

Mechanics Mitra: The Future of Vehicle Servicing

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Abstract—The goal of the Mechanics Mitra project is to automate the current manual system involved in servicing a vehicle to a fully-fledged computer softwarebased system for their requirements, so that their valuable data and information is stored for longer periods of time in a systematised manner so that they could be used whenever there are such requirements of that information, and it eliminates the burden on the customer to search for mechanics whenever he or she requires m Both customers and mechanics profit from this platform. The employed software and hardware are readily available and simple to operate. The goal is to replace the current manual system with a computerised one in order to fill requirements and keep data for a longer time. Additionally, customers do not need to go looking for mechanics to service their vehicles because this platform will send mechanics to them anytime they need them to service their vehicles at reasonable pricing.

I. INTRODUCTION

To overcome the issue with the manual system that now exists, the Mechanic Mitra has been designed. Several problems with the manual vehicleservicing system are supported by this programme. Both car owners and technicians can profit from this web application since it makes it easier to identify mechanics who will service customers' cars quickly and affordably whenever they need it. This web application may be used by anybody with access to the internetand doesn't require any special training to use. The web programme will also assist mechanics in storing data regarding the type of servicing they perform, when and where they do it, and the payment they receive for it.

II. PROBLEM STATEMENT

The goal of creating this web application is to automate the current manual system involved in servicing and maintaining a vehicle from a manual system to a fully-fledged computer software-based system. Additionally, it eliminates the need for customers to search for mechanics whenever they need maintenance and servicing of their vehicle because mechanics can connect with customers easily and fix the issue that is present in their vehicle.

III. BACKGROUND ABOUT PROJECT IDEA

Background information regarding this project's idea comprises the first and foremost reason that we need a professional mechanic to service and maintain our vehicles because they need to be fixed or maintained quickly and affordably. The existing manual system, which has a number of problems

storing customer data, is the second factor in the decision to use this concept, and this application fixes those problems.

IV. LITERATURE REVIEW

We studied some of the online research papers before creating this web application Mechanics Mitra auto mobile servicing and maintenance application.

1. Customers may access "Web-based Vehicle Service Management System" by [1] T.Matheeban online in 2017. Customers may arrange their car servicing and maintenance using this facility. You may also make your payment online. Customers do not waste time waiting because of these conveniences. In today's fast-growing, competitive business environment, each individual is tremendously busy with their business and cannot relax for even a second. Customers would want to receive services online and have their requirements met.

2. Vehicle service centre management may be readily controlled with the Nurnadirah Binti Ngah wrote "Vehicle Service Management System Using Priority Scheduling" in (2018) [2]. The goals of this system are to build and construct a new system that will aid in work management by using the Priority Scheduling approach. In this manner, the work may be handled in accordance with the priority of booking time. It is also to design a system in which the employees who handle the repair tasks and divide the tasks correctly. The repair duty will be assigned to the employee who accomplished the least amount of work for the day by the system. This system will employ the Priority Scheduling approach to distribute work tasks and schedules.

3. "A's Review of Vehicle Service Management Systems," [3] by J. Li et al. (2017) provides an overview of the various types of vehicle service management systems, including manual systems, computer-based systems, and mobile systems. Furthermore, the authors discuss the key characteristics and functionalities to consider when selecting a system, as well as the benefits and challenges of implementing various systems.

4. The Internet of Things (IoT) is suggested as a way to enhance the efficacy and efficiency of vehicle service management systems in "Intelligent Vehicle Service Management System Based on Internet of Things" by [4] X. Li et al. (2016). In order to enable real-time monitoring and diagnosis of vehicle issues as well as to improve communication between vehicles and service centres, the authors propose a prototype

system that makes use of IoT technologies, such as sensor networks and cloud computing.

5. S. S. Al-Kharusi et al. (2015)'s (2015) examines several approaches for managing vehicle maintenance, including as preventive maintenance, predictive maintenance, and corrective maintenance, in "A Review of Vehicle Maintenance Management Systems." [5] The writers also go through the advantages and drawbacks of putting these systems in place, as well as how information technology supports vehicle maintenance management.

