Project Design Phase-I
Proposed Solution Template

Date	6 November 2022
Team ID	PNT2022TMID25311
Project Name	smart waste management system for metropolitan cities
Maximum Marks	2 Marks

Proposed Solution Template:

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	A clever waste management system that enables residents to separate the various forms of solid garbage they wish to dispose of and allows municipal authorities to collect the same in an effective manner. The system should be powered by Android mobile apps.
2.	Idea / Solution description	• The proposed system would be able to use IOT to control the complete collection process and automate the solid waste monitoring procedure (Internet of Things). • The Smart Trash System (STS) and the Smart Monitoring and Controlling Hut are the two key components of the proposed system (SMCH). • The circuit at the garbage bin, which communicates it to the receiver at the desired location in the area or spot, is placed at the waste bin in the proposed system to acknowledge whenever the waste bin is filled. • In the suggested system, the waste bin status at the monitoring and regulating system is shown by the signal that is received.
3.	Novelty / Uniqueness	3 Ideas in our innovation - REDUCE, REUSE AND RECYCLE. iot can greatly optimize collection services and reduce operational cost for cities, transitioning waste management into data- driven collection process. the emission of gases like, methane, carbon di oxide etc from the waste which is harmful to the human beings can be exposed by catalytic sensor is used in our idea. barometric sensor is used to analyse the weather condition according to that the precaution methods can be taken. photoelectric sensor -causing smoke in the wastages can be detected by using the photoelectric sensor.

		temperature and distance can be measured by the infrared sensor. segment of bio and non-bio degradable waste by using Ai(sensor roko sn04 , infrared sensor fc-51, sensor light). recycle waste to produce electricity, fuel and heat. whole system can be tracked by the gsm/gprs/gps.
4.	Social Impact / Customer Satisfaction	Toxins from e-waste combine with ponds, lakes, and groundwater when improperly disposed of. The water is then unintentionally consumed by the communities that rely on these sources of water. All forms of life are at risk from these heavy metals.
5.	Business Model (Revenue Model)	By offering different waste management and disposal services as well as recycling options to clients in the residential, commercial, industrial, and municipal sectors, Waste Management makes money. The Company receives a variety of fees related to its service offerings as a source of income.

6.	Scalability of the Solution	A significant advantage of the proposed approach is that the system is not limited to a specific type or size of waste-bin but can be scaled regarding any of its components including waste-bin sizes and shapes, numbers of sensors and information data flow. This is due to the fact that the architectural components have discrete roles and functional independence. Scalability was considered in both modelling and simulation as well as physical component selection.
		
		1.Scaling for Waste-Bin Geometry and Sensor Type:
		    The scalability of waste-bin size and shape is made possible based on the following design choices:
		    Each sensor has its own independent area of responsibility. The way the system was designed, each sensor is responsible for a specific area of the waste-bin and there is no overlap between areas of various sensors.
		        The chosen ultrasonic sensor comes in multiple versions of beam range and width. The type of sensor that was chosen is very versatile because a wide range of models exist with different characteristics concerning their beam width, detection range and resolution. All these models provide the same basic functionalities and logic of measurement However, the use of versatile programmable active RFID tags, which provides multiple analog inputs and digital

I/O's, allows the co-existence of other sensor types that can trigger events or assist in measurement. Types of sensors that can be of use may include magnetic latches to monitor waste-bin lid status as well as temperature and humidity sensors. As the active RFID tag can sample multiple inputs and collectively transmit them to the reader, addition of various sensors can take place by slightly altering the tag profile and RFID M/W software, regarding tag frame disassembling; without affecting the architecture.

2.Scaling for Information Data Flow:

The information data flow across the system is based on RFID technology. Even though the active RFID tag can control a number of sensors, in large applications where more sensors are needed additional RFID tags can be used for the extra sensors. The RFID tags and readers automatically exchange information whenever they are in range. This means that the addition of new waste-bins to the system or even the addition of extra RFID tags per waste-bin, could be realized without affecting the architecture and not even raising the need for reprogramming the tags or the reader. In such a case the collection of the data would be again realized automatically; however, it would be of the related backend software's responsibility to correlate the new additions with their physical interpretations.