

# Vehicle Maintenance System using Python

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**Abstract:** Owners of vehicles can avoid unforeseen car problems by maintaining their vehicles regularly. Early detection of vehicle concerns is crucial to preventing them from developing into serious difficulties. Owners of vehicles frequently inquire about service at auto shops. Vehicle technicians examine crucial parts of the vehicle and fix problems to make sure they are in good condition and won't break down suddenly. The study was carried out by the researchers to evaluate the everyday activities and transactions carried out in auto repair facilities. The researchers gathered preliminary data and discovered that the majority of auto repair companies or garages still handle their daily transactions manually. Customer records are still entered manually, as are transactions with clients, tracking of vehicle repairs as they are made, updates on vehicle services, and billing. The functioning of the garage and the response time to client inquiries will be slowed by the ongoing usage of manual procedures. The researchers have identified a need to modernize how auto repair shops work. Customers and car garages will both profit from the system's installation. Utilizing the technology to run the company will help car garages expand and improve operational efficiency. Customers may do business for car service easily and comfortably

**Keywords:** vehicles

## I. INTRODUCTION

Vehicles now play a significant role in daily life seen. The vast majority of individuals commute daily using the automobile. Regular maintenance helps ensure that the car runs smoothly and that fuel is used effectively. Another issue is that when automobiles are taken in for servicing or maintenance, it is presumed that repairs would be made carefully, but it has been noted that multiple vehicle accidents occur each year as a result of the neglect of repair facilities and car dealers.

When the vehicle is handed over for repair, the problem of confidence is crucial. Customers are frequently taken advantage of under the name of service. A serious issue is the replacement of original parts with outdated ones. Additionally, it might be challenging for clients to confirm that the service providers are doing the tasks for which they are paying. Service providers take advantage of this circumstance and overcharge customers. The practice of "periodic vehicle maintenance," which mandates that the vehicle have periodic servicing and maintenance, is widely used.

A vehicle's service life is typically determined by either a predetermined time frame or the mileage travelled. Generally speaking, it is advised to get the car serviced every six months or 10,000 km. However, the problem with "periodic vehicle maintenance" is that it's difficult to determine which parts need to be repaired or replaced, which might lead to repairs or replacements of parts that are still in good shape. Predictive vehicle maintenance proves useful in this situation. This data is obtained from numerous built-in or customized sensors in the car that are used to keep track of the condition of various components. To analyze and make decisions, this data is relayed via the internet, and the chance of failure in the future is then predicted. When a consumer uses this approach to choose when to service their automobile and which part to fix, it saves them a lot of time and money since it gives them transparency. A certain system could occasionally require maintenance or repair before the next scheduled due date. The solution effectively manages this problem since the user instantly receives a warning on their mobile application. This prevents the buyer from having to pay more money for the additional damage the automobile would have sustained if the defective item had been driven. Given that the service center, already has cameras installed, our solution makes advantage of such infrastructure.

**II. PROBLEM DEFINITION**

This solution will streamline the administrative tasks related to handling business transactions in vehicles garage. The following transactions are included in the list: recording customer records, tracking the status of car repairs, updating vehicle service orders, managing vehicle service schedules, maintaining maintenance logs, dealing with customers, and billing. The suggested idea would do away with manual processes and transactions in auto repair facilities. The system will operate as a hub for transactions that can be accessed by clients and technicians working on vehicles, as well as monitored by an administrator. The suggested strategy would boost operational effectiveness and overall client happiness when it comes to receiving car service.

**III. MOTIVATION**

Since the initial booking and charge estimation are handled directly by the website, less time is needed to visit the store and complete these tasks. the client may access it without downloading any apps to their phone. The user doesn't need a laptop to open the website because it is also mobile-accessible.

**IV. SYSTEM ARCHITECTURE**

The building of the Vehicle Service Management System in Django is suggested in this essay. The solution will streamline the administrative tasks related to handling business transactions in a car garage. The following transactions are included in the list: recording customer records, tracking the status of car repairs, updating vehicle service orders, managing vehicle service schedules, maintaining maintenance logs, dealing with customers, and billing. The suggested idea would do away with manual processes and transactions in auto repair facilities. The system will operate as a hub for transactions that can be accessed by clients and technicians working on vehicles, as well as monitored by an administrator. The suggested strategy would boost operational effectiveness and overall client happiness when it comes to receiving car service. 1Time-consuming: Since the initial booking and charge estimation are handled directly by the website, less time is needed to visit the store and complete these tasks.Regular maintenance is essential for keeping vehicles in optimal condition and preventing unexpected breakdowns. With a maintenance system in place, timely servicing and inspections can be scheduled, ensuring that vehicles are well-maintained and reliable.

