

## **ABSTRACT**

Waste management and sorting mechanisms are important for waste pick-up services to efficiently collect and segregate them and reduce the costs incurred. Often, the garbage gets accumulated around the bins when there is no proper disposal of waste done regularly, creating an unhygienic environment. A significant challenge in waste collection is the frequency of collecting trash from bins with low fill levels – less than 50% that leads to high operational costs. By monitoring the fill level of the containers, routes optimization can be implemented so the drivers can focus on fully filled trash containers. This project focusses on optimizing this system by monitoring the fill levels of trash bins, measuring the weights of bins that will help to predict the fill levels over time so that the frequency of pick-ups can be estimated and automating the waste classification to improve the overall efficiency of the waste management practices.

Challenges addressed in this project for the dataset:

- Data may come from various sources such as sensors in trash cans, GPS data from the waste collection vehicles, temperature etc. Integrating these diverse data is complex.
- The failure of the sensor to detect the trash and log the signals can lead to disruptions in the planned operations.
- Scalability issue may exist with increase in data volume, which must be handled.
- Data may be noisy, incomplete, or inconsistent, ensuring the quality and accuracy of the data is crucial for making informed decisions.
- Developing and maintaining infrastructure requires significant resources, including hardware, software, and skills.
- Implementing real-time analytics on sensor data can be complex and resource-intensive.