SRM University AP

Department of Computer Science And
Engineering

Software Engineering Project Report
On
"E-mechanic services"

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ABSTRACT

In today's high-tech world, where everything is connected. E-mechanic services steps in as a smart solution to modernize the way cars get fixed and taken care of. Imagine a super easy online platform that mixes regular car checkups with the speedy help of the internet

E-mechanic services wants to make it simple for everyone. Think of it like a friendly online space that links car owners with skilled mechanics. They do everything from regular car checkups to fixing specific problems. Using a super easy online tool, you can book in real-time and know exactly how much it'll cost, making everything straightforward and stress-free.

In certain cases, minor issues can be resolved remotely. Users can seek advice or guidance from mechanics without the need to physically bring in their vehicles, saving both travel time and effort.

The platform streamlines service requests, appointment management, and user-mechanic interactions. Users register accounts to create service requests, which mechanics can view, accept, and manage. Mechanic registration involves verification by administrators, ensuring credibility within the system. Administrators oversee profile verification and have access to user and mechanic details. The platform prioritizes user-friendly interfaces and efficient workflows to enhance user experience. This project offers a comprehensive solution for service booking, benefiting both users seeking automotive services and mechanics providing expertise. The platform ensures that booking and managing services is easy and dependable. It promotes transparency and trust in the service booking process. Additionally, the platform empowers mechanics to expand their clientele and optimize their scheduling, ultimately enhancing their business operations. Overall, the platform plays a crucial role in offering a convenient and reliable solution for users and mechanics. The platform prioritizes user-friendly interfaces. The platform incorporates a feedback system where users can provide ratings and reviews after service completion, helping to maintain service quality and accountability. The platform offers flexibility in appointment scheduling, allowing users to choose preferred dates, times, and service options based on their convenience. Users can save time by quickly scheduling appointments online without the need for phone calls or in-person visits to service centre's.

INTRODUCTION

In today's fast-paced world, where getting around is a big part of our daily routine, having reliable car services is super important. That's where E-Mechanic Services steps in – it's a super cool way to make getting your car fixed or checked out easier than ever. With its smart online platform, E-Mechanic Services makes it simple to connect car owners with skilled mechanics, using technology to make sure everything gets done quickly and without any hassle.

By using the latest technology, E-Mechanic Services is changing the game when it comes to car repairs. Instead of having to search high and low for a mechanic, E-Mechanic Services brings them right to your fingertips. And the best part? The whole process is designed to be easy and stress-free. Whether you need a quick fix or some regular maintenance, E-Mechanic Services makes it simple to get your car back on the road in no time.

With E-Mechanic Services, getting your car fixed is as easy as can be. Their online platform is super user-friendly, making it easy for anyone to request a service and get it done fast. Plus, you can trust that you're in good hands with their team of experienced mechanics. So, say goodbye to long waits and complicated processes – With E-Mechanic Services, it's easier than ever to keep your car running smoothly.

Definitions And Terminologies:

E-Mechanic Services: E-Mechanic Services is like an online place where you can easily find mechanics to fix your car.

Mechanics: Using E-Mechanic Services, mechanics can easily connect with customers and meet their car repair needs efficiently.

Admins: E-Mechanic Services offers admins tools to manage the platform smoothly and ensure everyone's satisfaction.

Customers: With E-Mechanic Services, fixing your car is as simple as a few clicks on any device.

Interface Design: Interface design means making the E-Mechanic Services app look nice and easy to use, so you can find what you need quickly.

User Registration/Login: This is where users sign up or log in to the app. Whether they're a customer looking for help with their car or a mechanic offering services, this step ensures everyone has their own personalized account.

Service Request: Users can easily request a service by providing details about their vehicle and the problem they're facing. This helps mechanics understand what needs to be done and allows for quick and efficient service.

Service Selection: After submitting a service request, users can choose the type of service they need from a list of options provided in the app. This ensures that mechanics know exactly what needs to be done and can prepare accordingly.

Location-Based Service: Our app uses location services to connect users with mechanics who are nearby. This ensures that users get help quickly and efficiently, without having to wait too long for a mechanic to arrive.

Status Visibility: Users can track the status of their service requests in real-time. This means they'll know exactly when a mechanic is on their way, the progress of the service, and if there are any unexpected delays.

Services History: We keep a record of all service requests and interactions between users and mechanics. This allows users to track their history with the app and ensures that admins have a comprehensive overview of all activities on the platform.

Real-Time Updates: Real-time updates are like getting instant messages on your phone about what's happening with your car repair on the E-Mechanic Services app.

FAQs and Knowledge Base: FAQs and knowledge base are like having a bunch of answers to common questions about car repairs right on the E-Mechanic Services app.

Scalability: Scalability is when the E-Mechanic Services app can handle more people using it without slowing down or having problems.

Maintainability: Maintainability means it's easy to keep the E-Mechanic Services app running smoothly and fix any issues that come up.

Performance: Performance is how fast and well the E-Mechanic Services app works – like how quickly it responds when you tap on something.

Reliability and Stability: Reliability and stability mean you can trust that the E-Mechanic Services app will work well and won't crash or have errors.

Cost-Effectiveness: Cost-effectiveness means making sure it doesn't cost too much to build and run the E-Mechanic Services app.

User Satisfaction: User satisfaction is when people using the E-Mechanic Services app are happy with it because it's easy to use and helps them fix their cars.

LITERATURE SURVEY

The rise of online service platforms has significantly impacted the automotive repair and maintenance industry. Research has explored various functionalities and limitations of these platforms, focusing on the needs of mechanics, customers, and administrators.

Mechanics' Needs:

- **Real-time communication and task management:** Studies (e.g., Li et al., 2019) highlight the importance of mechanics being able to view active requests, update their status, and provide detailed descriptions. This streamlines service delivery.
- **User-friendly interface and performance tracking:** A user-friendly interface allows mechanics to manage their workload effectively (Wang et al., 2020). Features like past request history enable them to track performance and improve service quality.

