A MINI PROJECT-I REPORT
ON

Real life solutions for Waste Management

SUBMITTED TOWARDS THE
PARTIAL FULFILLMENT OF THE ACADEMIC REQUIREMENTS
FOR THE SEMISTER V

BACHELOR OF TECHNOLOGY

(Third Year Computer Engineering)

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Year:2025-2026

CERTIFICATE

This is to certify that the Mini Project-I Entitled

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is a bonafide work carried out by Students under the supervision of Dr.Mayuri Kulkarni and it is submitted towards the partial fulfillment of the Academic requirements for Semester V (Third Year Computer Engineering).

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Abstract

The Smart Waste Management and Recycling System (SWMRS) is a web-based application developed to enhance the efficiency and transparency of waste collection and recycling processes. The system integrates multiple users — administrators, citizens, workers, and buyers — into a unified digital platform that facilitates seamless waste reporting, monitoring, and management. Citizens can report waste with location details, workers can update collection status, administrators can manage operations and analyze data, and buyers can purchase recyclable materials.

The project was motivated by the increasing need for smart and sustainable solutions to tackle urban waste management challenges. It aims to replace manual processes with a technology-driven system that ensures timely waste collection, promotes recycling, and supports environmental sustainability.

The outcome of the project is a fully functional role-based management system that uses PHP, MySQL, and Google Maps API to provide real-time tracking, reporting, and analytics. The innovation lies in integrating waste collection management with a recycling marketplace and performance analytics, creating a smart, interactive, and eco-friendly waste management solution.

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Chapter 1

Introduction

1.1 Project Idea

The Smart Waste Management and Recycling System (SWMRS) is a web-based platform that digitalizes the waste collection and recycling process. It connects citizens, workers, administrators, and buyers on one system. Citizens can report waste using location and type, workers get assigned tasks to collect it, admins monitor progress and manage operations, and buyers can purchase recyclable materials. The project aims to make waste management efficient, transparent, and eco-friendly by using PHP, MySQL, and Google Maps API for real-time tracking and automation.

1.2 Motivation of the Project

Traditional waste management systems often face challenges such as delayed collection, lack of monitoring, and inefficient recycling. Citizens have limited means to report uncollected waste or track progress, while administrators struggle with manual record-keeping and coordination. This project was motivated by the need for a smart, technology-driven approach that bridges these gaps through automation, user engagement, and data-driven insights. By leveraging modern web technologies, SWMRS promotes cleaner cities and supports sustainable waste recycling practices.

Chapter 2

Literature Survey

2.1 Related Work Done

Explain Referred Papers for paper in paragraph.

2.2 Limitation of Existing System

The existing waste management systems are mostly manual, unorganized, and inefficient, leading to several operational and environmental challenges. Waste collection often relies on fixed schedules rather than real-time requirements, causing overflowing bins or uncollected waste in public areas. There is no direct communication channel between citizens and municipal authorities, making it difficult to report waste-related issues quickly. Manual data entry and record maintenance result in errors, delays, and lack of transparency in monitoring and tracking waste disposal activities. The absence of a centralized digital platform means workers' performance cannot be effectively tracked, and administrators face difficulties in coordinating tasks. Moreover, there is no system to promote recycling or connect buyers with recyclable material suppliers, leading to loss of reusable resources. Overall, the traditional system lacks automation, accountability, and data-driven insights, which reduces efficiency and fails to support sustainable waste management practices.

Chapter 3

Problem Definition and Scope

3.1 Need of Project

The existing waste management system is mostly manual, inefficient, and lacks real-time monitoring. Citizens cannot easily report waste or track its collection. Hence, there is a need for a smart, digital system that connects citizens, workers, administrators, and recyclers to ensure faster, transparent, and eco-friendly waste management.

3.2 Problem Statement and Objectives of Project

Problem statement:
The current waste management process faces delays, poor coordination, and no centralized tracking. There is no system that links citizens, authorities, and recycling centers efficiently.

Objectives:

- To design a web-based system for waste reporting and management.
- To provide real-time tracking using Google Maps.
- To manage and monitor workers and reports digitally.
- To create a marketplace for recyclable materials.
- To promote sustainable and smart waste handling practices.

