Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	28 October 2022
Team ID	PNT2022TMID52815
Project Name	Project -Smart Waste Management System For Metropolitan Cities
Maximum Marks	4 Marks

ARCHITECTURAL DIAGRAM

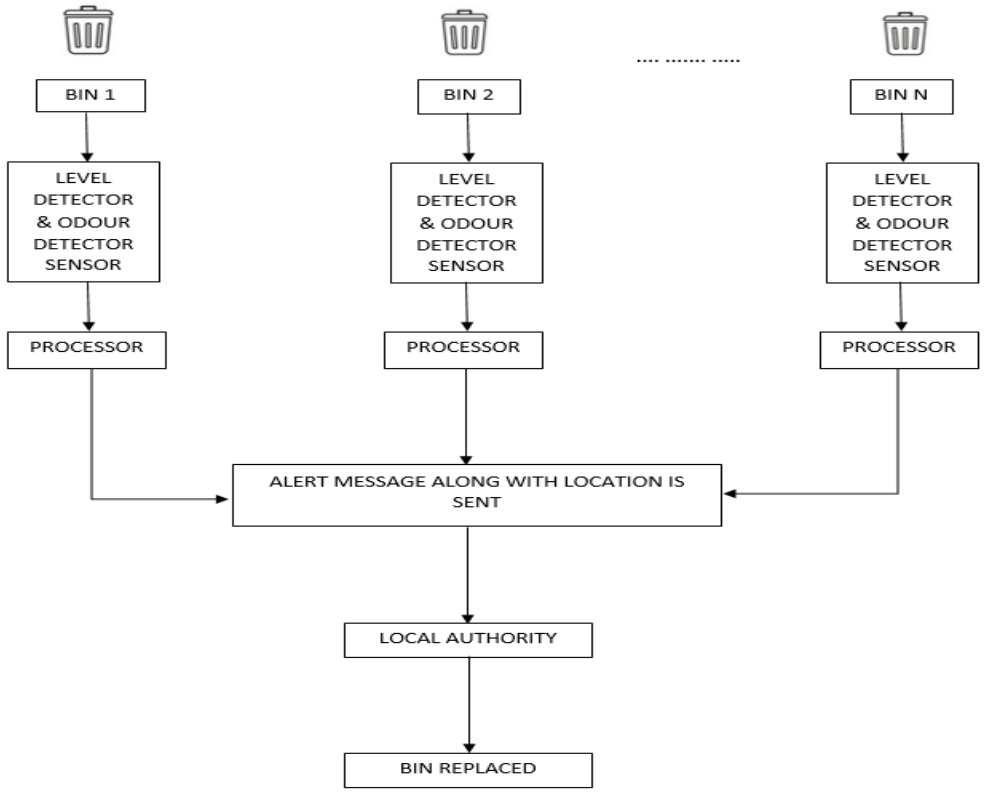

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web portal	HTML ,CSS, NodeRed, Javascript.
2.	Application logic -1	To measure the amount of waste in the dustbin.The sensor is attached to the inner face of the lid and it measure the distance between the lid and the waste.	Ultrasonic sensor.
3.	MQ-136-Hydrogen Sulfide Gas Sensor	To detect the foul smell of the garbage.	Microcontrollers/Arduino
4.	ESP -32S or ESP-8266	To receive input signal, process signals, and control ouput devices.	Single board Microcontroller/C/Arduino IDE
5.	Application logic -2	Getting location of the Garbage	GSM/GPS
6.	Cloud database	Database service on cloud	IBM DB2,IBM cloudant etc.
7.	File storage	File storage requirements	Github, Local file system.
8.	External API	Data from the ESP board has been sent to the real time database i.e., firebase, and the data from the firebase will be displayed in the dashboard which is used for displaying the current levels of the dustbin and also the location of the dustbin.	Firebase
9.	Application logic -3	Automatic level indication and alert is send via Bluetooth to the authority.	Bluetooth

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open source frameworks	NodeRed, Python, IBM Simulator	IoT
2.	Security Implementations	Use a reusable bottles, Use reusable grocery bags Purchase wisely and recycle Avoid single use food and drink containers.	IoT
3.	Scalable Architecture	ULTRASONIC SENSOR SPECIFICATIONS: Working voltage-3.3V/5V compatible wide voltage level:3.2V-5.2V Operating current-8mA I/O pins needed -3 ESP32 SPECIFICATIONS: Memory – 520 KB of SRAM Power- 3.3 V DC Clock frequency-240MHz	IoT
4.	Availability	These smart bins use sensors like ultrasonic and MQ 136 to measure the amount of waste in dustbin and to the detect the foul smell of garbage. GPS technology is used to track the location of the garbage. By developing & deploying resilient hardware and beautiful software we empower cities, businesses, and countries to manage waste smarter.	IoT
5.	Performance	Customers are hence provided data-driven decision making, and optimization of waste collection routes, frequencies, and vehicle loads resulting in route reduction by at least 30%	IoT/Web portal