6. A. Al-Sarawi et al (2014) .'s article "Real-Time Vehicle Service Management System" [6] describes a real-time vehicle service management system that makes use of GPS and GPRS technologies to track and monitor cars in real-time. The writers go through the architecture and operation of the system as well as the advantages of using it to optimise vehicle maintenance and enhance customer service.

7. According to S. A. Hameed et al. (2013)'s "Mobile Vehicle Service Management System," [7] mobile technologies could be used to improve the efficacy and efficiency of vehicle service management. The authors present a mobile vehicle service management system that uses GPRS and SMS technologies to enable real-time communication between cars and service facilities. The system also includes a web-based interface for organising and tracking service requests and responses.

8. "A Review of the Literature on Predictive Maintenance for Vehicles" by [8] J. Wang, L. Zhang and Y. Liu (2019). It reviews predictive maintenance for vehicles, focusing on the use of sensors, data analytics, and machine learning techniques to predict and prevent vehicle failures.

Overall, these research papers suggest that advances in technology, such as IoT and big data analytics, have the potential to significantly improve the efficiency and effectiveness of vehicle maintenance management. The papers also stress on the importance of effective maintenance management in reducing vehicle downtime and improving overall vehicle performance. The use of these technologies can also help to reduce maintenance costs and improve the environmental performance of vehicles, which is an important consideration in today's society. [9]

This chapter provides an overview of the system's idea. A survey of the literature is essential to assisting the developer in determining the problem from the previous system that can be improved or the flow of the new system. Furthermore, it aids the developer in better understanding the system and the strategies employed. [10]

During the survey, the majority of the research papers/reference papers were on "Vehicle Tracking System," which was not useful, but we also obtained some great websites such as DreamzTech Solution, CarZ, The Bike Doctor, and many more, which were rivals to Gaadizo. The key difference among the present system and the one being suggested is position booking to eliminate time consumption, auto-billing for transparency, FAQ for general questions, and navigation services to determine the precise position of the repair facility.

In conclusion, research on vehicle service systems points to the possibility that these technologies might boost both the effectiveness and efficiency of vehicle maintenance and customer service. [11] Real-time communication and monitoring are two of these systems' primary features, and they also offer a number of different maintenance management strategies. [12]

V. METHODOLOGY

This section describes the approach that was utilised to create Mechanics Mitra. The approach is used to solve the entire problem that arises and to guarantee that the project runs smoothly and is completed within the time frame specified. There are several methodologies that may be employed and utilised in the building of a system. The strategy must be appropriate for the project. It is critical to lead the researcher through the work at hand. As a result, the Waterfall Model is employed for this project. Additionally, each phase involved in the creation of this project, as well as the system requirements, will be detailed in depth later in this chapter.

The waterfall paradigm was designed for software development. The model is named by the main premise that it grows methodically from one phase to another in a descending fashion, similar to a waterfall. Definition research or analysis, basic design, technical design, building and implementation, testing, integration, and maintenance are the steps. The waterfall model was adopted for the following reasons:

1. Project Monitoring - Each phase of development is checked on a regular basis to ensure that all system modules meet previous system requirements.
2. Allow for modifications - Any changes in the system's development can be implemented at any stage to improve the system's functioning.
3. Save money - The system's development can save money since the information gathered at each phase is highly specific until the system's final test.

A. METHODOLOGY OF SYSTEM DEVELOPMENT/SOFTWARE

The waterfall paradigm was employed in this project to apply Structured Analysis and Design Methodology (SADM). This approach is flexible to the amount of time available to finish the assignment. It begins with planning, requirement analysis, design, implementation, and testing, followed by operation and maintenance. Every step must adhere to the specification. When the system is finished, it will be maintained as a final test.

B. PHASE OF PLANNING

The goal of this phase is to design how to create a system called Mitra, as Mechanics. This method will be created for technicians and consumers as a service for customers Before visiting the auto servicing centre, schedule an appointment. Every mechanics should be assigned jobs.

C. PHASE OF REQUIREMENT ANALYSIS

The goal of this phase is to collect all of the requirements needed to Create the system and analyse the existing one. During this stage, the information received on online booking and how to put it into action The scheduling techniques are gathered based on past study analysis. to increase the knowledge of the system that will be constructed.