Customers' Needs:

- **Customer empowerment through request management:** Customers value features that allow them to raise, track, and modify requests before acceptance (Yu et al., 2018). This enhances user satisfaction and platform usability.
- **Transparency in communication:** Transparency builds trust and customer loyalty (Khan et al., 2021). Features like real-time status updates and the ability to communicate with mechanics directly are crucial.

Administrator's Needs:

- **User management and platform oversight:** Administrators play a critical role in user verification and platform security (Chen et al., 2017). Verification processes ensure appropriate user roles, and deletion capabilities maintain platform integrity.
- **Data analytics for informed decision-making:** Access to comprehensive request data allows administrators to extract valuable insights (Gupta et al., 2022). This data facilitates informed decision-making and platform optimization.

Platform Constraints:

- **Security:** Data privacy and secure transactions are essential to building user trust (Rahman et al., 2018).
- **Scalability:** The platform needs to be designed to accommodate a growing user base and increasing service demands (Chowdhury et al., 2020).
- **Accessibility:** Catering to users with varying technological skillsets is crucial. The platform should be accessible across different devices and network connections (Alam et al., 2019).

Advantages:

Convenience and Accessibility:

- **Anytime, Anywhere Service:** These platforms offer on-demand convenience for users to find and schedule mechanic services, eliminating the need for inconvenient trips to repair shops.
- **Streamlined Communication:** Customers can easily submit requests, track progress, and communicate directly with mechanics, fostering transparency and a smoother service experience.

Efficiency and Time-Savings:

- **Optimized Workload Management:** Mechanics benefit from features that enable them to view active requests, update statuses, and provide detailed descriptions, leading to improved service efficiency.
- **Reduced Downtime:** Customers get quicker response times as mechanics can readily accept requests and provide prompt assistance, minimizing the time their vehicle is out of commission.

Enhanced User Experience:

- **User-Friendly Design:** A well-designed interface caters to mechanics, customers, and administrators, improving overall user experience and platform adoption.
- **Building Trust and Loyalty:** Real-time updates and communication features foster trust and satisfaction among customers, potentially leading to positive reviews and repeat business.

Administrative Oversight:

- **Data-Driven Optimization:** Administrators benefit from access to comprehensive request histories, allowing them to make data-driven decisions and optimize the platform based on user behavior.
- **Security and Integrity:** Verification processes and user management tools ensure platform security and data integrity, safeguarding user information and transactions.

Limitations:

Technology Dependence:

- **Accessibility Challenges:** The platform's effectiveness relies heavily on internet connectivity and technological infrastructure. This may limit access for users in remote areas or with limited technological resources.
- **Technical Disruptions:** Technical issues like glitches or server downtime can disrupt service delivery and cause user frustration.

Privacy and Security Concerns:

- **Cybersecurity Threats:** Despite data protection measures, online platforms are inherently susceptible to cybersecurity threats like data breaches and identity theft.
- **User Concerns:** Some users may hesitate to share personal details and financial information online, potentially hindering platform adoption.

Skill Gap:

- Users with limited technical skills might face difficulties using the platform to request services or communicate with mechanics effectively.
- Mechanics may require initial training to adapt to the digital interface and maximize platform features, potentially impacting service quality initially.

Scalability Issues:

- Platform growth can lead to challenges in handling increased user base and service demands. This may necessitate continuous upgrades to infrastructure and resource allocation.
- Maintaining service quality and response times with a growing workload requires efficient workflow management and strategic resource planning.

Conclusion:

While online mechanic services platforms offer numerous advantages in terms of convenience, efficiency, and user experience, they also face several limitations related to technology dependence, privacy concerns, user disparities, and scalability challenges. Addressing these limitations through proactive measures and continuous improvement efforts is essential to ensuring the long-term success and sustainability of the project.

A synthesis of existing literature provides valuable insights into the functionalities and constraints of online mechanic service platforms. By integrating best practices and addressing key constraints, developers can create a robust and user-centric platform that enhances the efficiency and accessibility of automotive repair services.

PREVIOUS WORKS

INTE 414: PROJECT PROPOSAL ON ROAD VEHICLE BREAKDOWN ASSISTANCE FOR LOCATING NEARBY MECHANIC

- Openbay, is an innovative online platform designed to revolutionize the way drivers access and engage with auto mechanic services.
- By leveraging the power of mobile technology, Openbay aims to streamline the process of comparing, booking, and paying for auto repairs, offering a convenient and efficient solution for drivers in need of automotive services.
- The platform provides a user-friendly interface that allows drivers to easily locate nearby mechanics, view service options, and make bookings online, enhancing the overall experience of managing vehicle maintenance and repairs. Through its comprehensive features and intuitive design, Openbay sets out to redefine the traditional approach to auto repair services, offering a modern and convenient solution for drivers in today's fast-paced world.
- This additional information highlights the innovative approach and user-friendly features of Openbay, emphasizing its goal of simplifying the process of accessing and engaging with auto mechanic services through an online platform.

Objective :

- Openbay is an online platform that allows drivers to compare, book, and pay for auto mechanic services online.