3.3 Scope of the Project

In Scope:

- Waste reporting, monitoring, and task management.
- Role-based access (admin, worker, citizen, buyer).
- Google Maps integration and analytics.

Out of Scope:

- IoT sensors and smart bins.
- Mobile application or live vehicle tracking.

3.4 Expected Outcomes

- Efficient and transparent waste management system.
- Centralized data storage and reporting.
- Improved coordination between users.
- Promotion of recycling and sustainability.
- Real-time monitoring and digital analytics.

3.5 Applications

- Municipal bodies for city waste management.
- Recycling centers to buy recyclable waste.
- Residential areas to report and track waste.
- Smart city projects to enable automated and sustainable waste handling.

Chapter 4

System Requirement Specification

4.1 Hardware and Database Requirement

Hardware Requirement:

Sr. No.	Parameter	Specification	Justification
1	CPU Speed	2 GHz	Write use of sensor
2	RAM	3 GB	Write use of sensor

Table 4.1: Hardware Requirement

Database Information :

1. Database Software Used: MySQL, which is part of the XAMPP package.
2. Database Schema with Attributes and Data types:
3. Normalization Technique Used:

   First Normal Form (1NF)

   - Each table has a **Primary Key**.
   - All attributes hold **atomic (indivisible) values**.
   - There are **no repeating groups or arrays** in any table.
   - Each field contains **only one value** for each record.

- Ensures that the data in every column is **unique and clearly defined**.

Second Normal Form (2NF)

- The database is already in **First Normal Form (1NF)**.
- All **non-key attributes depend on the entire primary key**, not just part of it.
- Ensures that there are **no partial dependencies** in any table.

Third Normal Form (3NF)

- The database is in **Second Normal Form (2NF)**.
- All attributes are **independent of non-key attributes**.
- Ensures there are **no transitive dependencies** in any table.
- Every non-key attribute depends **only on the primary key**.

Chapter 5

Project Plan

5.1 Project Schedule

5.1.1 Time Line Chart

A project timeline chart is presented. This may include a time line for the entire project.

Chapter 6

System Deign

6.1 System Architecture

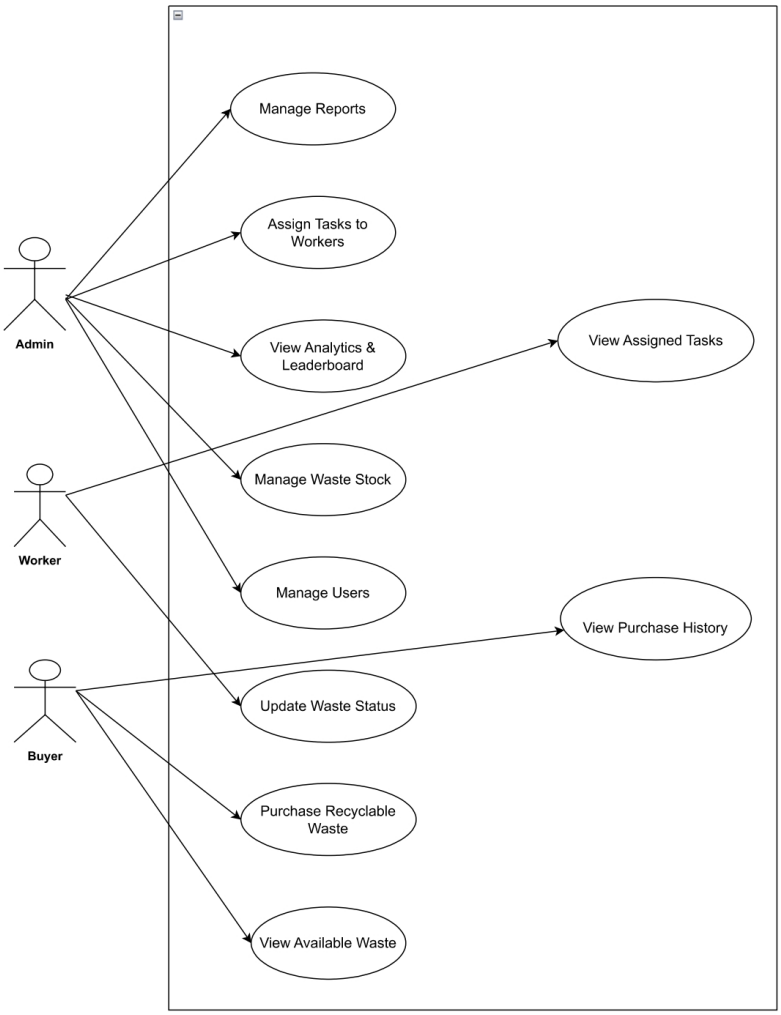

Figure 6.1: System Architecture)