D. DESIGN STAGE

The design phase includes various diagrams that depict how the system will work. This project's design will be separated into three categories: Process Design, Database Design, and Interface Design. The criteria included in Process Design are Context Diagram, Data Flow Diagram (DFD) Level 0, Data Flow Diagram (DFD) Level 1, Data Decomposition, and Algorithm, which will be used in this project.

E. PHASE OF IMPLEMENTATION

This step will turn the design into a working prototype. The project was created using HTML, CSS, JavaScript, and Python programming.

F. PHASE OF TESTING

Upon the completion of the code, the system module is tested using single unit testing to test the system's single module. The integrated components are then tested during integration testing. Following that, system testing is performed to test the overall system for errors. Any problems or defects will be corrected, and the system will repeat the testing step until no errors or flaws are discovered. When the testing process is completed, the initial version of the system will be launched.

G. PHASE OF DEPLOYMENT

The system can be released and used once it has been thoroughly tested for bugs. After the system has reached a steady state, it is examined to ensure that it has met all of the project plan's goals, requirements, and objectives with satisfactory outcomes.

VI. CLASS DIAGRAM, DFD

A. Class Diagram

A class is a structure that contains both variables and methods. A variety of classes, interfaces, collaborations, and the The class diagram shows the related ships. The most common diagram used to depict object-oriented systems is the A static perspective of a system is presented. It highlights how the classes that may be applied to our system are interdependent. The interactions between our projects' modules or classes are shown here. The name of the class, variables, and methods are all contained in Each brick.

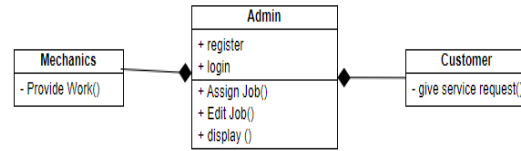


Fig. 1. Class Diagram

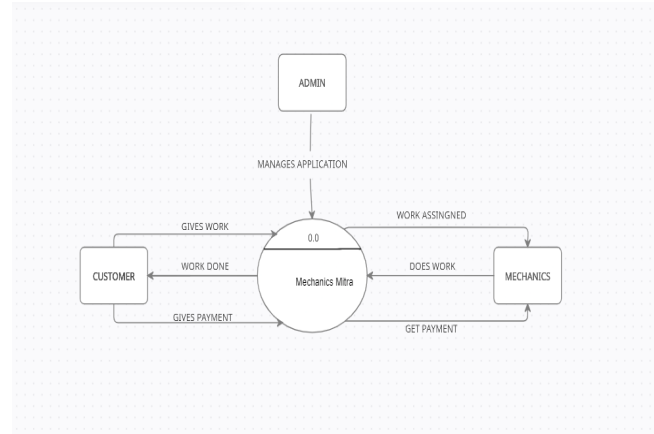


Fig. 2. Level 0 DFD

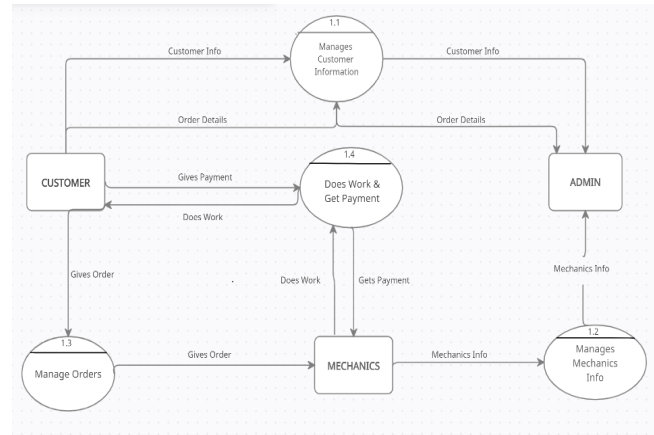


Fig. 3. Level 1 DFD

B. DFD

A data-flow diagram is a visual representation of the movement of data through a process or system (usually an information system). The DFD also includes information on each entity's and the process's outputs and inputs.

There is no control flow in a data-flow diagram – no decision

rules or loops. A flowchart can depict certain procedures based on data.

