

E Technician Thesis

by Jalal Ahmed

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E-TECHNICIAN



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DEPARTMENT OF COMPUTER ENGINEERING

**BALOCHISTAN UNIVERSITY OF INFORMATION
TECHNOLOGY, ENGINEERING, AND
MANAGEMENT SCIENCES**

Spring 2023

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Supervisor: Syed Ali Asghar Shah

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A project report submitted to the

Department of Computer Engineering

in partial fulfillment of requirements for the degree of Bachelor of Science in Computer
Engineering at Balochistan University of Information Technology, Engineering and
Management Sciences

Spring 2023

Signature of Supervisor: _____

Signature of FYP Coordinator: _____

Undertaking

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It is certified that this work titled “E-Technician” is our own work. The work has not been presented elsewhere for assessment. Where material has been used from other sources it has been properly acknowledged / referred to.

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Acknowledgements

We would like to thank both Syed Ali Asghar Shah and Syed Umair Shah for their unwavering support and encouragement throughout the development of the E-Technician app. Their guidance and mentorship have been invaluable, and we are forever grateful for their contributions to this project. We are also deeply grateful to our parents for their love, support, and understanding during the numerous hours we spent working on this project. Their encouragement and belief in us have been a constant source of motivation and inspiration.

We would also like to thank the rest of our team for their contributions and support throughout the development process. Without their dedication and hard work, this project would not have been possible. We are grateful to all the technicians who participated in our testing and provided valuable feedback that helped us improve the user experience.

³⁴ Overall, we are truly grateful to everyone who has contributed to the success of our E-technician web app and mobile app. We are confident that it will provide a valuable service for both technicians and those in need of their services, and we look forward to seeing it continue to grow and evolve.

Dedication

We would like to express our heartfelt dedication to Syed Ali Asghar and Syed Umair Shah for their invaluable contributions to our project, the E-Technician web and mobile app. Without their guidance, support, and encouragement, this project would not have been possible.

Syed Ali Asghar has been an invaluable mentor and advisor throughout the development of the E-Technician app. His wealth of knowledge and experience in the field of software engineering has been instrumental in guiding us through the complexities of building a web and mobile app. His insights and expertise have helped us to create a platform that is user-friendly, efficient, and reliable.

Syed Umair Shah has also played a crucial role in the success of the E-Technician app. His expertise in project management has helped us to keep the development of the app on track and ensure that it is delivered on time. His dedication and commitment to the project have been unwavering, and we are truly grateful for his invaluable contributions.



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Balochistan University of Information Technology, Engineering and Management Sciences, Quetta

BUITEMS

Quality & Excellence in Education

Final Year Project Intellectual Property Form, FICT

*Project Title: E-technician***All information in this form should be typed.***Date:** 12/07/2023

1. Project Title: E-Technician

2. Supervisor Details:

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Designation	Lecturer
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Declaration

I agree that the information related to the project titled **E-Technician** under the supervision of **Syed Ali Asghar Shah** will be kept confidential. This includes:

1. All the technical and scientific data relating to project discussions, research, design and simulation, processes, and business and/or marketing plans that are developed or are under development.
2. This information will be disclosed solely to individuals who have a signed non-disclosure agreement with, or who have express approval from **Syed Ali Asghar Shah** and **Dr.Sibghat Ullah Bazai**, in written, to receive this information.

Understood and agreed on the 12 of July in 2023.

4. Group Members Signature:

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Syed Zainularfien	
Jalal Ahmed	

5. Supervisor Remarks:

Supervisor Name	Remarks	Signature/Stamp
Syed Ali Asghar Shah		

Abstract

The home services system is incredibly useful for everybody who wants to urge home services like plumbing, electronic repair, home appliances repairing service. When an individual relocating from one area to a different because now a day's everyone wants to save lots of time and shot out their problems within time with no problem. Therefore, online home services are very beneficial for people. Now a days for any services like Plumbing, Electrical, Electronic, Home appliances Repairing, If any customer wants to use this type of services than they can go through a personal meeting or mobile call. It is difficult for customer to find any service in emergency at any time and place. So, with this project we are going to develop website and android app which will help customers to find out solution for any problems related to Plumbing, Electrical, Electronic, Home appliances repairing service. Our website and android application will provide a platform for all kind of repairing services at any time and place.

As per our problem we introduce a platform where technician finding is very much convenient and easy. The focus of the current project is on online services delivered through an Android and web application. This application is helpful in giving workers and customers a solution for services like plumbing, electricians, Electronics devices repairing etc. Customers and the workers should be signed up, and workers will be having their own profile which will be rated by customers using location and their availability, the application would enable customers to hire technicians. We offer the service, which includes a list of options with regular pricing and a prompt response.

There will be an option for the customers to rate the technician according to his performance and price rating that will be stored on the database of the application that will provide certain information about the technician and when the customers are hiring the technicians, they can easily choose which technician to choose. As we discuss pricing, costs are calculated based on the task and are paid at fair rates. The environment of our application will be very much interactive and user friendly.

Keywords: Service Providing Application, Service Booking Application.

