MILESTONE 2 – LITRATURE REVIEW

Anantha Narayanan:

Upon reviewing these research papers, I garnered valuable insights for our project. The first paper, "***A Garbage Classification Method Based on a Small Convolution Neural Network***, " introduces a garbage classification method utilizing a small convolutional neural network (CNN) to enhance the efficiency of social garbage classification. A novel adaptive image-brightening algorithm is devised in the preprocessing stage, addressing background brightness for improved classification. The second paper, "***A deep learning approach for medical waste classification*** ," proposes a deep learning approach for medical waste classification, employing ResNet and transfer learning to achieve accurate detection and categorization of eight types of medical waste. Lastly, the third paper, "***Design and development of smart Internet of Things–based solid waste management system using computer vision*** ," discusses the design and development of a smart solid waste management system utilizing computer vision, IoT, and machine learning techniques. The system classifies waste into biodegradable and non-biodegradable categories, employing a ground-up built convolutional neural network (CNN) and ResNet V2 models for image classification. These papers collectively inspired our project, influencing our strategies for efficient waste classification and management.

Kishan Ramesh:

After reviewing these research papers, I drew inspiration for our project from the innovative waste management models they presented. The first paper, "***An Intelligent Waste Management Application Using IoT and a Genetic Algorithm–Fuzzy Inference System***," introduces an intelligent waste management system for smart cities, utilizing a hybrid model of genetic algorithms and a fuzzy inference engine. This model enhances correctness and robustness by dynamically deciding how to manage waste collection, addressing the efficiency concerns of traditional genetic algorithms. The second paper, "***Smart Waste Collection Monitoring and Alert System via IoT*** ,"proposes an efficient waste monitoring and alert system via IoT, focusing on real-time garbage bin level monitoring. The system sends SMS notifications to the garbage collection department when bins are nearly full, improving the effectiveness and systematic nature of waste collection. The third paper, "***Data Analytics Platform for the Optimization of Waste Management Procedures*** ," discusses a data analytics platform for optimizing waste management procedures in Industry 4.0. It utilizes IoT sensors, big data, and advanced analytical tools for monitoring solid waste collection and transportation processes, providing real-time monitoring of bin fullness and optimizing routes for waste management companies. These diverse approaches collectively influenced our project, shaping our strategies for intelligent waste management.

Aparna Shankar:

These research papers were instrumental in inspiring our project. The first paper, "***Intelligent waste management system using deep learning with IoT***," introduced a sophisticated system that combines IoT and deep learning, utilizing convolutional neural networks and a smart trash box architecture with multiple sensors for real-time garbage management. This process, involving waste scanning, image capture, preprocessing, and microprocessor-based classification, resulted in an impressive 95.31% waste classification accuracy and an 86% System Usability Scale (SUS) score. The second paper, "***Waste Management and Prediction of Air pollutants using IoT and Machine Learning Approach***," provided insights into an IoT-based smart bin connected to a Google Cloud Server. This system conducts real-time data analysis, predicting bin status and air pollutant levels with trained models, contributing to

effective classification and alert notifications. The third paper, "***Waste Object Detection and Classification***," influenced our project by focusing on waste detection techniques using the TrashNet dataset. Despite dataset limitations, the research employed innovative methods, including image augmentation and a hybrid transfer learning model, ensuring precise detection of object boundaries and facilitating the categorization of disposable items. Together, these papers laid the foundation for our intelligent waste management initiative.

Anbu Nambi:

After reviewing several research papers on waste management innovations, our project draws inspiration from cutting-edge solutions presented in these papers. For instance, the implementation detailed in "***Smart Waste Management Using Deep Learning with IoT***" serves as a foundation. In our approach, we aim to gather sensor data from trash cans, transmitting it to the cloud upon reaching capacity, prompting timely waste collection. Going beyond, we incorporate weight measurement for more accurate fill level predictions and optimize collection routes based on container fill levels. Another noteworthy influence is the framework introduced in "***Recycle.io: An IoT-Enabled Framework for Urban Waste Management***," leveraging IoT to monitor real-time waste generation and collection. Our project aspires to automate waste classification for enhanced operational efficiency, aligning with the innovative spirit of these research endeavors. Additionally, the autonomous waste classification system proposed in "***Smart Waste Management and Classification Systems Using Cutting Edge Approach***" guides our project's direction. By employing deep learning algorithms, our system can independently identify, classify, and organize waste into specific bins, streamlining the collection process and contributing to efficient waste utilization.