VII. IMPLEMENTATION

Python, JavaScript, HTML, and CSS were used to create this online web application or we can call it a website for solving the problem of both mechanics and user. The proposed concept would eliminate manual operations and transactions in vehicle repair shops. The system will function as a transaction centre that clients and technicians working on automobiles may use while being monitored by an administrator. The proposed technique will improve operational effectiveness and overall customer satisfaction when it comes to automobile service. Time-consuming: Because the initial booking and charge estimation are done directly by the internet, visiting the store to complete these duties takes less time. Ease of

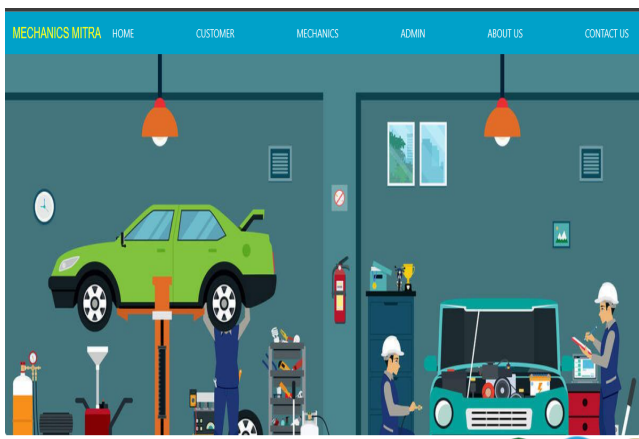


Fig. 4. Landing Page

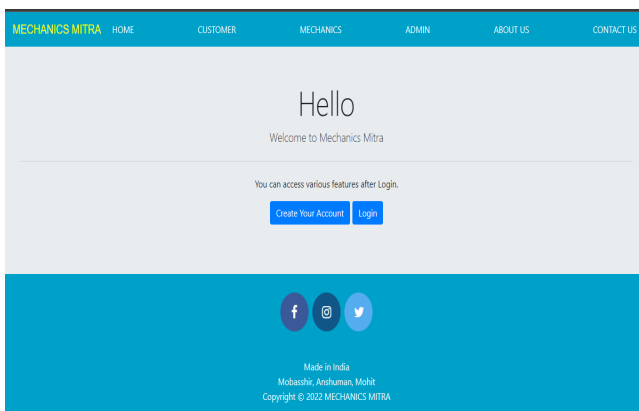


Fig. 5. Customer Page

use: Because it is a website, the customer may view it without installing any apps to their phone. The website is mobile-friendly, so the user does not need a laptop to view it. Online system: The client won't have to travel since the website will make it easy to do chores online. The purpose of car services is to provide system users with improved information

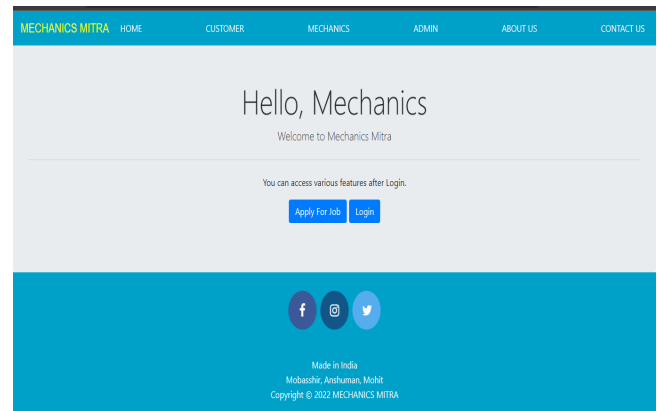


Fig. 6. Mechanics Page

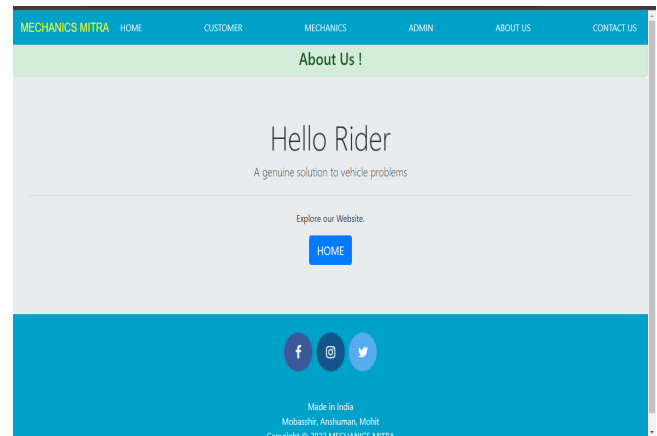


Fig. 7. About Us Page

so that they may better manage their sales, purchases, and stock information. And Additionally, there are three sections in this web application: the admin portion, the mechanics section, and the customer section