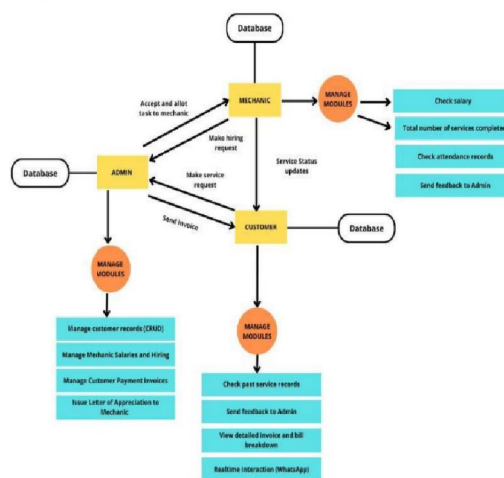


Figure 1: System Architecture

**V. PROPOSED SYSTEM**

The proposed Vehicle Maintenance System (VMS) addresses these shortcomings by introducing a comprehensive, automated solution that streamlines the entire maintenance process:

VMS automates job scheduling, parts inventory management, and service tracking, leading to increased efficiency and reduced turnaround times for maintenance tasks.

The system provides secure, web-based access to stakeholders, enabling them to retrieve and update information from anywhere at any time.

Improved Transparency: VMS offers real-time visibility into job statuses, service histories, and billing details, fostering transparency and trust between service providers and customers. By automating repetitive tasks and centralizing data management, VMS reduces administrative workload, allowing staff to focus on delivering high-quality services. The user-friendly interface, timely communication, and transparent processes of VMS contribute to higher customer satisfaction by ensuring prompt service delivery, clear billing, and consistent service quality.

Overall, the proposed VMS represents a significant advancement over the existing manual system, offering numerous advantages in terms of efficiency, accessibility, transparency, administrative overhead, and customer satisfaction.

## **VI. MODULES USED**

### **1. Admin Module**

**Dashboard:** The admin may view all of the details in this part, including the total number of users registered, total inquiries, total mechanics, and total services. Using a customer's phone number, email address, or contact number, the administrator can search inquiries in this section. **Service Search:** The administrator can use the phone number, email address, or contact number of a client to search for services in this area. **Mechanics:** The administrator can control mechanics in this area (add, delete, and update). the type of vehicle. The administrator can control the vehicle category in this area (add, delete and update) **Reg Users:** The administrator can examine and edit user details in this area. **Service Demand:** The administrator may add service charges (service fee and any extra parts fees that may apply) in this area. Based on status, the admin may view services (pending services, rejected services, and complete services). Admins can also approve pending policies. **Client Inquiry** The administrator can answer client inquiries in this section as well as view inquiries to which no customers have responded.

### **2. Customers Module**

**Dashboard Enquiry:** Here, the user may complete the form and see whether or not his inquiry has received a response (which is done by the admin). **Service Request:** In this part, the user may complete the service form, check the progress of the service, see how much is being charged for the service, and print an amount slip (which is done by the admin). Users may also change their passwords, retrieve their passwords, and update their profiles.

### **3. Mechanics Module**

The mechanic may examine the tasks the admin has assigned him in this section. He can also look up the attendance record. The vehicle's state is updated by the mechanic module, including whether or not it has been fixed.

## **VII. ACTIVITY DIAGRAM**

Activity diagram is a graphical representation of workflows of stepwise activities and actions with support for choice, iteration and concurrency. An activity diagram shows the overall flow of control.

The most important shape types:

- Rounded rectangles represent activities.
- Diamonds represent decisions.
- Bars represent the start or end of concurrent activities.
- A black circle represents the start of the workflow.
- An encircled circle represents the end of the workflow.