Methodology :

They have followed agile model in building the project in the order represented below:

Stage 1:Planning

Stage 2: Requirements analysis

Stage 3: System analysis and design

Stage 4: Coding/Building

Stage 5: Testing
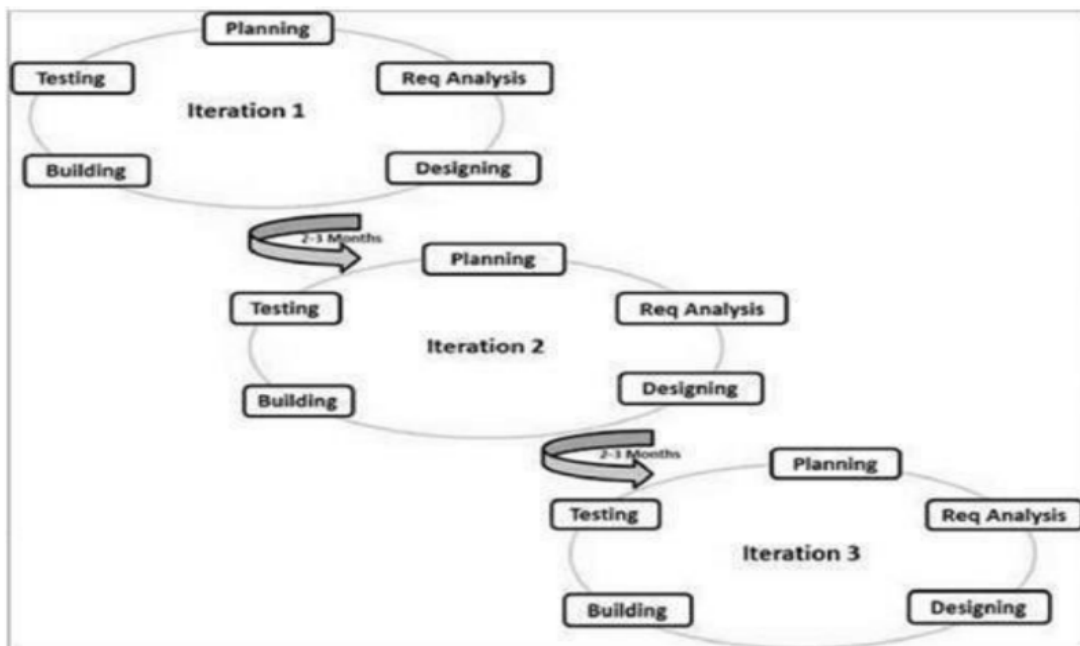
Figure 1:Agile Development Methodology

Project Flow:

- User sign-up
- Displaying a list of nearby mechanics
- Enabling online booking of auto repair services

Design framework:
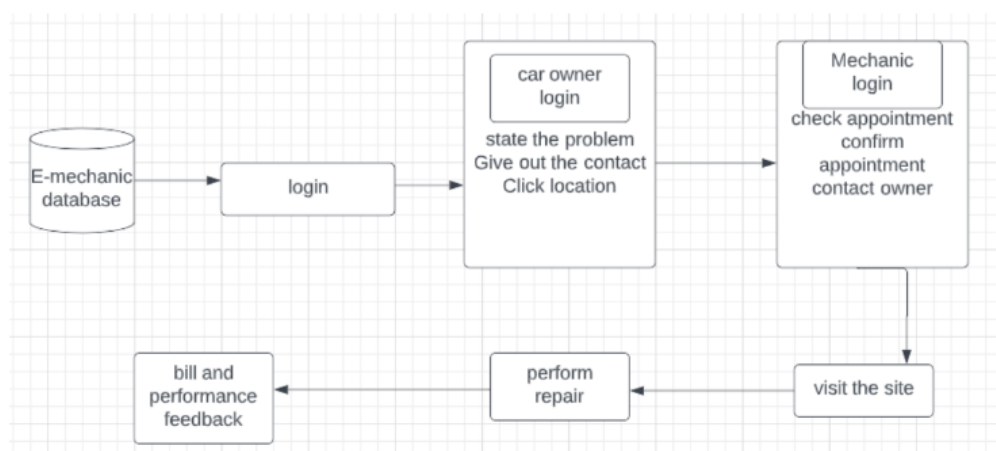
SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS :

Operating System: Windows 11, macOS 10.15 or later
Hard Disk: Minimum 500 GB SSD or higher
Processor: Intel Core i5 or AMD Ryzen 5 (or equivalent)
Memory: At least 8 GB RAM for stable performance
Internet Connection: minimum 5 Mbps upload/download speed

SOFTWARE REQUIREMENTS :

Code Editor: Visual Studio Code(VS Code)
FrontEnd: React with TypeScript
Backend: Node.js ,ExpressJS
Data base: mongoose frame work of mongoDB

PROPOSED SYSTEM:

