Basic Details of the Team and Problem Statement

Ministry/Organization Name/Student Innovation: VIT-AP University, Amaravathi

PS Code:1487

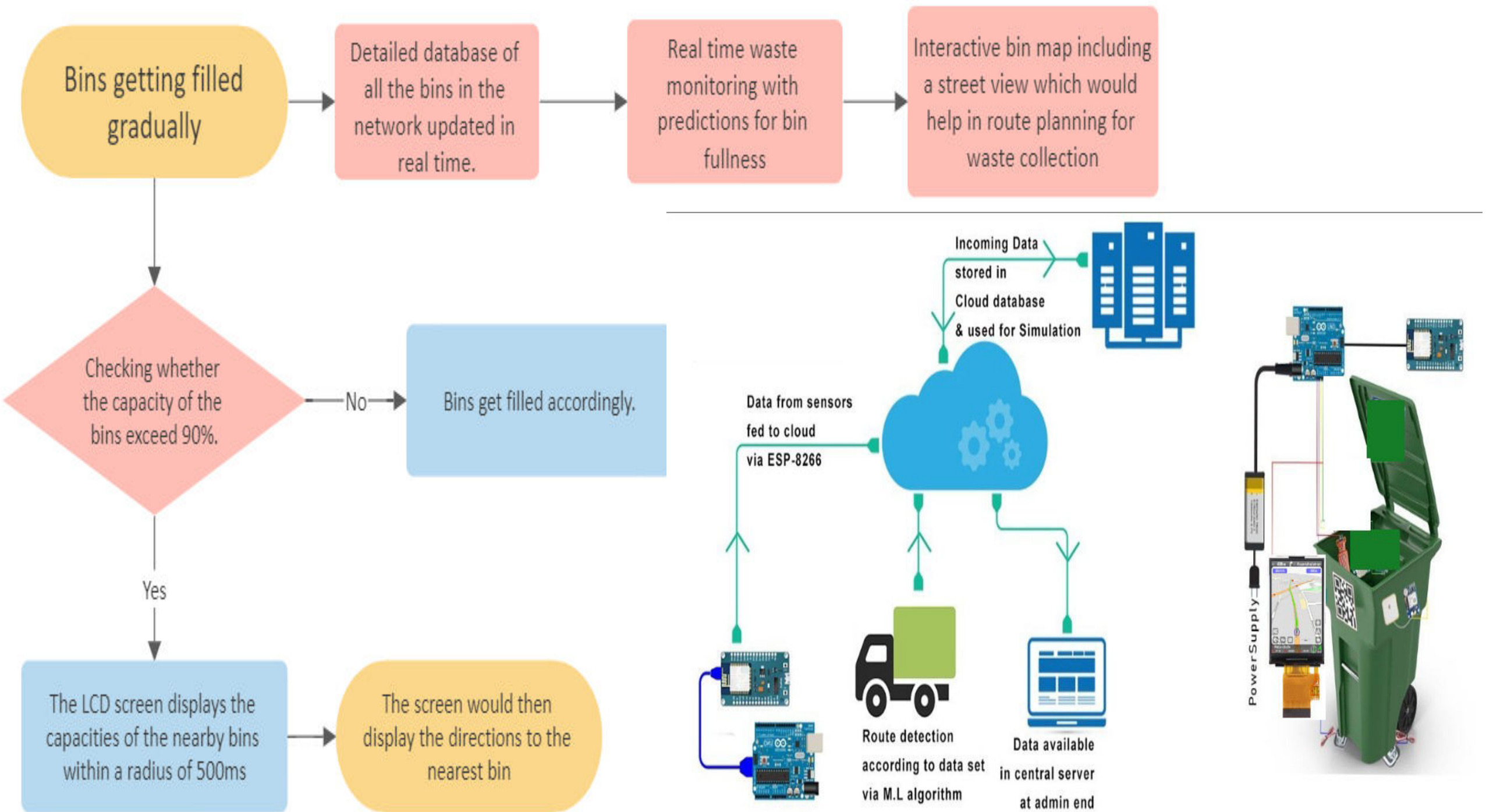Problem Statement Title: GPS-enabled Smart Bin Network
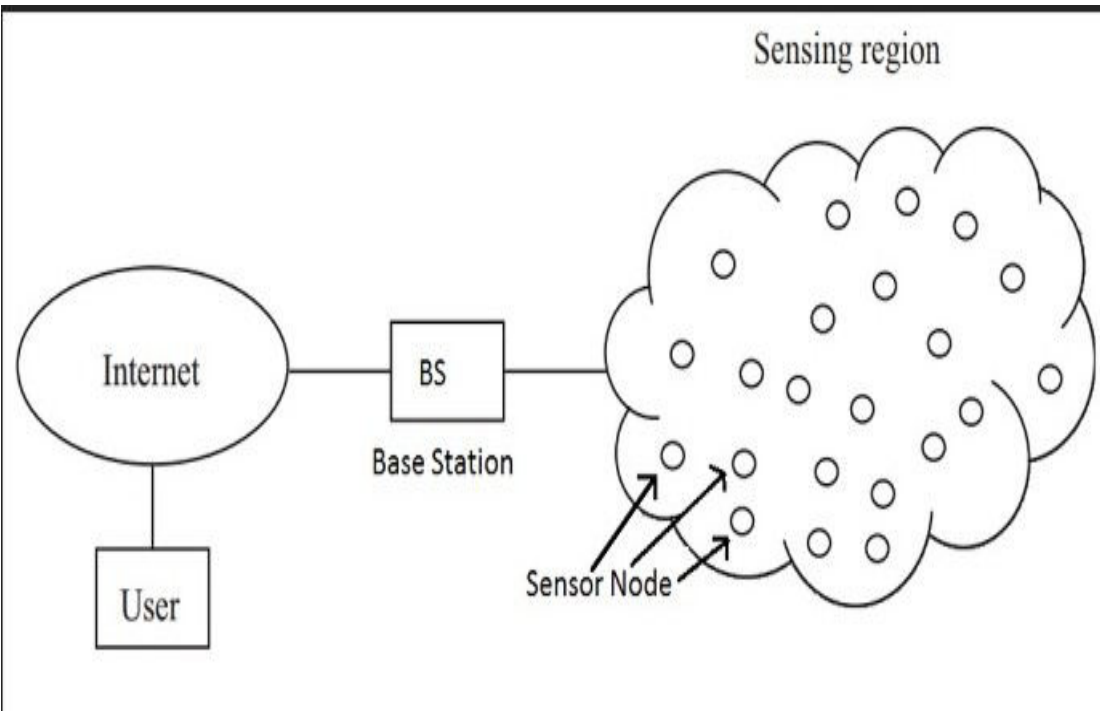
Team Name: The Six Senses

