

19CCE384 DESIGN & INNOVATION LAB

# INCENTIVE BASED SMART GARBAGE MANAGEMENT SYSTEM USING IOT

Team 108



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# PROBLEM STATEMENT

The "Incentive Based Smart Garbage Monitoring System Using IoT" is an innovative solution to the problem of waste management. The system utilizes the Internet of Things (IoT) technology to monitor the level of garbage in a particular area, and provides an incentive-based system via a user application to encourage individuals to properly dispose of their waste.

# LITERATURE SURVEY

Smart Garbage Monitoring and Clearance System using Internet of Things

Year: 2018

Cite: S. V. Kumar, T. S. Kumaran, A. K. Kumar and M. Mathapati, "Smart garbage monitoring and clearance system using internet of things," 2017 IEEE International Conference on Smart Technologies and Management for Computing, Communication, Controls, Energy and Materials (ICSTM), Chennai, India, 2017, pp. 184-189, doi: 10.1109/ICSTM.2017.8089148.

In this Paper,

- A IOT based smart waste clean management system is proposed which checks the waste level over the dustbins by using Sensor systems.
- Once it is detected this system immediately alters the concerned authorities through GSM/GPRS. This system uses Microcontroller as an interface between the sensor system and GSM/GPRS system.
- To monitor and integrate an android application is developed to display the desired information related to the various level of waste in different locations.

Drawbacks: Lack of automation & bin segregation techniques.

# LITERATURE SURVEY

IOT Based Smart Garbage Monitoring System using Raspberry Pi with GPS Link

Year: 2019

Cite: Tejaswini, Rayapaneni & Ravuri, Roshitha & Kumar, M & Manogaran, Rajkumar. (2019). IOT Based Smart Garbage Monitoring System using Raspberry Pi with GPS Link.

In this Paper,

- The proposed system, which is an IOT based smart garbage monitoring system along with real time monitoring with alerting facility using GPS.
- In this system it uses a Raspberry-Pi module, GSM module and with GPS antenna. It also uses bin compression technique to compresses the waste in the bin when it is overloaded and also giving notification that it has been compressed.

Drawbacks: Absence of segregation techniques.

# LITERATURE SURVEY

Garbage Waste Segregation Using Deep Learning Techniques

Year: 2020

Cite: Susanth, G & Livingston, Jenila & Livingston, Agnel. (2021). Garbage Waste Segregation Using Deep Learning Techniques. IOP Conference Series: Materials Science and Engineering. 1012. 012040. 10.1088/1757-899X/1012/1/012040.

In this Paper,

- The idea was to decrease the human intervention and make this waste segregation process more productive.
- The proposed work is aimed to build an image classifier that identifies the object and detects the type of waste material using Convolutional Neural Network.
- In this work, four different models of the CNN, such as ResNet50, DenseNet169, VGG16, and AlexNet, trained on ImageNet, are used to extract features from images and are fed into a classifier to make predictions and distinguish a type of waste from its corresponding category.

# LITERATURE SURVEY

Smart Garbage monitoring system using Internet of Things

Year: 2021

Cite: P. Kanade, P. Alva, J. P. Prasad and S. Kanade, "Smart Garbage Monitoring System using Internet of Things(IoT)," 2021 5th International Conference on Computing Methodologies and Communication (ICCMC), Erode, India, 2021, pp. 330-335, doi: [10.1109/ICCMC51019.2021.9418359](https://doi.org/10.1109/ICCMC51019.2021.9418359).

In this Paper,

- An IoT-based trash checking system is utilized using Arduino and an open IoT stage is presented.
- The proposed framework includes an Arduino microcontroller, ultrasonic sensor, Wi-Fi module and a heap battery. Information from the ultrasonic sensor.
- By utilizing an ultrasonic sensor, the profundity of the trash in the compartment is resolved and the heaviness of the waste receptacle from the heap cell is also estimated.
- For indicating the information, the LCD screen is utilized. The Wi-Fi module sends to the web the information portrayed previously.

# NOVELTY IN THIS PROPOSAL

" Providing Incentives based on the waste disposed to the system "

- This strategy is used to encourage individuals and organizations to properly dispose of their waste.
- This approach aims to create a financial incentive for people to reduce the amount of waste they generate and ensure that the waste they do produce is disposed of in a responsible and environmentally-friendly manner.
- In this System, we have created an application where it enables the users who try to dispose waste to login to their account, where it shows the amount of waste that has been disposed by them and its corresponding monetary incentive based on the different wastes that's been disposed.

