes. The conveyer belt helps to carry the waste. The IR sensor helps to detect the bio wastes like vegetable ,fruit wastes. The Metal sensor is used to sense the metals and other non biodegradable wastes. It can also sense the presence of hazardous gases through gas sensor and notify it. A buzzer is used to alert the workers once the bin is filled completely. Finally, all the data is transferred to the control room where the workers are able to monitor the process done with the bin.

7. Project summary (Max. 500 words, include figures if necessary):



An idea of a bin with a pool of sensors transmitting data regularly to indicate the level of bin has been proposed. This bin is customized with automation in opening and closing based on the presence of human with the help of motor. Many sensors are involved to sense the hazardous gases and used to segregate the wastes into bio degradable and non bio degradable. some of the sensors used here are PIR sensor, Ambient Sensor, ultrasonic sensor , IR sensor, metal sensor and gas sensors. The PIR sensor plays a role in opening and closing of the lid as it senses the presence of human around the bin with a limited range of distance. When the light intensity of the surroundings fall below the minimum value, the Ambient Sensor send signal to the LED that is connected to it and thus the bulb glows. The metal sensor and IR sensor is involved in the segregation of wastes. And the ultrasonic sensor is used here to detect the level of the bins and passes the data to the control room. A set of 7 bins can also be monitored from a single control room. Hence this proposed IoT based Brainy bins proves to be efficient in crowded areas where the usage of bins are more.

8. Work Plan

a. Methodology

b. Time schedule of activities giving milestones (also append to bar diagram)

a.Methodology:

In literature, a cost-effective design of an intelligent waste container for small-scale cases is designed, based on Arduino Nano board and an ultrasonic sensor to monitor the fullness level of the container and give SMS alerts using a GSM module[1]. The system is powered by lithium battery power bank supported by a solar cell panel. The system provides an option of charging external portable devices using the power bank. Srinivas et.al[2] has designed a smart bin solution using IoT Cloud based sensors and actuators. The proposed approach was designed to create as an end product where the product design was modeled in a 3D modeling software and printed using a 3D printer. Jackulin et.al [3] proposed a system which will sense different types of waste and segregate them at the user end and will inform the authority when the waste bins are getting filled. It will also provide users with a proper dumping technology to put their waste into the assigned bins and also guide them to the nearest bin if they encounter any problem with bins. In[4] smart bins are designed such that it continuously collects real-time data to maximize the operational time and deliver this data through a wireless mesh network. The Smart- bin system was tested in an outdoor environment. The collected data from the dustbin was applied with sense-making methods to obtain refined utilization of our smart bin.Jun-Ho-Huh et.al[5] proposed Internet of Things (IoT)-based Smart Trash Separation Bin model that can reduce the cost of trash separation work. The three efficient designs that respectively use a sensor, image processing, or spectroscope technology are presented. These IoT-based designs can bring significant merit to reducing the manpower costs, as well as the administrative cost involved.

In the proposed design an IoT based brainy bins are developed that uses sensors to detect various wastes and classify them as bio degradable and non biodegradable wastes. The PIR sensor is used to detect the movement of human being. The ambient sensor controls the brightness of the bin .The ultrasonic sensor monitors the level of the bin .A motor is attached to the ultrasonic sensor which helps to open and close the bin by detecting the level of wastes. The conveyer belt helps to carry the waste. The IR sensor helps to detect the bio wastes like vegetable ,fruit wastes. The Metal sensor is used to sense the metals and other non biodegradable wastes. It can also sense the presence of hazardous gases through gas sensor and notify it. A buzzer is used to alert the workers once the bin is filled completely. Finally, all the datas are transferred to the control room where the workers are able to monitor the process done with the bin.

References:

[1] The Design and Implementation of Smart Trash Bin, *Fady Samann*,2017
[2] IoT Cloud based Smart Bin for Connected Smart Cities - A Product Design Approach, *Mannem Srinivas, Shajulin Benedict, and Basil C. Sunny*,2019
[3] Waste Segregation using Smart bin and Optimization of Collection Routes, : *Jacklin Gounder, Rosy Caunder, Shivam Baikerikar, Sejal Chopra*,2020
[4] Waste Management Through Smart Bin, *Shubham Rai , Nipun Goyal*,2020
[5] : Smart Trash Bin Model Design and Future for Smart City , *Jun-Ho Huh, Jae-Hyeon, Kyungryong Seo* ,2021

b.Time Schedule of activities giving milestones:

Milestone/months	1-6	7-12	13-20	21-24
Literature Survey				
Design of Smart bin				
Implementation and Testing				
Report Writing				

9. Any other relevant matter.

Financial requirements:

***Please give activity-wise break-up as mentioned below**

Particular/Item	Total idea project cost (Rs. In lakh)	Amount GOI assistance (Rs. In lakh) (Maximum 85% of the total cost)	Incubatee share (Rs. In lakh) (Minimum 15% of the total cost)
Technology related expenditure like machine usage charges, electricity charges, procurement of raw materials, testing/calibration charges and any other technology related expenditure essential for development of idea. **Max (10.00) Lakh.**	7.0	5.95	1.05
Charges for mentor/handholding supporting team **Max (3.00) Lakh.**	1.0	0.85	0.15
Travelling Expenses or any other item not covered as above may be allowed as per need for development of the idea **Max (2.00) Lakh.**	1.0	0.85	0.15

***Total idea/project cost (Rs. in lakh)** :9.0

***Total GOI Assistance required (Rs. in lakh)** :7.65

***Total Incubatee share (Rs. in lakh)** :1.35

1.S. Subashi

2.S.Vasanth S.Vasanth

3.R.S.Vasunthra Vasunthra.R.S

P. S 11/10/2022

Signature of the Applicant

Signature of the Project Team Members

Principal 11/10/22

PRINCIPAL
Velammal College Of Engineering & Technology
Madurai - 625 009

Velammal College of Engineering and Technology (Autonomous) Madurai 625 009