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Chapter No. 1

1 INTRODUCTION

1.1 Background

Since technicians are essential for maintaining and repairing systems and equipment, recruiting technicians is an important process for anyone in a variety of industries. Finding the right technician might be a significant obstacle for your job, and we are unable to continue the old practice of physically employing them from their place of employment. Because they frequently lack a shop where they can display their work, technicians also struggle to acquire employment. The provision of technicians to the desired consumer and the technician's search for a suitable employment both require a platform where both sides may shake hands. In prior studies, we have observed that online recruiting applications were very helpful in connecting people with technicians, but they occasionally fell short of their intended goals since they did not guarantee client safety and a problem with impersonation had emerged. Additionally, the employees have observed problems with price negotiations. We therefore require a solution that offers customers both the certainty of safety and the inclusion of online payment option.

1 In this fast-growing technology, we still must take the appointment of person who solve the problems related to our daily life like plumbing related problem, mechanical problem, electrical problem, electronic problem, home appliances repairing services. To take the appointment of service provider we have to call him or with the personal meeting we can meet him, and it is not sure that we get the appointment of the service provider at a time because there are many problems occur, like the service provider is busy at somewhere else or he is not present at his office when we go there, or he wants heavy cost for fix the problem etc. We are not getting any service on time and not proper changes of services. It is also not secure in terms of safety concern.

To overcome this type of problem we are going to make our android application and website where the people get appropriate results. This android application and website are very dynamic and very easy to understand. The interface of the android application and website is very easy, and anybody can easily work on it. This android application and website can provide all the description and important information about the problem.

The E-technician android application and website is also very useful because the customer doesn't have to visit to service provider's office, he/she can easily book his/her order via this

application and he/she can also pay the payment online in this android application and website. So, he/she can resolve their issue related to the repairing problem without any kind of disturbance. Our android application and website is secured. It will provide security for the customer.

1.2 Problem statement

- We still need to visit or schedule appointments with people in this rapidly evolving technology to solve issues that pertain to our construction sites or residential, such as Electrician & plumbing-related issues and at our houses like electronic devices and home appliances, such as mobile phones, laptops, televisions, and air conditioners, become defective for a variety of reasons.
- Calling the service provider or technician for appointment or meeting him in person is required a lot of time, and there is no guarantee that required a lot of time we will find the right answer to our problem. We can't find an expert technician, who can do the job perfectly, or the technician isn't trustworthy, or he wants a high fee to fix the problem and many problems can arise.
- We must meet him personally at his workplace, and it is not guaranteed that we will receive service from him at the same time because many problems can arise, such as the technician being busy somewhere else or being absent from his workplace when we arrive.
- Another problem that arises here that we don't know that the technician we are hiring is trustworthy or not. What is the background of the technician is he a good and trustworthy technician or not, does he complete his task in time? His personal information etc.

1.3 Objective

- To provide a web and mobile application for customers to easily find and hire skilled technicians for variety of services, including electrical, electronics, plumbing, and Home appliance repair
- To allow technicians to advertise their skills and find job opportunities through the web and mobile application
- To offer a rating and review for customers to provide feedback on technician services and online payment system for digital transactions and messaging system which allows customer to chat with technician.

- To continually update and improve the web and mobile application based on user feedback and industry trends.

1.4 Scope

The scope of the E-Technician website and mobile app is to provide a platform for customers to easily hire technicians for various services, including electrical work, plumbing, and appliance repair. Customers can browse through profiles of available technicians, view their ratings and reviews, and select the one that best meets their needs. The website and app also provide an easy payment system for customers to pay for the services they receive.

In addition to helping customers find technicians, the E-Technician website and app also provide a way for technicians to find work. Technicians can create profiles on the platform and list their skills and services, making it easier for customers to find them when they need help. The E-Technician website and app are designed to be user-friendly and easy to use. Customers can easily navigate the platform to find the services they need, and technicians can easily create profiles and list their services.

The E-Technician website and app are designed to be a one-stop shop for all the customer's technician needs. From electrical work to appliance repair, customers can find the help they need quickly and easily, while technicians can find work and showcase their skills to potential clients. E-Technician website and app a convenient and accessible choice for customers and technicians alike. The scope of our project is to design a complete environment to provide a safe and user-friendly environment for online service booking. The main aim of the project is to provider and easy to use application for services provided for customer.

1.5 Mapping FYP with Sustainable Development Goals (SDGs)

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1.5.1 Goal 8

Decent Work and Economic Growth - The E-Technician platform helps to achieve this goal by allowing technicians to find work and earn money, supporting economic growth in the technician industry, and boosting job prospects.

1.5.2 Goal 9

Reducing Inequalities - The E-Technician platform can help minimize inequities by giving technicians equitable access to career opportunities regardless of their geographical location or socioeconomic status. It can also promote equitable payment practices and guarantee that technicians are fairly compensated for their work.

1.5.3 Goal 10

Industry, Innovation, and Infrastructure - By utilizing digital technology and creating an online platform for technicians and service seekers, the E-Technician platform supports the development of innovative solutions and improves access to efficient and reliable infrastructure in the service sector.

1.6 Organization of the Thesis

1.6.1 Chapter 1 Introduction

The development of an E-Technician website and mobile app is the subject of the thesis, which is thoroughly covered in the introduction chapter. This chapter will provide background information and motivation for the project, emphasizing the significance of building a marketplace where employers can hire technicians and employers can find technicians. Additionally, it will include a summary of the thesis' goals and research questions. The idea may also be supported by a market study that offers information on the need for such a platform and its potential advantages.

