PROJECT REPORT

TEAM MEMBERS:

TEAM ID: LTVIP2025TMID60442

Team Leader: Myneni Tharun

Team Member: Pathan Sameer

Team Member: Shaik Shiritiz Ahmed

Team Member: Thota Tulasamma

INTRODUCTION

Project Overview

The Garage Management System (GMS) is designed to streamline the day-to-day operations of automobile service centers by automating job scheduling, inventory management, billing, and customer engagement. As vehicle usage grows, garages face the challenge of efficiently managing resources while ensuring customer satisfaction. GMS bridges this gap with real-time data handling, a user-friendly interface, and integrated features that enhance productivity and customer service.

Project Objectives

Develop a centralized platform for managing garage operations.

Automate vehicle check-in, service tracking, and customer communication.

Provide inventory management for spare parts and tools.

Generate real-time reports and analytics for decision-making.

Improve customer satisfaction with timely service updates and invoicing.

LITERATURE SURVEY

Existing Problems

Manual Processes: Many garages still use paper-based records leading to errors and inefficiencies.

Poor Inventory Tracking: Difficulty in tracking spare parts leads to delays.

Inadequate Customer Communication: Customers lack updates on service status.

Unstructured Data: Difficulty in retrieving service history for repeat customers.

Inefficient Billing: Time-consuming invoice generation and payment handling.

References

Smith, J. (2022). Modern Automotive Workshop Automation. Springer.

Kumar, P. (2021). Role of Software Systems in Vehicle Servicing. IEEE Transactions.

PROBLEM STATEMENT

Traditional garage management systems fail to meet the growing demands for automation, transparency, and efficiency in automobile service centers. The lack of centralized systems causes delays, mismanagement, and poor customer experience. This project proposes an integrated Garage Management System that automates and digitizes core processes to improve operational efficiency and customer satisfaction.

IDEATION s PROPOSED SOLUTION

Empathy Map Summary

To understand users like garage staff and vehicle owners, an empathy map was created focusing on their needs, frustrations, and goals.

Key Ideas from Brainstorming

Real-time service tracking

SMS/Email service alerts

Digital job cards

Inventory auto-updates

Customer portal

Finalized Solution

The GMS system will allow garage owners to manage services, staff, vehicles, inventory, and customer data in one unified platform.

REQUIREMENT ANALYSIS

Functional Requirements

Register and manage customer vehicles.

Assign and track service tasks.

Manage spare parts inventory.

Generate and send invoices.

View service history and reports.

Non-Functional Requirements

Performance: Handle multiple jobs and users concurrently.

Security: Data encryption and role-based access.

Scalability: Easy to add new garages/branches.

Reliability: Auto-backup and error recovery mechanisms.

Usability: Clean UI with minimal training required.

PROJECT DESIGN

Data Flow Diagram

(Level 1 DFD shows flow from customers to admin, inventory, and billing modules.)

User Stories

SOLUTION ARCHITECTURE

System Architecture

Components:

Frontend: HTML/CSS/JavaScript

Backend: Python Flask

Database: MySQL or SQLite

Storage: Local / Cloud for files

APIs: For SMS/Email alerts

PROJECT PLANNING s SCHEDULING

G. CODING s FEATURES

Feature 1: Real-Time Job Tracking

Track vehicle service status from check-in to completion. Display technician updates and service duration estimates.

Feature 2: Inventory Management

Auto-update spare parts based on job cards. Alerts for low stock. Allows reorder directly from the system.

PERFORMANCE TESTING

Stress tested with 50 concurrent users.

Load time < 2 seconds on average.

CRUD operations validated through unit testing (100+ test cases).

RESULTS

Successfully deployed on local server.

Real-time dashboard showing pending/completed services.

Email notifications tested for service completion.

ADVANTAGES s DISADVANTAGES

Advantages

Time-saving and paperless process.

Increased transparency for customers.

Efficient resource and parts management.

Disadvantages

Initial setup cost.

Staff training needed.

Dependent on consistent power/internet access.

CONCLUSION

The Garage Management System addresses key inefficiencies in traditional garage operations

through automation and data-driven tools. The solution improves customer satisfaction, optimizes resource usage, and enables business scalability with ease of access and reporting.

FUTURE SCOPE

Integration with vehicle diagnostics.

Mobile app for real-time updates and bookings.

Multi-branch support for franchise garages.

AI-based service recommendations and maintenance forecasting.

APPENDIX

Source Code (Python Flask)

Database Schema

UI Mockups

Dataset (Sample Customer C Job Records)

Deployment Guide