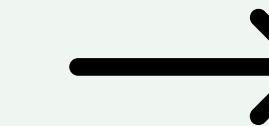


# METHODOLGY

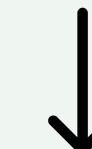
The user logs on to his account for waste disposal



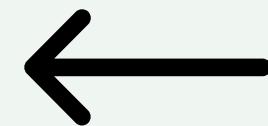
Once logged in, the user places the waste on the bin lid



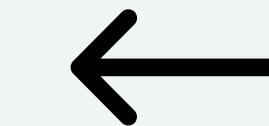
The waste is detected based on the trained Machine Learning model



The ML model converts the waste quantity detected into database



Based on the amount of weight, incentive is credited to user's e-wallet

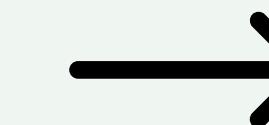


Once detected the waste is segregated into the appropriate partition of the bin

Using an ultrasonic sensor, the level of the bin is measured

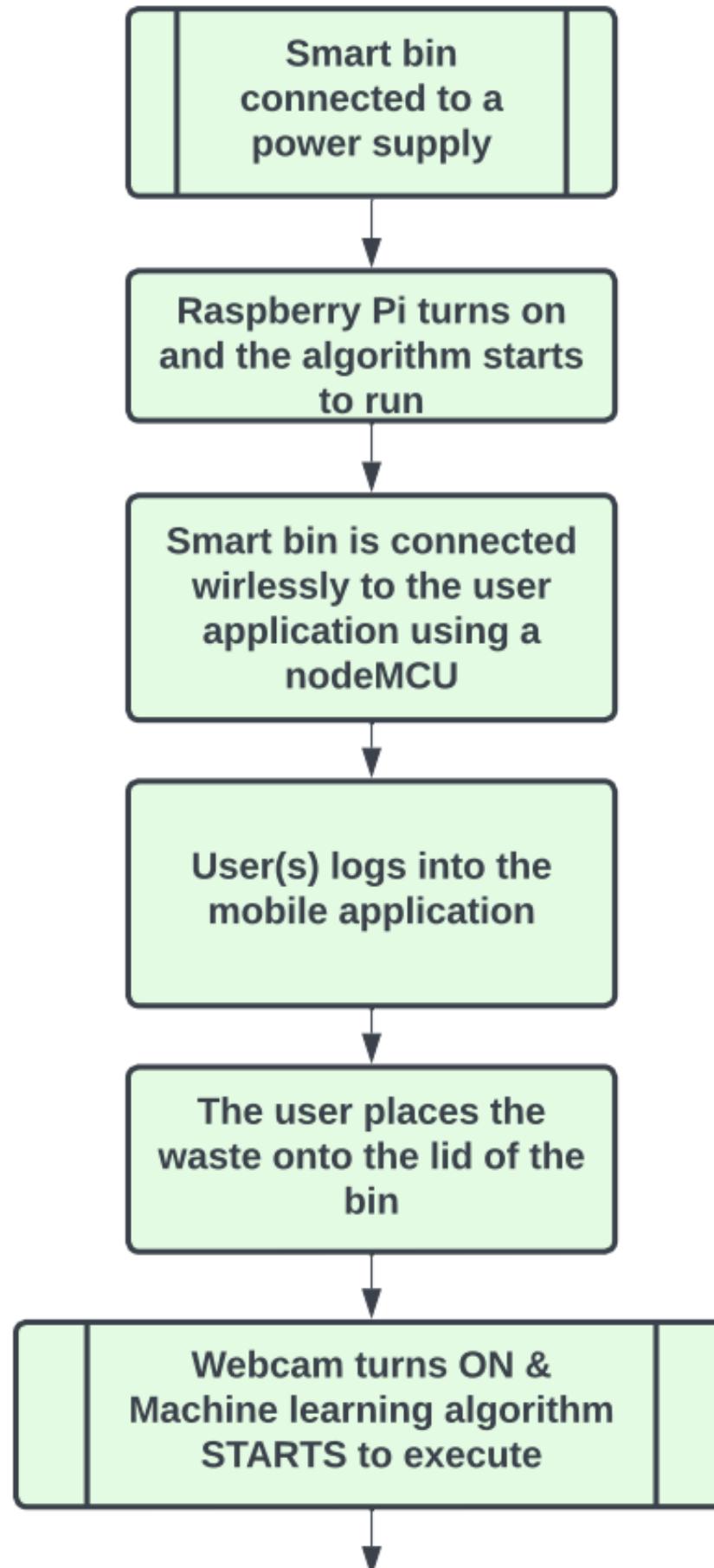


If the bin is sensed FULL then local authorities are informed to empty the bin