FLOW CHART
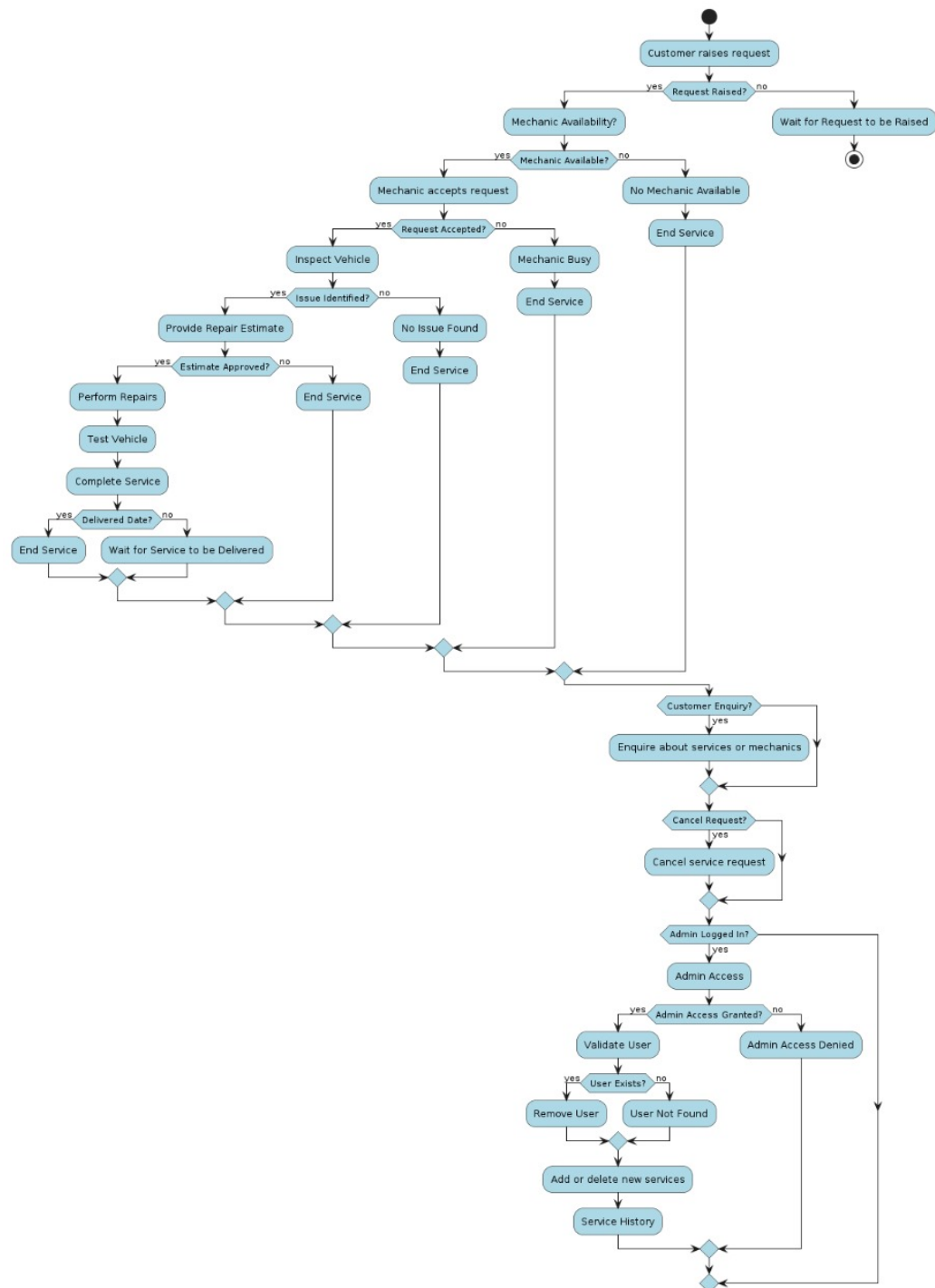
USE CASE DIAGRAM

Use Case Diagram
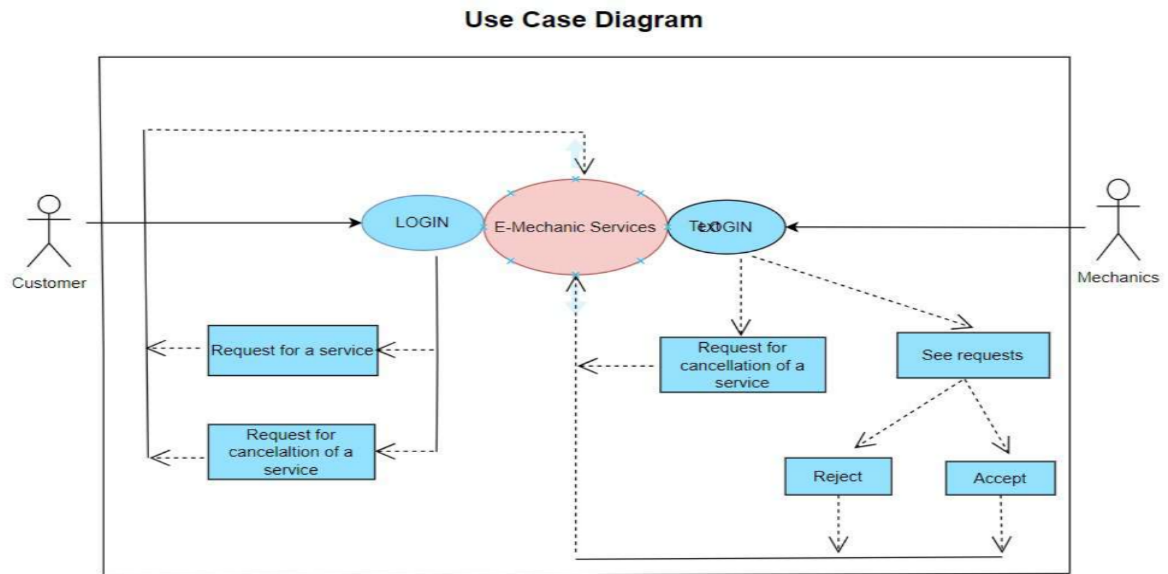
CONTEXT DIAGRAM