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1.6.2 Chapter 2 Literature Review

The chapter on literature reviews examines previously published works, academic articles, and related projects that are pertinent to the E-Technician platform. It will cover subjects like gig economy platforms, online job marketplaces, and websites or apps that focus on providing services. The literature review will evaluate prior research critically and point out any inadequacies or gaps in the current solutions. The theoretical foundation for the creation of the E-Technician platform will be laid out in this chapter, which will also lay the groundwork for the following ones.

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1.6.3 Chapter 3 Methodology

The approach and methods used to create the E-Technician platform are described in the methodology chapter. It will go over the research techniques used to assemble information and insights, such as the survey carried out to determine the requirements and preferences of users and technicians. This chapter will also cover the tools and technologies used in the implementation process, as well as the software development methodology that was used. The methodology chapter is essential for proving the accuracy and dependability of the project's results and findings.

1.6.4 Chapter 4 Deployment and Testing

The actual E-Technician platform implementation will be covered in the development and testing chapter. An overview of the website and mobile app's architectural layout, database organization, and user interface will be given. This chapter will go into detail about the development process, including the difficulties encountered and the methods used to overcome them. The testing process, including the various testing methods used to guarantee the platform's functionality, usability, and security, will also be covered. This chapter will cover any suggestions or adjustments made after the testing phase.

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1.6.5 Chapter 5 Conclusion and Future Work

The conclusion chapter summarizes the thesis's main findings and contributions. It will restate the project's goals and discuss how they were met. The chapter will also address the shortcomings of the existing implementation and potential areas for improvement. Future work ideas and proposals for more research will be provided, researching potential for improving the E-Technician platform, expanding its functionality, or performing additional studies in relevant areas. This chapter will conclude the thesis and bring the research to a close.

1.6.6 Interconnection and Objective Contribution

Each chapter of the thesis helps to meeting the project's objectives and developing a thorough understanding of the E-Technician platform. The introduction chapter defines the context, justifies the importance of the topic, and establishes the research questions. The literature review chapter provides theoretical foundation and highlights gaps in the current research, assisting in the design and functionality of the platform. The methodology chapter ensures the project's legitimacy by utilizing data collection methods and research tools, such as a market survey. The chapter on development and testing demonstrates the implementation process and checks the platform's quality. Finally, the conclusion chapter summarizes the findings, recognizes shortcomings, and offers future study directions or enhancements. These chapters, taken together, give a thorough evaluation of the E-Technician platform and contribute to the overall goals of the thesis.

Chapter No. 2

2 Review of Similar Applications

The Purpose of the literature review is to study existing literature, research papers, and related work to provide a thorough overview of the present state of knowledge on the E-Technician platform. The literature study is important because it helps the project by finding gaps in the existing literature, defining the theoretical underpinning for the platform's development, benchmarking against similar solutions, and promoting informed decision-making. It responds to the research questions and objectives by offering insights, validating ideas, and influencing succeeding chapters, thereby improving the project's overall quality and efficacy.

This literature review explores the research and development of domestic Android applications for home services. The paper emphasizes the increasing role of smartphones and the Internet of Things (IoT) in managing household tasks. It investigates the existing literature to identify key themes, challenges, and future directions in this domain. The review highlights the significance of user experience, security, and integration with IoT devices in designing effective home service applications [1].

This study investigates the idea of doorstep home services, which deliver practical and skilled services right to clients' homes. The importance of doorstep services, as well as their advantages and difficulties, are covered in the paper. Key issues, trends, and future directions in this field are examined by looking at the body of existing work. An overview of doorstep home services and their rising popularity is given in the introduction. These firms seek to deliver a range of expert services, including cosmetic procedures, home repairs, healthcare, and groceries, right to consumers' front doors. The convenience and time-saving benefits of doorstep services, which spare clients from having to travel or stand in queue, are highlighted in the report [2].

The paper discusses the process of designing and developing an e-commerce web application for a cooperative store. The paper begins by discussing the benefits of e-commerce for cooperative stores, such as increased sales, improved customer service, and reduced costs. The paper then describes the steps involved in designing and developing an e-commerce web application, including defining the requirements, ¹ designing the system architecture, ¹⁴ designing the user interface, designing the database, developing the software, testing the system, deploying the system, and maintaining the system. The paper concludes by discussing the

challenges of developing an e-commerce web application for a cooperative store, such as limited resources and lack of technical expertise [3].

By looking at current research in the area, this literature review investigates the idea of online systems for household services. The overview discusses how these systems have evolved, their advantages for consumers and service providers, problems and constraints, customer satisfaction and quality assurance, socioeconomic ramifications, and potential future research areas. The evaluation emphasizes the accessibility and convenience provided by online platforms while also addressing issues like privacy, trust, and fair competition. It highlights the importance of continuing research and innovation to unlock the full potential of these systems and offers insightful information for academics, professionals, decision-makers, and platform operators [4].