A. Admin Section

The administrator can manage both customers and mechanics in this section. The administrator has the ability to add and remove users of both the customer and mechanic categories. Additionally, based on location, the admin distributes the work to the mechanics. The administrator has authority over mechanics in this domain add, delete, and update mechanics. The administrator has authority over the cuspetomer using Mechanics Mitra in this domain add, delete, and update users or customers. The administrator may include service costs service fee and any other parts prices that may apply. The administrator can examine services depending on their status: pending services, rejected services, and completed services. Policy proposals can also be approved by administrators. Request for Information from a Client In this area, the administrator can react to client queries and view inquiries to which no consumers have answered.

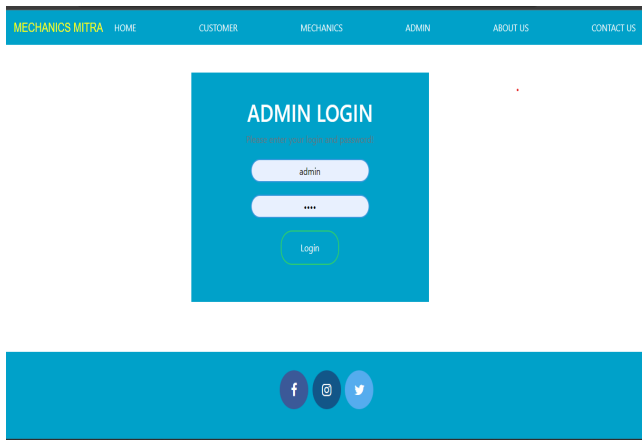


Fig. 8. Admin Login

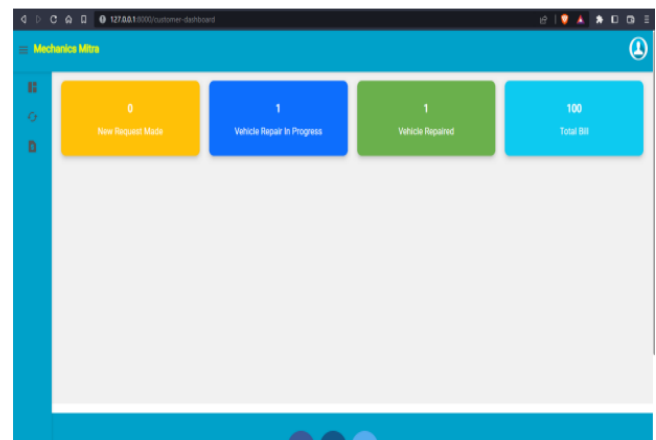


Fig. 11. Customer Dashboard

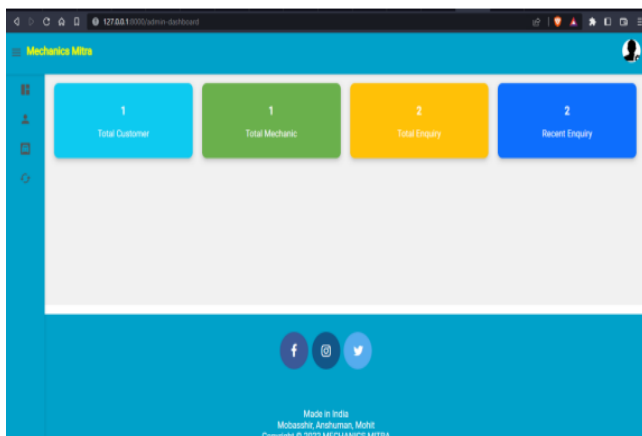


Fig. 9. Admin Dashboard

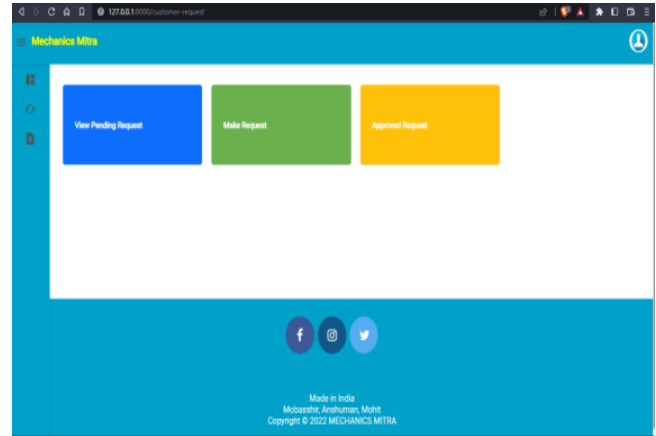


Fig. 12. Customer Request Page

B. Mechanics Section

Mechanics can add themselves to the web apps in this part, receive the job they need to complete, and then receive paid for the work completed.

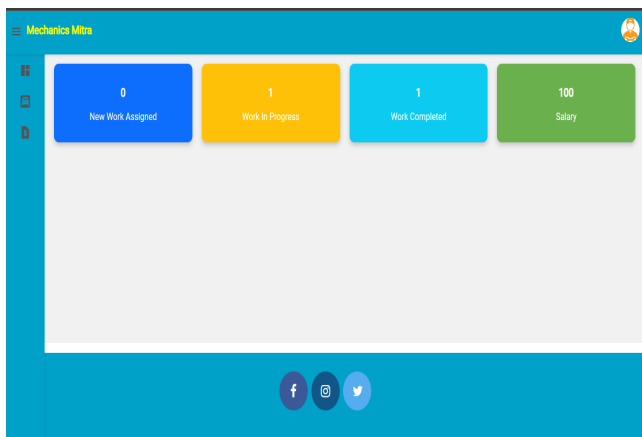


Fig. 10. Mechanics Dashboard

C. Customer Section

Customers can register themselves in this section of the website in order to contact mechanics for repair and maintenance of their vehicles. and complete their assignment.

VIII. SPECIFICATION

A. Abbreviations and Acronyms

Abbreviations and acronyms should be specified the first time they appear in the text, even if they were explained in the abstract. IEEE, in other words, greater than, less than, and more than are not need to be specified. Abbreviations should be avoided in titles and headings unless absolutely necessary.

B. Technical Specification

1) *Software Used:* Visual Studio Code , usually known as VS Code, is a source-code editor created by Microsoft using the Electron Framework supports a variety of operating platforms including Windows, Linux, and macOS.