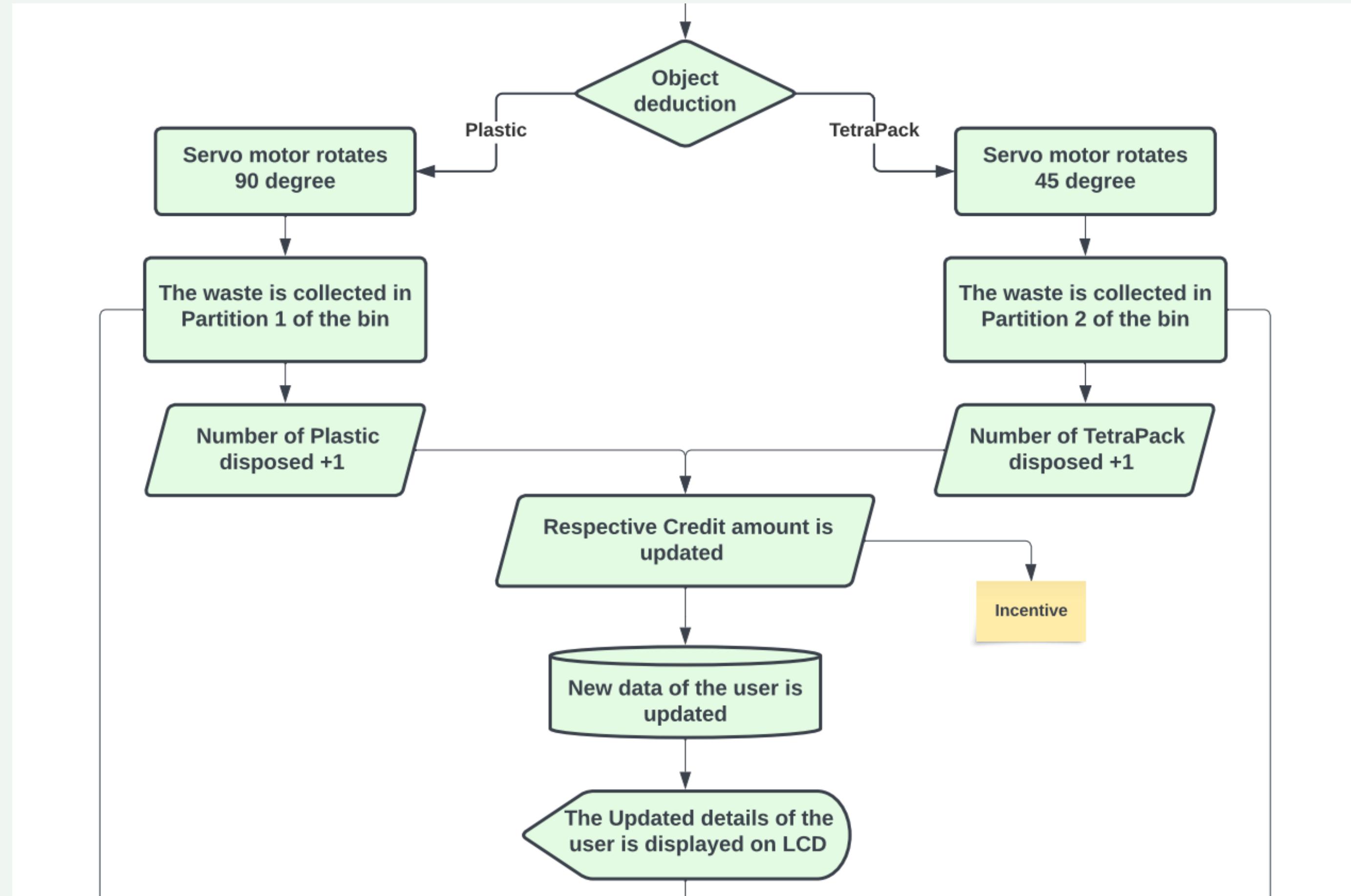


Until then the bin remains closed and a warning message is displayed

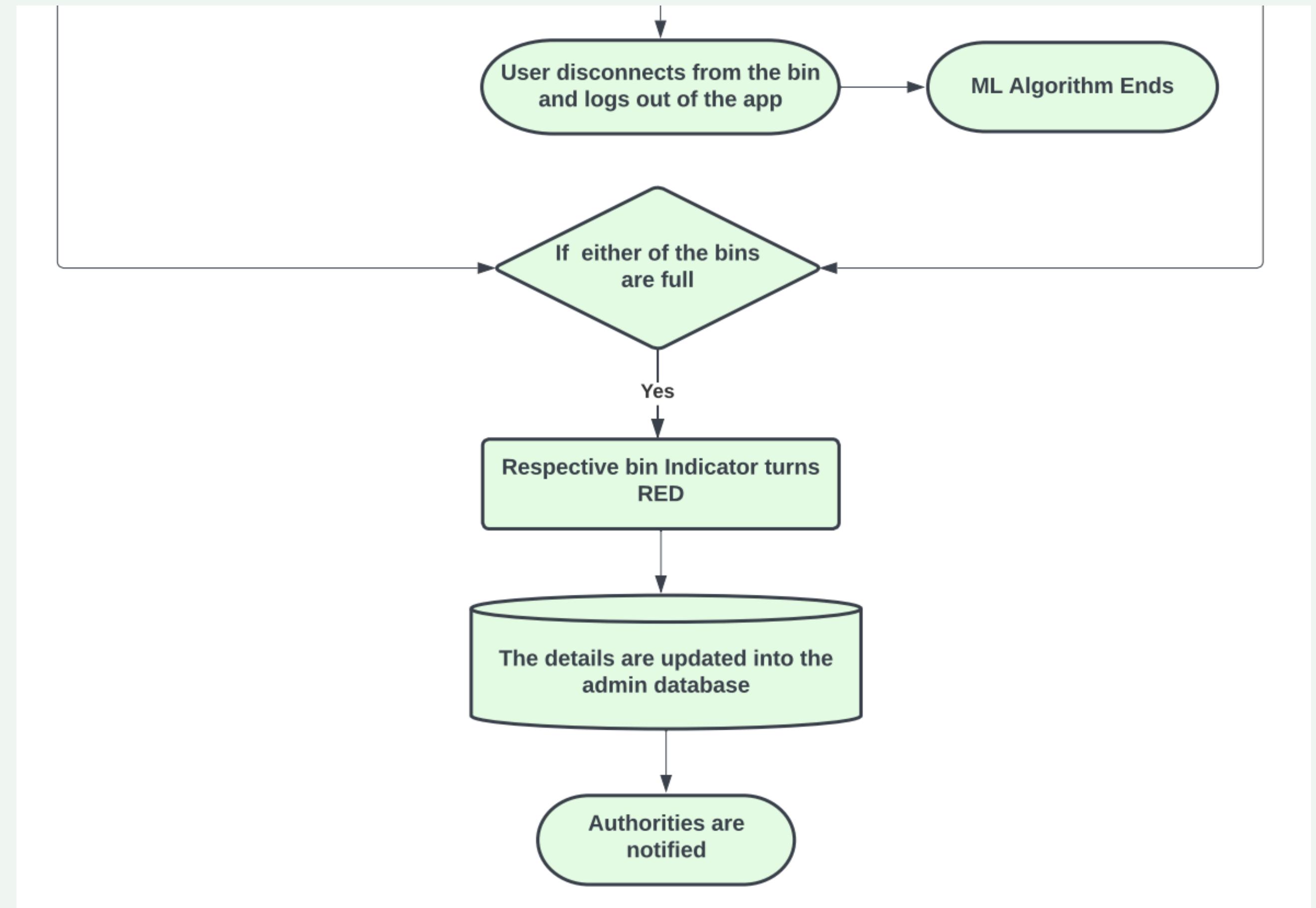
# FLOWCHART



# FLOWCHART

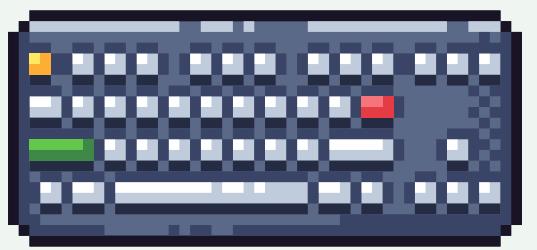


# FLOWCHART

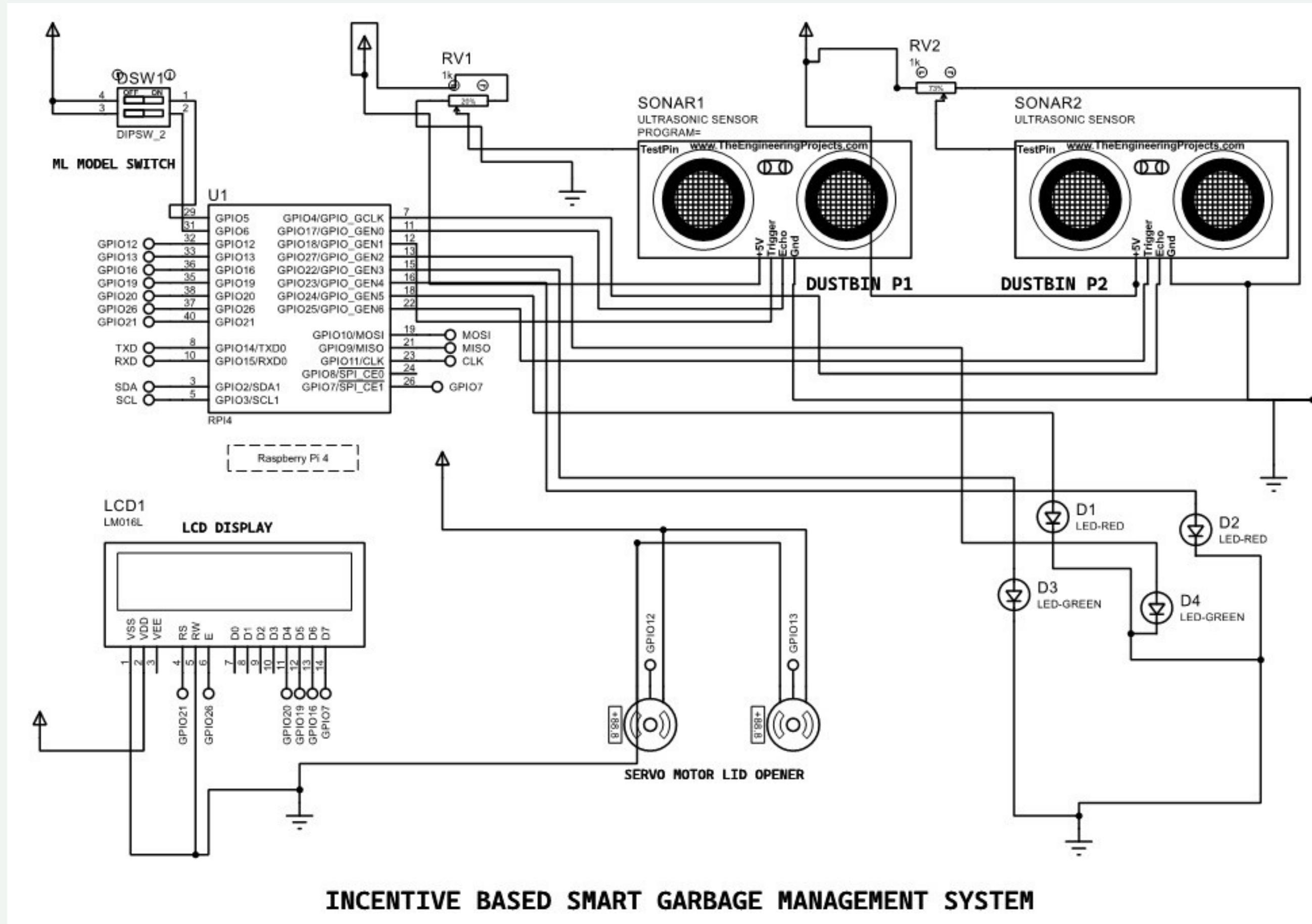


# TOOLS & HARDWARE

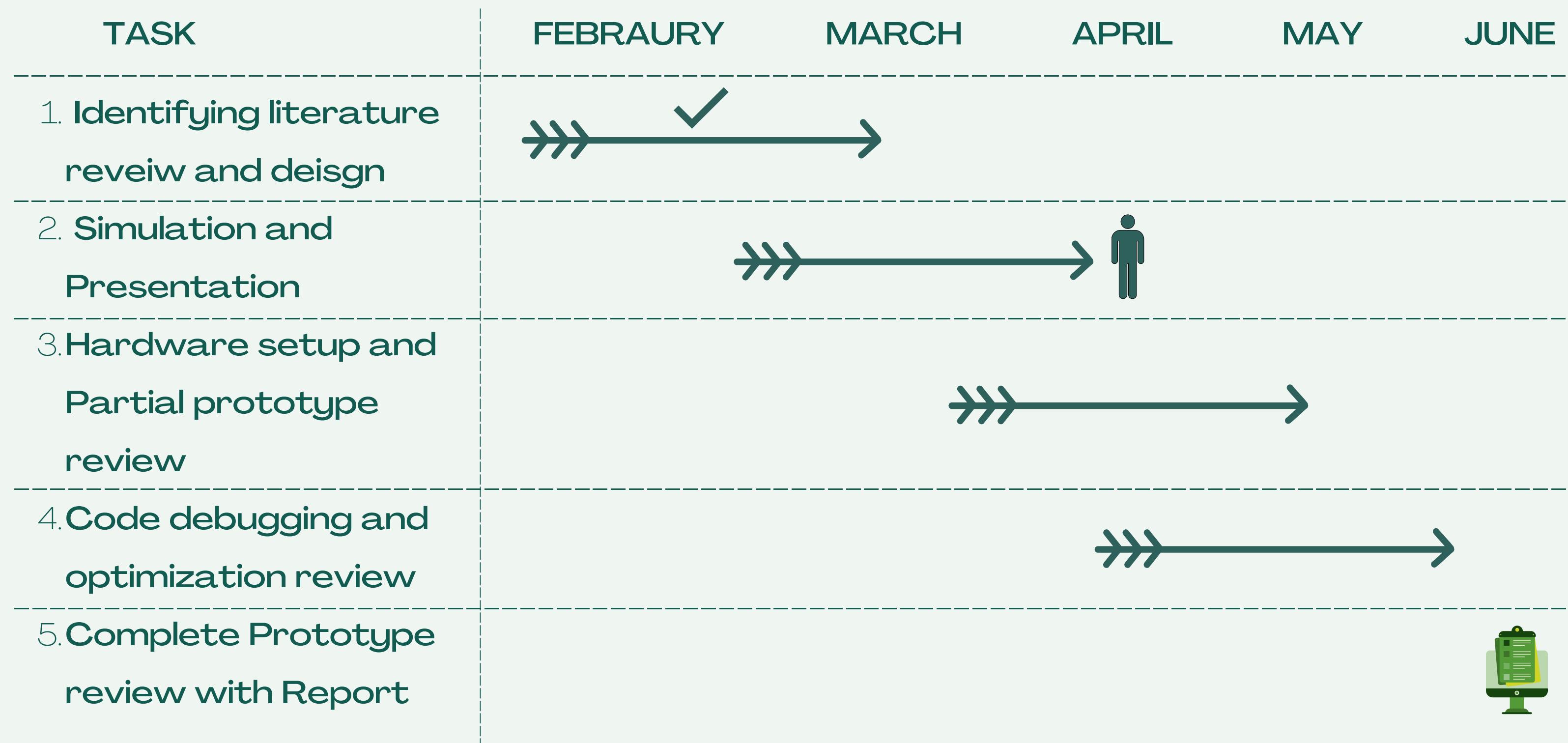
1. **Raspberry Pi 4**
2. **Ultrasonic sensors**
3. **Servo motor**
4. **Web Camera**
5. **LED Indicators**
6. **LCD Display**
7. **PP Sheet made Dustbin box.**
8. **Connecting wires**



# SIMULATION



# TIMELINE



# REFERENCE

[https://www.researchgate.net/publication/344539743\\_IOT\\_Based\\_Smart\\_Garbage\\_Monitoring\\_System\\_using\\_Raspberry\\_Pi\\_with\\_GPS\\_Link/link/5f7ed327a6fdccfd7b4f8b63/download](https://www.researchgate.net/publication/344539743_IOT_Based_Smart_Garbage_Monitoring_System_using_Raspberry_Pi_with_GPS_Link/link/5f7ed327a6fdccfd7b4f8b63/download)

<https://ieeexplore.ieee.org/document/9418359>

<https://www.instructables.com/Smart-Garbage-Monitoring-System-Using-Internet-of-/>

<https://iopscience.iop.org/article/10.1088/1757-899X/1012/1/012040>

# THANK YOU

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