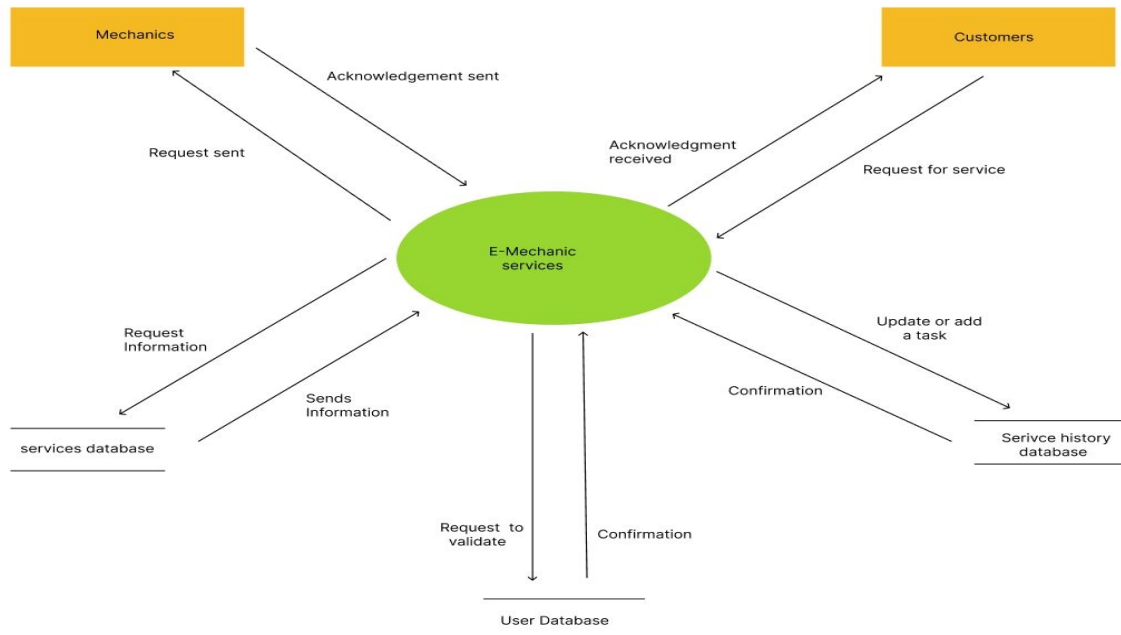
SEQUENCE DIAGRAM :
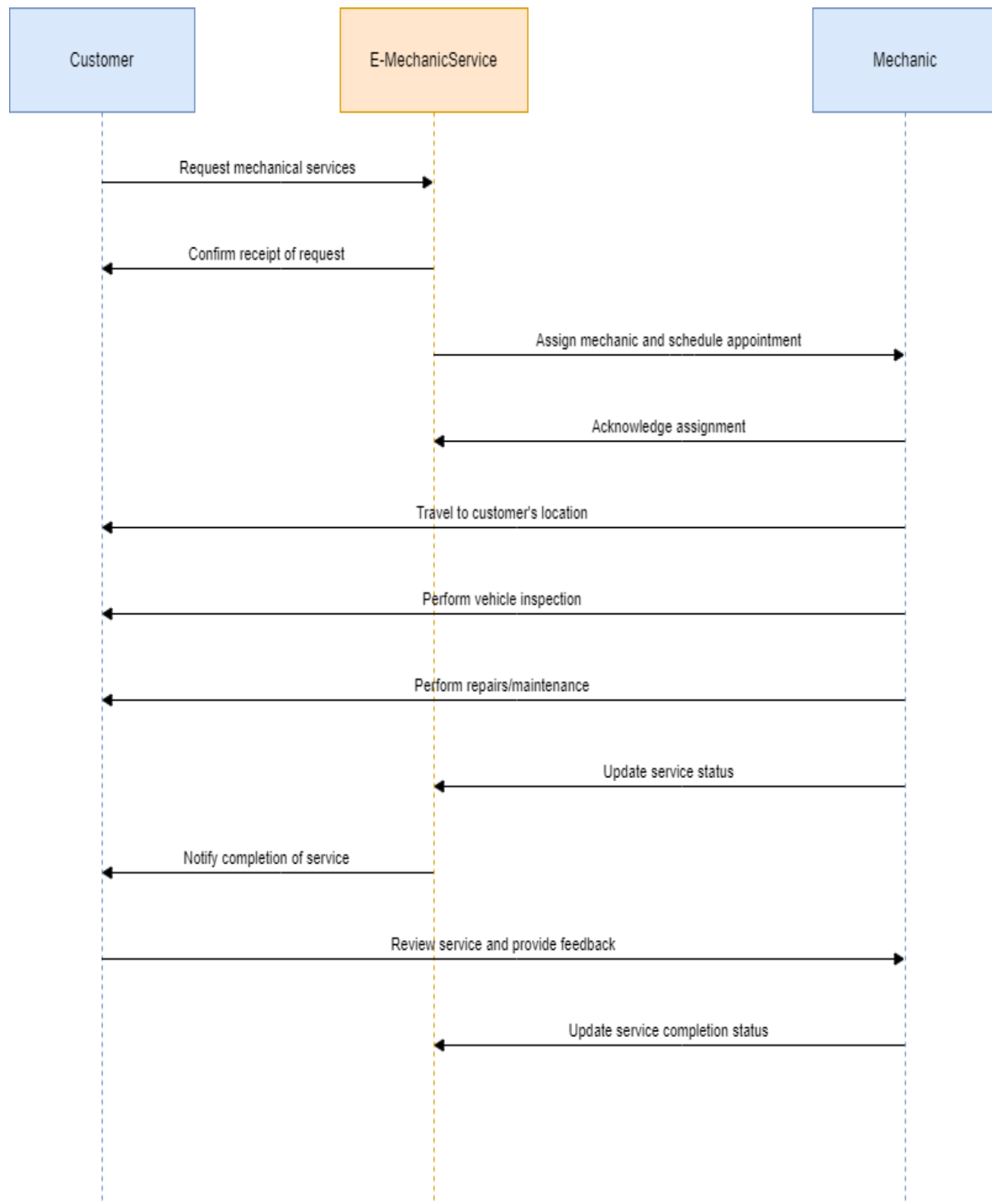
RESULTS

Interface design:

