

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

Date	03 October 2022
Team ID	PNT2022TMID05219
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	<ul style="list-style-type: none">➤ 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	<ul style="list-style-type: none">➤ All monitored bins and stands can be seen on the map, and you can visit them at anytime 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	<ul style="list-style-type: none">➤ 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.

		<ul style="list-style-type: none"> ➤ 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	<ul style="list-style-type: none"> ➤ We help you identify bins that drive up your collection costs. ➤ The tool calculates arating 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	<ul style="list-style-type: none"> ➤ 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 fullthe bins you collect are.
FR-6	Predictions for bin fullness	<ul style="list-style-type: none"> ➤ It is a 24x7 monitoring system is designed for monitoring the dumpster. ➤ If either of thecontainers 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	<ul style="list-style-type: none"> ➤ Based on current bin fill-levels and predictions of reaching full capacity, you are ready to respond and schedule waste collection. ➤ You can compare planned vs. executed routes toidentify any inconsistencies.

Non-functional Requirements:

Following are the non-functional requirements of proposed solution

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	<ul style="list-style-type: none">➤ 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	<ul style="list-style-type: none">➤ 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	<ul style="list-style-type: none">➤ 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	<ul style="list-style-type: none">➤ 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	<ul style="list-style-type: none">➤ 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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