Chapter 7

Project Implementation

7.1 Overview of Implementation

7.2 Tools and Technologies Used

1. Frontend Technologies:
HTML5 – Used to structure all web pages and user interfaces.
CSS3 – Used for styling the frontend and creating responsive layouts.
JavaScript – Used for interactive features, form validations, and enhancing user experience.
2. Backend Technologies:
PHP – The main server-side scripting language used to handle logic, authentication, database connectivity, and role-based operations.
Google Maps API – Integrated to display waste locations, view reports visually, and support the tracking functionality.
3. Database Technologies:
MySQL – Relational database used for storing users, reports, tasks, recyclable waste, purchases, and system logs.

7.3 Flowchart of the System

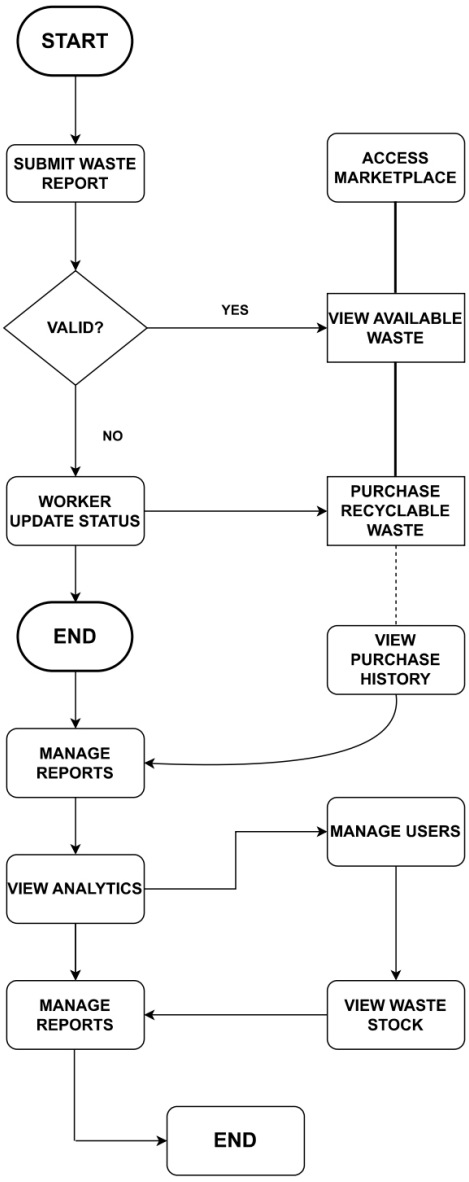

Figure 7.1: Flowchart of Smart Waste Management and Recycling System (SWMRS)

Chapter 8

Results

8.1 Screen Shots

8.2 Outputs

Chapter 9

Conclusion and future scope

Conclusion:

The Smart Waste Management and Recycling System (SWMRS) project has helped create a more organized and efficient way to handle waste-related activities. By bringing citizens, workers, and administrators onto a single platform, the system ensures better communication and faster processing of waste reports. Features like real-time status updates, role-based access, and a recyclable waste marketplace make the overall waste management process more transparent and user-friendly. The system not only reduces manual efforts but also improves accountability and sustainability. Overall, the project successfully meets its goals and provides a solid foundation for building smarter and more eco-friendly waste management solutions in the future.

Future Scope:

1. Mobile Application
Developing a dedicated Android/iOS app to increase user accessibility, improve notifications, and provide real-time updates.
2. IoT Integration
Smart bins equipped with sensors to automatically detect waste levels and trigger alerts for optimized collection.
3. AI Machine Learning
Implementing AI to:
Predict waste generation patterns
Optimize worker routes
Improve classification of recyclable materials

Annexure A

References

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