The research done on the online meal delivery app "Foodie" is summarized in this review of the literature. The evaluation emphasizes the advantages, difficulties, and implications of the app. It talks about how convenient it is for customers, how it affects restaurant partnerships and logistics for deliveries, as well as how it fits into the gig economy. Additionally addressed are issues like sustainability, pricing transparency, and food quality. The evaluation highlights the need for continual analysis and development to maximize the app's advantages and overcome its drawbacks [5].

² The "MAZDOOR" system is incredibly useful for everybody who wants home services like painter, electrician, carpenter, plumber, construction worker, fabricator etc. When an individual is new to a locality it's hard to find services they want, in such a situation e-Commerce plays an important role. Hence to help them get their services done in time, we have created an application called the "MAZDOOR" App. Through this application one can search for the services they want, visit the profile of best labor available in their area. The profile contains various information regarding the labor as the name, phone no etc. The customer can directly give a call to the labor and ask for the services they want. Hence, mazdoor app acts as a broker which helps to connect customer to the labor [6].

This literature review gives a summary of the studies done on cab booking websites. It looks at how they affect drivers' experiences, customer happiness, transportation, and more general implications for urban mobility. The review covers the development of these applications, their advantages for users and drivers, problems with fairness and safety, and prospects for future

study. To maximize the advantages and mitigate the drawbacks of cab booking applications, it emphasizes the necessity for continued study, collaboration, and policy development. [7].

This condensed survey of the literature looks at the study on e-commerce and how it affects markets and trends around the world. It emphasizes how e-commerce has fundamentally changed consumer behavior, corporate strategies, market competitiveness, and global trade. The assessment talks about how e-commerce has changed through time, how it has affected consumer behavior and business strategies, and what opportunities and problems this digital business model presents. Overall, the assessment highlights the necessity of continual research and modification to fully utilize e-commerce's potential in the world market [8].

An overview of the research on online applications based on on-demand home service systems is given in this review of the literature. It covers issues including client convenience, service provider management, technological integration, customer happiness, as well as the broader ramifications for the home service sector as it examines the advantages, difficulties, and implications of these systems. To maximize the effectiveness and efficiency of these systems, the study emphasizes the need for continual research, innovation, and cooperation. It is an important resource for those working in the home services industry who are researchers, practitioners, policymakers, and platform operators [9].

The research on creating a user-friendly online shopping website is examined in this overview of the literature. It highlights how crucial usability and user experience (UX) are to building a successful e-commerce business. Intuitive navigation, clear product display, a quick checkout procedure, responsive design, and tailored recommendations are some of the topics covered in the evaluation. It emphasizes how important convenience, trust, and customer pleasure are to boosting the overall purchasing experience. Researchers, developers, and designers that want to make user-friendly online shopping websites that satisfy the expectations of contemporary customers would find this review to be a useful resource [10].

This literature study thoroughly explores the development, present relevance, and potential futures of online payment systems. It discusses the evolution of online payments throughout history, including the introduction of credit cards and electronic wallets. Various forms of online payment systems, including conventional payment gateways and cryptocurrency, are investigated. The evaluation addresses the advantages and disadvantages of online payment methods for consumers and enterprises. Additionally, it examines emerging technologies, legal issues, and anticipated future developments, such as decentralized banking and digital

currencies issued by central banks. The importance of ongoing research and collaboration is emphasized in the conclusion to ensure safe and effective online payment systems. Overall, this evaluation offers insightful information to the field's scholars, business people, and legislators [11].

This survey of the literature gives a thorough summary of the contemporary age studies on online payments and e-commerce. The development of e-commerce, customer behaviour, the function of online payment systems, security issues, and future perspectives are all explored. The assessment highlights the value of safe online payment methods and e-commerce in facilitating trade, boosting convenience, and promoting economic growth. It is a useful tool for academics, decision-makers, and business experts who want to learn more about how e-commerce and online payment systems interact dynamically in the present era [12].³⁷

This literature study offers a thorough analysis of the experience and process of the job hunt. It covers all the steps, including evaluating oneself, creating a CV, applying for jobs, going on interviews, and negotiating. In addition to discussing the difficulties job seekers experience, such as competition and discrimination, the paper investigates factors that affect job search behaviors. It outlines methods for improving the efficiency of employment searches, including networking and proactive measures [13].

The usage of web applications that link users with software and hardware professionals for laptop and desktop repairs is explored in this literature study. It looks at the characteristics and capabilities of these programmes, including user registration, technician profiles, scheduling appointments, and safe payment processing. The evaluation focuses on the advantages for users, such comfort and accessibility, and for technicians, including greater visibility and employment options. It also addresses issues like handling customer reviews and confirming technician credentials. It is highlighted how important user satisfaction, future directions, and incorporating developing technology [14].

This study of the literature looks at sophisticated labor-finding software and highlights its advantages for businesses, job seekers, and employers. It talks about functions like secure payment processing, job advertising, candidate search filters, and user registration. The evaluation highlights the larger influence on the labor market by addressing issues like data privacy and fair employment practices. Future directions emphasize the necessity for ongoing research and innovation with platforms for the gig economy and AI integration. For those

interested in sophisticated labor finding applications, including developers, employers, job seekers, and researchers, this evaluation provides insightful information [15].