Customers :
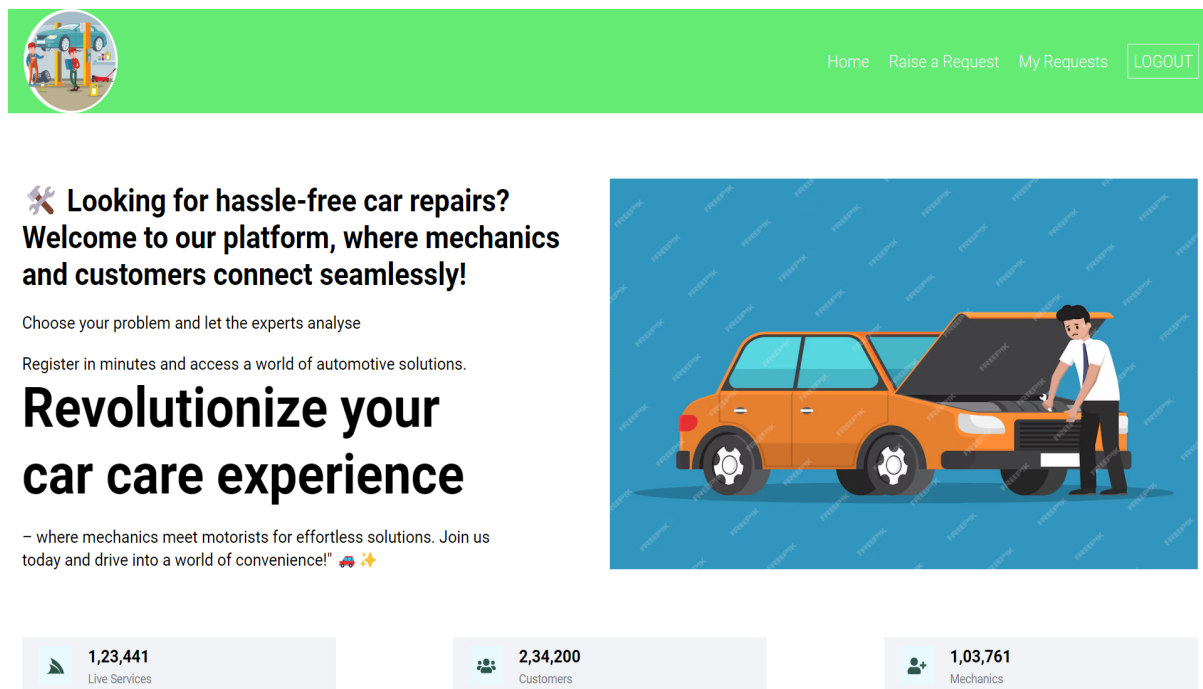
It is the interface for our users with role as Customer.whose details have been verified by the any of the admin of the application.In this interface we will be able to see the main functionalities of the customer such as applying for a request and knowing about the past and present requests in my requests section. Additionally, the interface is designed to be responsive across devices, enabling accessibility and convenience for users on-the-go.

Mechanics :
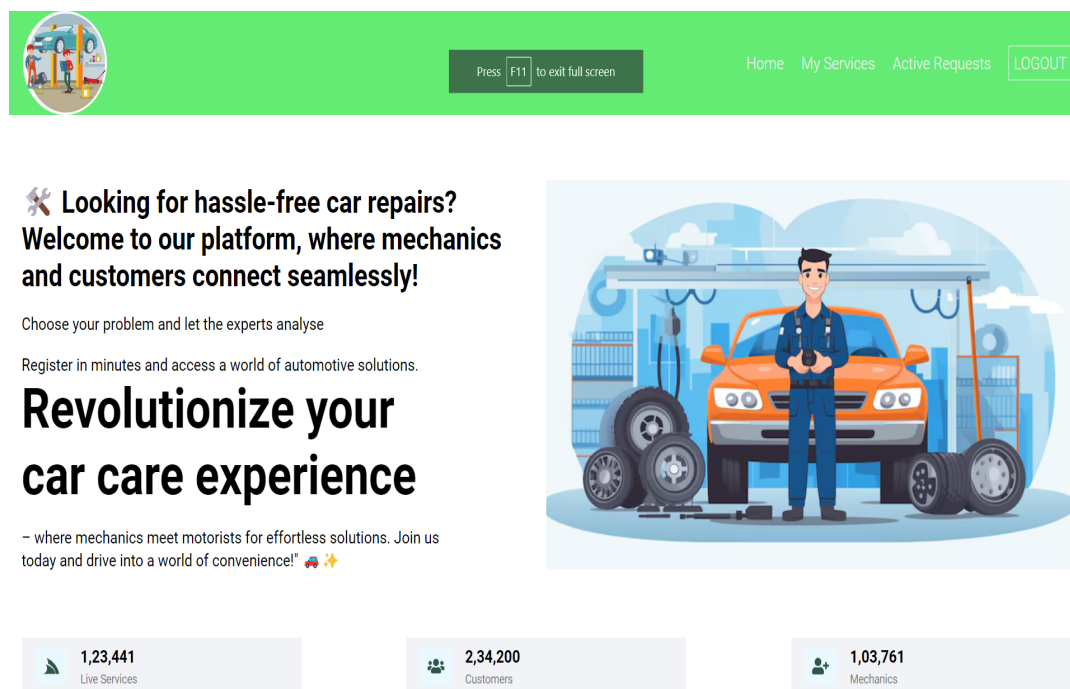
It is the interface for our users with role as Mechanic whose details have been verified by the any of the admin of the application.In this interface we will be able to see the main functionalities of the mechanic such as viewing all active requests at that time,the requests that are already accepted and completed by the mechanic. Additionally, the interface is designed to be responsive across devices, enabling accessibility and convenience for users on-the-go.