PyCharm is an integrated development environment for Python programming.

2) *Languages Used:* HyperText Markup Language For pages intended to be viewed in a web browser, the HyperText Markup Language, or HTML, is the accepted markup language.

CSS The display of a document produced in a markup language, such as HTML or XML, can be described using Cascading Style Sheets, a style sheet language

JavaScript , JS is not just a computer language or a coding language but it is way more than that and for making beautiful web applications it is used along side with various tools and technologies like HTML, CSS and many more. According to various research made JS is one of the most popular and commonly used language in world right now.

Python Python is multipurpose programming language as it is used in making web apps or websites, servers, games, and many more things. It is a high level programming language as it is most commonly used in Artificial Intelligence and Machine Learning, and dynamically typed programming language and it uses Garbage collection tool also to remove unused memory. It is compatible with a variety of programming paradigms, including structured, object-oriented, and functional programming.

3) *Minimum Requirement:* Google Chrome Latest Version or any Standard Browser. And stable internet connection.

IX. CONCLUSION

A web application called Mechanics Mitra was created to support both customers and mechanics. At Mechanics Mitra, consumers and mechanics get together to solve each other's problems while the technicians work on customers' automobiles and are paid by the clients. The suggested system aims to make life easier for clients by including functions like pre-booking of slot machines, automatic computation of bill and time, and a module to describe the actions that occur throughout the car service operation.

X. FUTURE WORKS

In the future, we'll work to make this application even better and incorporate customer service features.

XI. ACKNOWLEDGMENT

We'd want to use this opportunity to thank our professors and friends who assisted us during the endeavour.

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