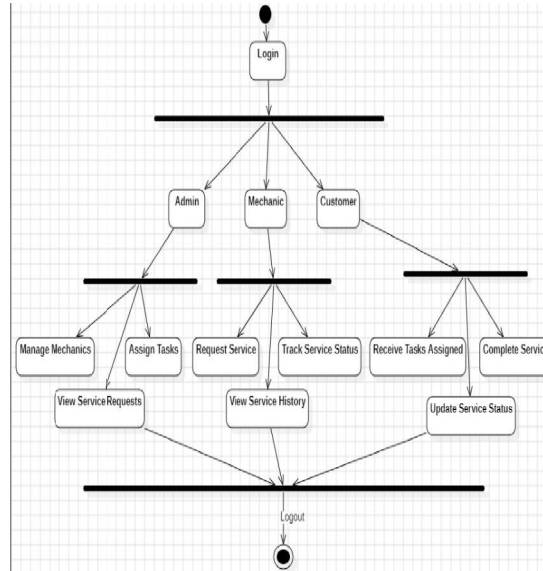


Figure 2: Activity Diagram

**VIII. RESULTS**

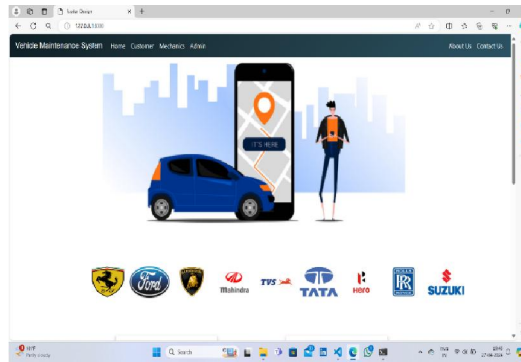


Figure 3: Home page

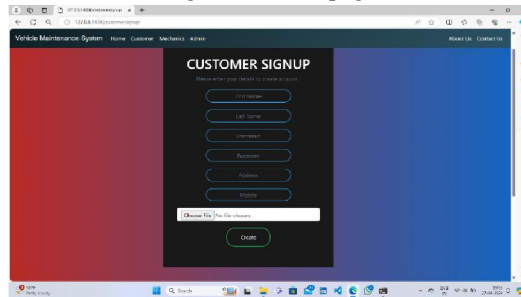


Figure 4: Customer Signup

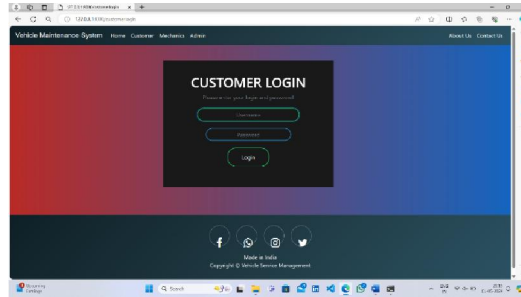


Figure 5: Customer Login page

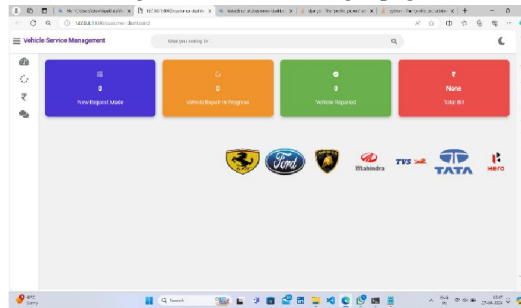


Figure 6: Customer Dashboard

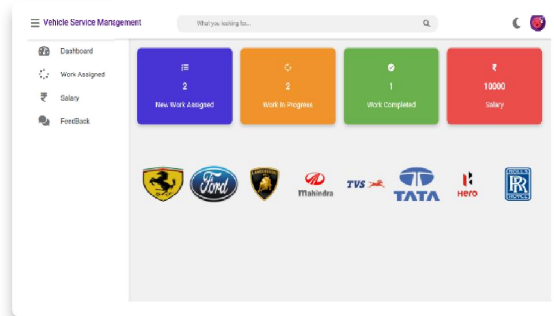


Figure 7: Mechanic Dashboard

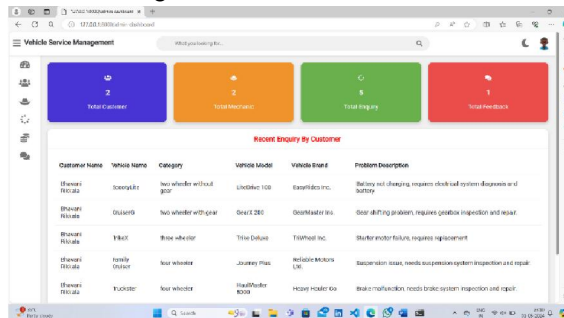


Figure 8: Admin Dashboard

**IX. CONCLUSION**

Vehicles need to be serviced to ensure that they are in good shape and function well. The result of the study showed that the developed system met the needs and requirements of the respondents and intended users.

The result showed that the respondents rated the system satisfactorily in terms of user acceptability, effectiveness, quality, productivity, and reliability.

The system will both benefit vehicle garages and customers. For vehicle garages, utilizing the system to operate the business will help them grow and increase business efficiency. For customers, can easily and conveniently make transactions for vehicle servicing.

By optimizing operations and enhancing customer satisfaction, the vehicle maintenance system contributes to the long-term sustainability of both vehicle garages and the automotive industry as a whole. Sustainable practices not only benefit the environment but also foster stability and resilience in the face of economic fluctuations and market changes. This system has a positive impact on the local community by creating employment opportunities, supporting small businesses, and promoting economic growth. As vehicle garages thrive, they contribute to the overall prosperity and well-being of the communities they serve, fostering a cycle of mutual benefit and support.

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