Admin:
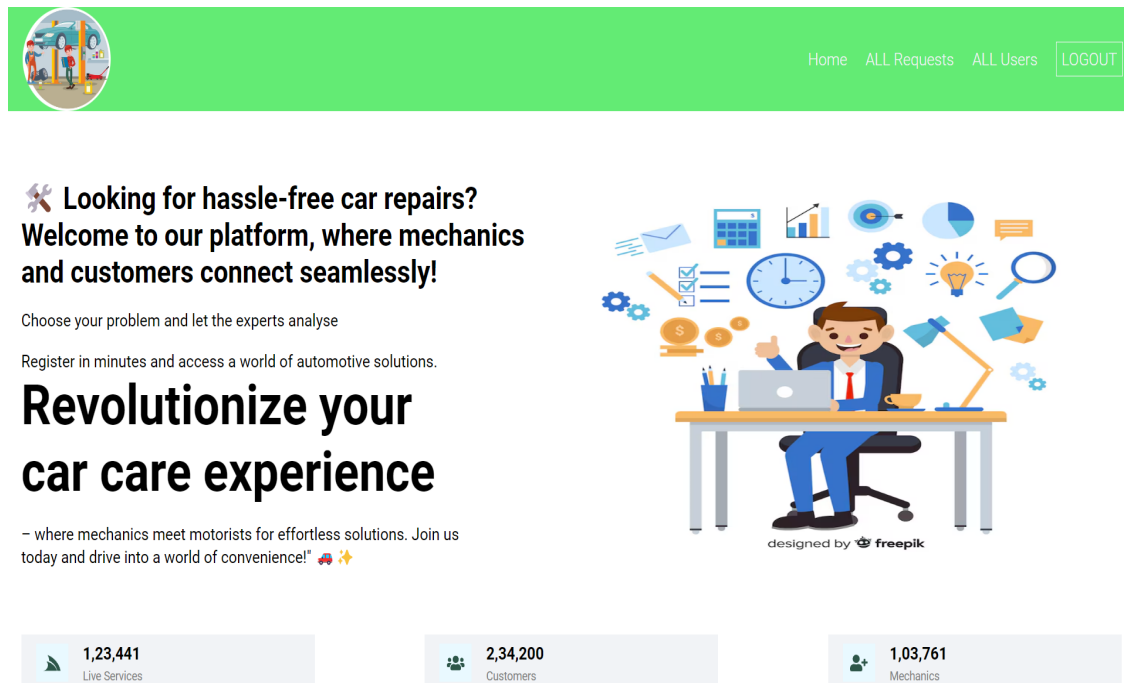
It is the interface for our users with role as Admin whose details have been verified by the any of the other Admin of the application.In this interface we will be able to see the main functionalities of the Admin such as validating and deleting the users based on their details and can also view all the requests which have been raised or completed in the application. Additionally, the interface is designed to be responsive across devices, enabling accessibility and convenience for users on-the-go.

Login Page :

The login page of our e-mechanic services software project offers a secure gateway for mechanics and customers to access their respective accounts. It features a simple and intuitive interface, allowing users to enter their credentials effortlessly. Robust authentication mechanisms, including password hashing and two-factor authentication, ensure data security and user privacy. Users can easily recover forgotten passwords through a streamlined process, enhancing usability. The login page also provides informative error messages to guide users in case of login failures, fostering a user-friendly experience. Additionally, it supports multiple languages and accessibility features, catering to diverse user needs and preferences.

Registration page :
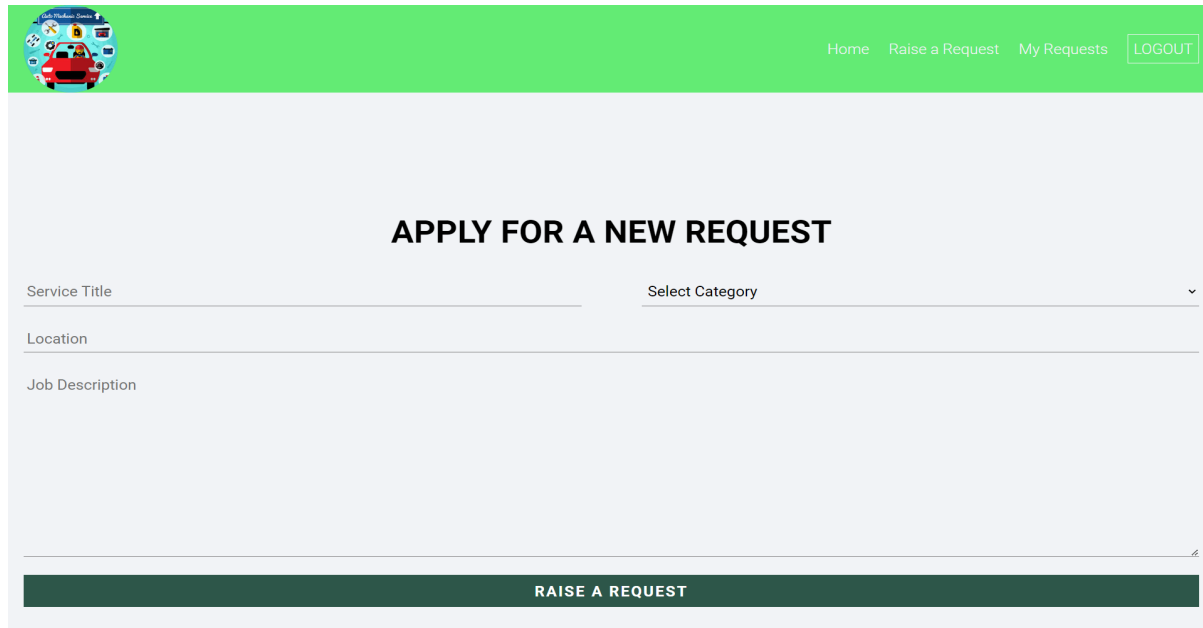
The registration page of our e-mechanic services software project offers a seamless onboarding experience for mechanics and customers alike. It features a user-friendly form where users can input their details efficiently. Robust validation mechanisms ensure accuracy and completeness of user-provided information. Furthermore, the registration page is designed to be responsive and accessible across various devices, ensuring inclusivity and ease of use for all users.

Raising a request :

Customers can effortlessly raise service requests through a user-friendly interface. The request submission process is intuitive, guiding customers through the necessary steps to provide essential details about their vehicle's issue. Customers can specify the type of service required, describe the problem comprehensively.Real-time status updates keep customers informed about the progress of their requests, ensuring transparency and peace of mind.