Chapter No. 3

3 METHODOLOGY

The methodology chapter's objective is to give a full account of the technique and procedures employed to address the problem statement and test the thesis hypothesis. Briefly restating the problem statement, there is a need for an E-Technician website and mobile app that allows users to hire technicians and technicians to find jobs by promoting their services. The approach chosen will aid in addressing this issue by defining the research methodologies used, such as data collection techniques and analysis procedures. Furthermore, the approach will lead the E-Technician platform development process, ensuring that the implementation corresponds with the identified problem and satisfies the project objectives. It will give a standardized framework for data collection, analysis, and software development, ensuring the validity and trustworthiness of the results.

3.1 Tools

In the development of the E-Technician website and app, our team effectively utilized a range of tools and technologies to streamline the development process and deliver a high-quality product. The collaborative efforts of team members resulted in the successful utilization of these tools and technologies. Here is how each tool and technology was used:

3.1.1 MERN Stack

We collectively decided to leverage the MERN stack due to its proven capabilities in building full-stack web applications. The team divided tasks based on expertise, with some members focusing on MongoDB for efficient data storage, others working on Express.js for server-side development, while some concentrated on React.js for building a responsive user interface. Node.js served as the common platform for server-side scripting, ensuring seamless communication between the front-end and back-end components.

3.1.2 HTML, CSS, and JavaScript

Our team members proficient in front-end development utilized HTML, CSS, and JavaScript to create captivating and user-friendly web pages. HTML was employed to structure the content, CSS enabled the application of appealing styles and layouts, and JavaScript facilitated dynamic functionality and enhanced user interactions.

3.1.3 React.js

React.js played a crucial role in building the user interface of the E-Technician website and app. Our team members with expertise in React.js collaborated to create reusable UI components, enabling efficient development and seamless updates. This component-based approach ensured a consistent and responsive user experience across the application.

3.1.4 Node.js and Express.js

Our team effectively utilized Node.js and Express.js for server-side scripting and back-end development. With Node.js, we handled server requests, performed data processing, and implemented business logic. Express.js simplified routing and middleware management, enabling seamless API development and efficient handling of HTTP requests.

3.1.5 MongoDB

As a team, we decided to adopt MongoDB as our database solution due to its flexibility and scalability. Our team members proficient in MongoDB designed the database schema, ensuring optimal data organization and efficient retrieval. MongoDB's document-oriented nature proved beneficial in storing dynamic data, user profiles, job listings, and other relevant information.

3.1.6 Git and GitHub

Throughout the project, we utilized Git as our version control system, enabling collaborative code management and tracking changes. By utilizing Git, team members were able to work on different features simultaneously, track progress, and merge code changes seamlessly. GitHub served as the central repository for our project, facilitating code sharing, reviewing, and collaboration.

3.1.7 Android App

Using Android Studio, Java, XML, PHP, and XAMPP, our team also created a mobile application for the E-Technician platform in addition to the website. The main development environment was Android Studio, which offered a complete set of tools for creating and testing the app. XML was used to specify the structure and layout of the app's screens, while Java was used to define the backend logic and functionality. The app's database connection, data retrieval and manipulation, and communication with the backend APIs were all handled by PHP and XAMPP.

Our team worked closely together throughout the development process, conducting code reviews and making use of the extensive documentation and community support offered by Android and related technologies. We were able to create the E-Technician app with a visually

appealing user interface, seamless functionality, and cross-platform compatibility by skillfully utilizing these tools and technologies.

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3.2 Research Design

3.2.1 Introduction

This section outlines the data gathering and analysis process conducted for the development of the E-Technician website. The objective was to collect relevant information and insights to understand user requirements, preferences, and industry standards.

3.2.2 Data Gathering Methods

To gather accurate and reliable data, the following methods were employed:

3.2.2.1 Surveys

Online surveys were conducted to collect quantitative data from potential users and technicians. The surveys consisted of targeted questions related to their preferences, expectations, and pain points regarding hiring technicians and finding jobs. Survey platforms were utilized to reach a broader audience and collect responses efficiently.

3.2.2.2 Interviews

In-depth interviews were conducted with potential users, technicians, and industry experts. These interviews provided qualitative data, allowing for a deeper understanding of the needs, challenges, and desired features for the E-Technician website. Structured and semi-structured interview formats were used to ensure consistency while allowing for open-ended discussions.

3.2.2.3 Competitor Analysis

A comprehensive analysis of similar platforms in the market was performed. This involved studying the features, user experience, payment methods, and security measures implemented by these competitors. The analysis helped identify industry trends, best practices, and areas for differentiation.

3.2.3 Data Analysis

The gathered data was carefully analyzed to extract meaningful insights and inform the design and development process of the E-Technician website. The analysis included the following steps:

3.2.3.1 Quantitative Data Analysis

Survey responses were processed and analyzed using statistical techniques. Data points such as user demographics, preferences, and rating patterns were examined. Key metrics, such as the percentage of users preferring certain features or payment methods, were calculated to determine user priorities.

3.2.3.2 Qualitative Data Analysis

Interview transcripts and open-ended survey responses were analyzed through thematic analysis. Common themes, recurring issues, and user expectations were identified. Insights related to user trust, payment concerns, and preferred communication channels were extracted. These findings helped shape the user experience and feature prioritization.

