Project Design Phase-II
Solution Requirements (Functional & Non-functional)

Date	08 October 2022
Team ID	PNT2022TMID15973
Project Name	Smart Waste Management System For Metropolitan Cities
Maximum Marks	4 Marks

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	**Fitting IoT device in the trashcans.**	The IoT device need to be fixed in the dustbin with Water proof safety. The IoT device consists Ultrasonic sensor, IR sensor, Weight sensor. To send data to the cloud GPRS/GSM is used.
FR-2	**Detailed bin inventory.**	All monitored bins and stands can be seen on the map, and you can visit them at any time via the Street View feature from Google. Bins or stands are visible on the map as green, orange or red circles. You can see bin details in the Dashboard – capacity, waste type, last measurement, GPS location and collection schedule or pick recognition.
FR-3	**Real Time Bin monitoring**	The Dashboard displays real-time data on fill-levels of bins monitored by smart sensors. In addition to the % of fill-level, based on the historical data, the tool predicts when the bin will become full, one of the functionalities that are not included even in the best waste management software..

		Sensors recognize picks as well; so you can check when the bin was last collected. With real-time data and predictions, you can eliminate the overflowing bins and stop collecting half-empty ones.
FR-4	**Expensive bins.**	We help you identify bins that drive up your collection costs. The tool calculates a rating for each bin in terms of collection costs. The tool considers the average distance depo-bin-discharge in the area. The tool assigns bin a rating (1-10) and calculates distance from depo-bin discharge
FR-5	**Eliminate unefficient picks.**	Eliminate the collection of half-empty bins. The sensors recognize picks. By using real-time data on fill-levels and pick recognition, we can show you how full the bins you collect are.
FR-6	**Predictions for bin fullness**	It is a 24×7 monitoring system is designed for monitoring the dumpster. If either of the containers is full then an alert message is sent from the dustbin to employees and the cloud. In turn, employees can clear the corresponding dumpster. The bin has Sensors that can recognize picks as well;so you can check when the bin was last collected. With real-time data and predictions, you can eliminate the overflowing bins and stop collecting half-empty ones.
FR-7	**Plan waste collection routes**	Based on current bin fill-levels and predictions of reaching full capacity, you are ready to respond andschedule waste collection. You can compare planned vs. executed routes to identify any inconsistencies.

Non-functional Requirements:

Following are the non-functional requirements of proposed solution

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	A smart solution has been proposed to make the waste by sorting more simple and accurate and improve the user experience, usability, and satisfaction. It aims to optimize ease of use while offering maximum functionality.
NFR-2	**Security**	Building and deploying IoT-based smart waste management in cities can be a complex,time consuming and resource-intensive process. Many municipal IT departments will not have the resources or in-house skills to support such a project internally.
NFR-3	**Reliability**	Smart waste management is also about creating better working conditions for waste collectors and drivers. Operates in a defined environment without failure resulting in less manpower, emissions, fuel use and traffic congestion.
NFR-4	**Performance**	The system will provide accurate reports, thus increasing the efficiency of the system. The real-time monitoring of the garbage level with the help of sensors and wireless communication will reduce the total number of trips required of Garbage collecting truck. This will reduce the total expenditure associated with the garbage collection.
NFR-5	**Availability**	Another purpose of this project is to make the proposed waste management system as cheap as possible. By this we empower cities, businesses, and countries to manage waste smarter.

NFR-6	**Scalability**	Using smart waste bins reduce the number of bins inside town , cities coz we able to monitor the garbage 24/7 more cost effect and scalability when we moves to smarter.

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