Team Leader Name: Yashas Yadav

Institute Code (AISHE): U-0945

Institute Name: VIT-AP University, Amaravathi

Theme Name: Clean and Green Technology

SMART INDIA HACKATHON 2023
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Bins getting filled gradually → Detailed database of all the bins in the network updated in real time. → Real time waste monitoring with predictions for bin fullness → Interactive bin map including a street view which would help in route planning for waste collection

Checking whether the capacity of the bins exceed 90%.

No → Bins get filled accordingly.

Yes

The LCD screen displays the capacities of the nearby bins within a radius of 500ms → The screen would then display the directions to the nearest bin

Incoming Data stored in Cloud database & used for Simulation

Data from sensors fed to cloud via ESP-8266

Route detection according to data set via M.L algorithm

Data available in central server at admin end

PowerSupply

Sensing region

Internet — BS (Base Station) — Sensor Node (Sensing region)

User

Use Cases:

--a city government could use smart bin data to identify areas where waste generation is highest and target those areas with waste reduction programs.

--a business could use smart bin data to identify which types of waste are being generated in the largest quantities and develop recycling programs for those materials.

--Making it easier for the citizens to locate the nearby bins easily thus making this a major cleanliness promoting initiative.

Dependencies

Technology stack:
- Fill level sensor
- GPS sensor
- 5.0 Inch 800x480 LCD display
- Server computer with access to cloud database

Network Architecture: Nodes(bins) will connect with a single base station(municipal server) thereby implementing a single-hop network architecture. We would be using the Star network structure thereby requiring just a single processing unit (server computer) thus reducing the total cost of the project.

Nodes: The bins would be acting as the nodes of the network connected to the server of the respective municipal department.
The sensor node consists of below components:
Sensing Unit: It consists of Sensor and ADC (Analog to Digital Converter). This sensor would gather the analog data, and ADC would change it to digital format. Sensor Node would collect and analyze the data pertaining to the capacity of the bin and correlate and fuse it with the data from other sensors.

LCD panel connected to a microcontroller board such as arduino:
Important part of this IOT based network, proper functioning of this component is necessary.

Team Member Details

Team Leader Name: Yashas Yadav

Branch : B.tech   Stream : CSE   Year : II

Team Member 1 Name: Priyanka Das Poddar

Branch : B.tech   Stream : CSE   Year : II

Team Member 2 Name: Sukanya Ghosh

Branch : Btech   Stream : CSE   Year : II

Team Member 3 Name: Adit Sahay

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Team Member 4 Name: Sayantan Mandal

Branch : Btech   Stream : CSE   Year : II

Team Member 5 Name: Anushree Das

Branch : Btech   Stream : CSE   Year : II

Team Mentor name: Prof. Chandan Nayak   Faculty of Electronics and Electrical Engineering (Academic)