3.2.3.3 Competitor Analysis Findings

The competitor analysis provided valuable insights into successful features and potential gaps in the market. By analyzing the strengths and weaknesses of existing platforms, key differentiators for the E-Technician website were identified. This analysis guided the development of unique value propositions and innovative solutions.

3.3 System Features

3.3.1 Introduction

This chapter presents a detailed account of the software development process employed by our team to build the E-Technician website and app. The process followed the MERN (MongoDB, Express.js, React.js, Node.js) stack, which facilitated the development of a robust and scalable platform. The chapter outlines all the stages, starting from the Software Requirements Specification (SRS) to the final deployment.

3.3.2 Software Requirements Specification (SRS)

The first stage of the software development process involved defining the requirements for the E-Technician platform. This was achieved through an in-depth analysis of user needs, market research, and discussions with stakeholders. The SRS document was prepared, encompassing functional and non-functional requirements, use cases, user interface specifications, and system architecture.

3.3.3 Design and Planning

Based on the SRS, the design and planning stage involved creating a comprehensive system architecture and database design. The team collaborated to design wireframes, user interfaces, and a responsive design layout. Additionally, the software development schedule and resource allocation plan were established to ensure efficient project management.

3.3.4 Front-end Development

The front-end development stage focused on implementing the user interface using React.js, a JavaScript library known for its component-based architecture. The team followed best practices to create visually appealing and user-friendly interfaces. HTML, CSS, and JavaScript were utilized to develop interactive elements, ensuring a seamless user experience.

3.3.5 Back-end Development

In the back-end development stage, the team leveraged Node.js and Express.js to build scalable and efficient server-side architecture. The RESTful API endpoints were developed to handle user requests, authentication, and data retrieval from the MongoDB database. Robust security measures, such as encryption and input validation, were implemented to safeguard user information.

3.3.6 Database Integration

During the database integration stage, the team utilized MongoDB, a NoSQL database, to store and retrieve data efficiently. The database schema was designed based on the requirements outlined in the SRS document. Data models and relationships were established, ensuring optimal performance and scalability.

3.3.7 Testing and Quality Assurance

The testing and quality assurance stage involved rigorous testing to identify and fix any bugs or issues. Unit tests were conducted to ensure the proper functioning of individual components, while integration testing verified seamless communication between the front-end and back-end systems. User acceptance testing (UAT) was carried out to gather feedback and validate the system against user expectations.

3.3.8 Deployment and Launch

The deployment and launch stage marked the final phase of the software development process. The team prepared the website and app for production by configuring servers, setting up domains, and ensuring the integration of necessary security measures, including SSL certificates. The production environment was thoroughly tested to ensure a smooth transition from the development environment. Once the platform was deemed ready, it was launched to the public.

3.3.9 Maintenance and Support

Following the launch, the team provided ongoing maintenance and support for the E-Technician platform. This involved addressing any reported issues, applying updates, and implementing new features based on user feedback and evolving market trends. Continuous monitoring and security measures were implemented to ensure a secure and reliable user experience.

3.4 Project Planning

3.4.1 Task Distribution

Table 1 Task Distribution

Group Members	CMS ID	Task Distribution
Qasim Khan	49375	Front End Development, Testing, Documentation
Syed ZainulArfien	49434	Backend Development, Testing, Documentation
Jalal Ahmed	50034	Mobile App Development, Testing, Documentation

3.4.2 Gant Chart

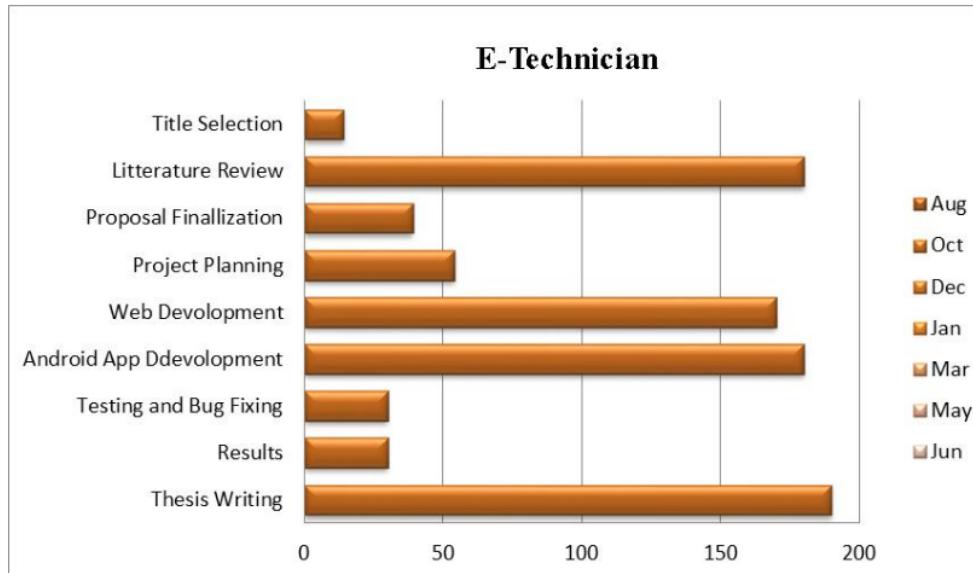


Figure 1 Gant Chart

3.4.3 SDLC Model

3.4.3.1 Gathering Requirements

- Identify and record the E-Technician platform's functional and non-functional needs.
- Engage stakeholders, such as users, technicians, and administrators, to learn about their needs and expectations.
- Create a detailed requirements document that will serve as the foundation for the following stages.