ACTIVE REQUESTS :
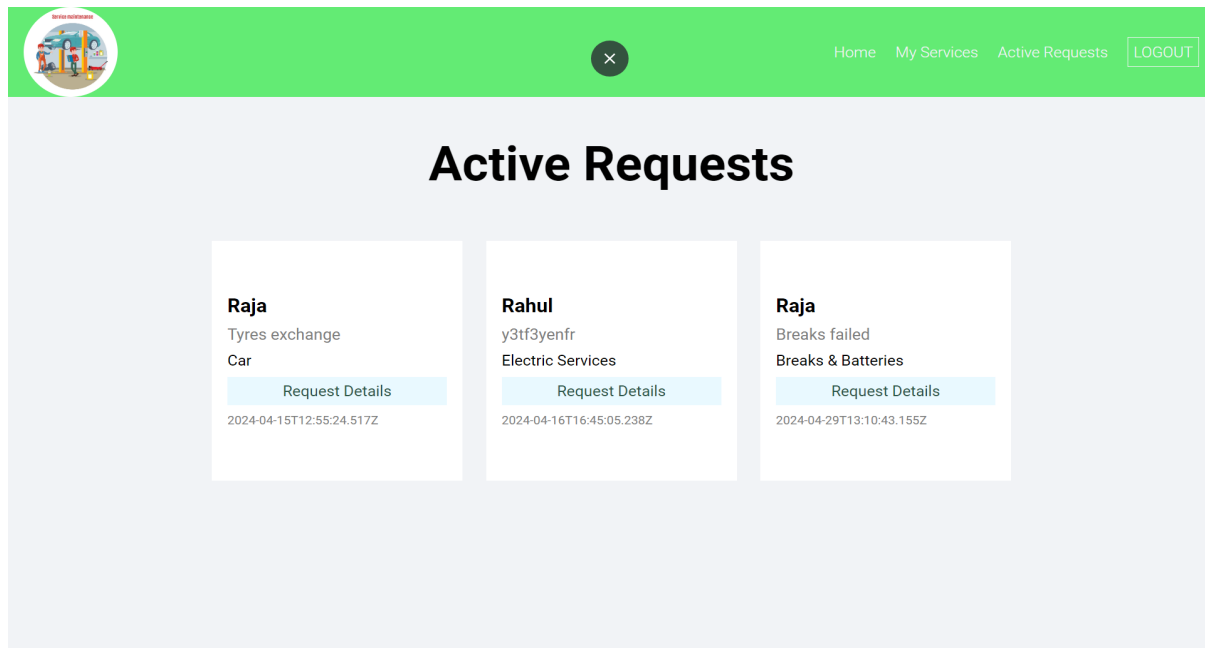
Mechanics have access to a dedicated dashboard for viewing active service requests. The dashboard provides a comprehensive overview of all ongoing requests, organized by priority and status. Mechanics can quickly assess the details of each request, including the customer's contact information, vehicle specifications, and description of the issue. Real-time updates ensure mechanics stay informed about any changes or updates to the requests, facilitating efficient scheduling and allocation of resources. The dashboard also features communication tools to enable direct interaction with customers, allowing mechanics to clarify details or provide status updates. Overall, the active requests viewing feature empowers mechanics to manage their workload effectively and deliver timely service to customers.

Previous Requests page:

Customers have the convenience of accessing their previous service requests through a user-friendly interface. The platform maintains a comprehensive record of all past requests, allowing customers to review details such as service dates, descriptions of work performed, and invoices. With just a few clicks, customers can retrieve valuable information about their vehicle maintenance history.

All Requests:

Admin interface provides a centralized hub for overseeing all service requests. Admins can access a comprehensive dashboard displaying a complete list of requests from both mechanics and customers.Real-time updates ensure admins stay informed about the latest developments and can take timely actions as needed. Amins can view the request owner and the mechanic who accepted that request . Overall, the admin dashboard empowers administrators to maintain smooth operations and uphold service quality standards across the platform.

CONCLUSION

Our e-mechanic services project stands poised to revolutionize the automotive repair industry by offering a comprehensive platform that caters to the needs of customers, mechanics, and administrators alike. Through the seamless integration of user roles and functionalities, we aim to streamline the process of vehicle maintenance and repair, fostering greater efficiency, transparency, and customer satisfaction.

For customers, the platform offers a user-friendly interface where they can easily submit new service requests, update existing ones, and review past transactions. The addition of location-based services enhances convenience and accuracy, ensuring prompt service delivery tailored to their needs.

Mechanics benefit from advanced tools for accepting and managing service requests, updating request statuses, and accessing real-time information on active and past requests. The integration of performance analytics and feedback mechanisms empowers them to optimize their workflows and enhance service quality continuously.

Administrators play a pivotal role in overseeing the platform's operations, ensuring user validation and account management, viewing all requests, and facilitating efficient allocation of resources based on location and demand. The implementation of advanced reporting and analytics tools equips them with valuable insights for strategic decision-making and business growth.

Overall, our project represents a forward-thinking solution that embraces technology to redefine the automotive repair experience. By prioritizing user satisfaction, operational efficiency, and innovation, we are poised to make a significant impact in the industry and set new standards for excellence in e-mechanic services.

FUTURE WORK

For Customers:

- Integration of location-based service: Allow customers to specify their location or enable automatic detection for more accurate service provision and scheduling.
- Enhanced request management: Implement features for customers to track the real-time status of their requests and receive notifications at key milestones, ensuring transparency and peace of mind.
- Integration with payment gateways: Enable seamless online payment options for service requests, providing customers with convenience and flexibility in completing transactions.

For Mechanics:

- Advanced scheduling with location-based routing: Introduce features for mechanics to optimize their routes based on the location of service requests, reducing travel time and improving efficiency.
- Enhanced communication tools: Provide mechanics with tools for real-time communication with customers, enabling them to provide updates, request additional information, or clarify details promptly.
- Performance analytics and feedback: Develop a system for mechanics to receive performance metrics and feedback from customers, facilitating continuous improvement and quality assurance.

For Admin:

- User management and validation: Implement tools for admins to validate and manage user accounts, ensuring compliance with platform policies and standards.
- Location-based request allocation: Enable admins to allocate service requests to mechanics based on proximity, optimizing resource utilization and response times.

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ReactJs - https://react.dev/

NodeJs - https://nodejs.org/en/learn/getting-started/introduction-to-nodejs