3.4.3.2 System Design

- Design the E-Technician platform's architecture and infrastructure while keeping scalability, security, and usability in mind.
- To visualize the user interface and receive input from stakeholders, create wireframes, mockups, or prototypes.
- Define the database structure, API standards, and, if applicable, integration points with external systems.
- Create a complete system design document that includes technical specifications as well as design decisions

3.4.3.3 Implementation

- Based on the system design, create the E-Technician website and mobile app.
- To provide an organized approach, divide the development tasks into modules or components.
- Write clean, maintainable code that adheres to coding standards and best practices.
- Conduct code reviews to ensure that the design specifications are followed.

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3.4.3.4 Testing:

- Unit testing, integration testing, and system testing are all examples of testing.
- Create test cases based on the specs and needs.
- Execute the test cases to check the platform's functionality, performance, and usability.

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3.4.3.5 Deployment

- Get the E-Technician platform ready for production deployment.
- Set up the required servers, databases, and network infrastructure.
- Migrate the website and app to production while maintaining data integrity and security.
- Conduct user acceptance testing (UAT) to ensure that the deployed platform fulfils the expectations of stakeholders.

3.4.3.6 Maintenance

- Maintain and support the E-Technician platform on an ongoing basis.
- Address any problem repairs, additions, or updates that users or stakeholders have requested.
- To maintain the platform's smooth operation, keep an eye on its performance, security, and user feedback.
- Future enhancements or upgrades should be planned based on user needs and emerging technologies.
- It should be noted that the Waterfall Model follows a sequential approach, with each phase being finished before moving on to the next. While it provides a structured framework, it may be too rigid to accommodate modifications or developing requirements. During the

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development of the E-Technician platform, it is critical to analyze potential limits and alter the procedure as needed.

3.5 Project Design

3.5.1 Diagrams

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3.5.2 Use Case Diagram

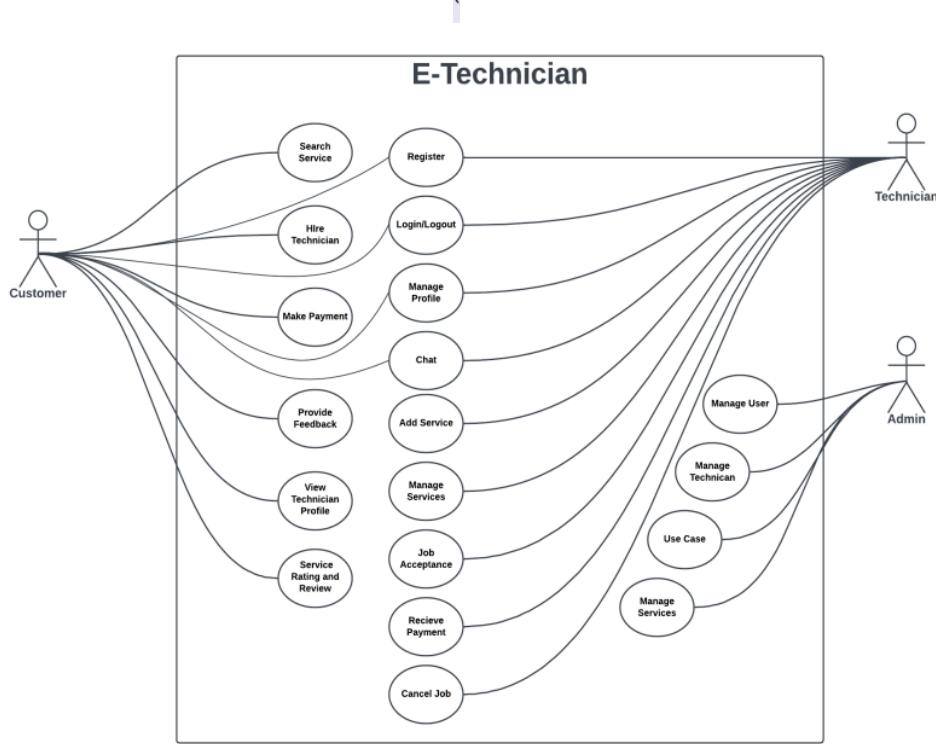


Figure 2 Use Case diagram of E-Technician

3.5.3 Flow Chart Diagram

3.5.3.1 Admin Module

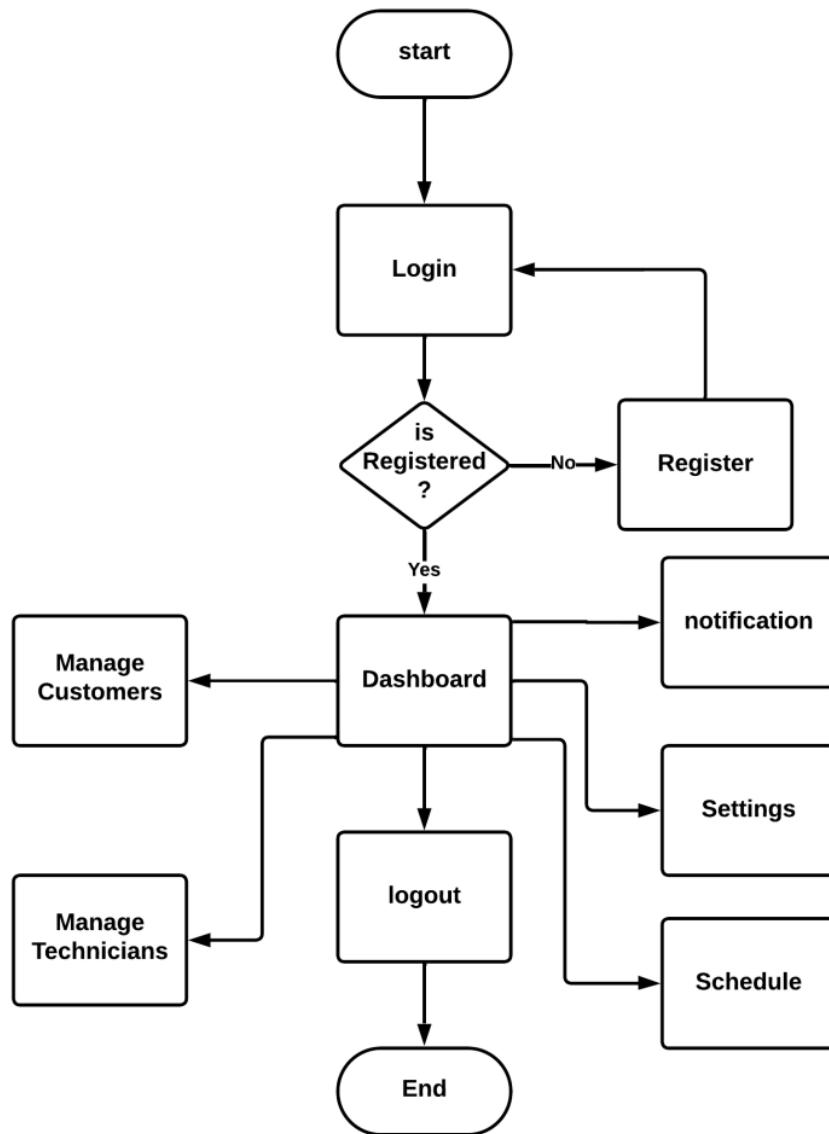


Figure 3 Admin Module

3.5.3.2 Customer Module

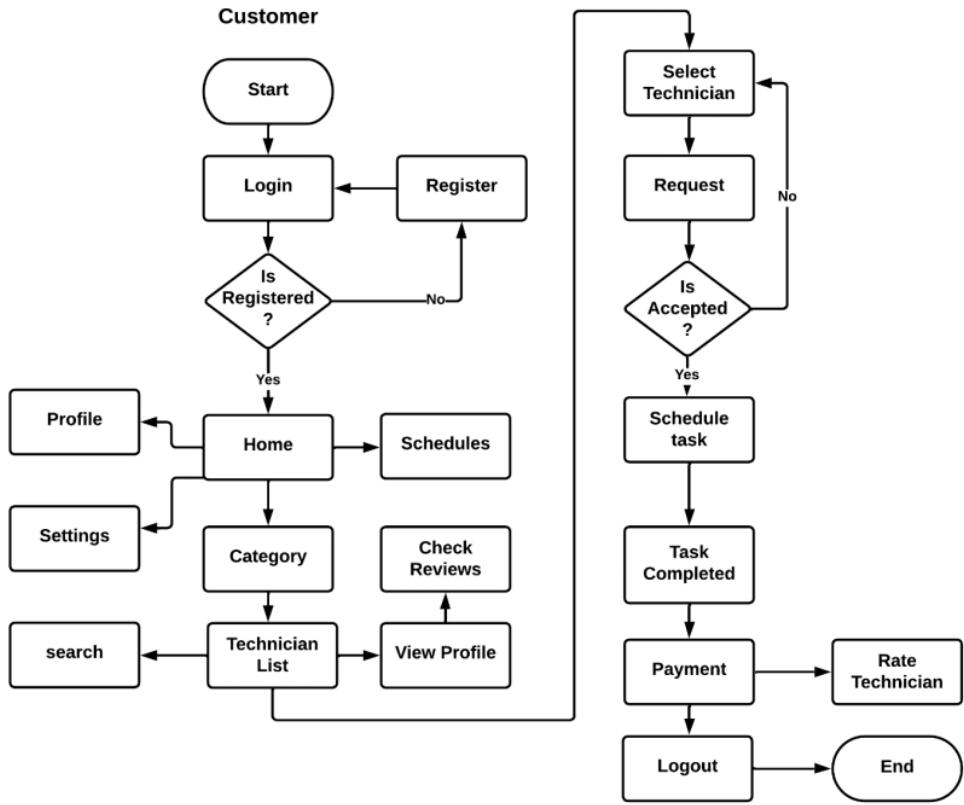


Figure 4 Customer Module

3.5.3.3 Technician Module

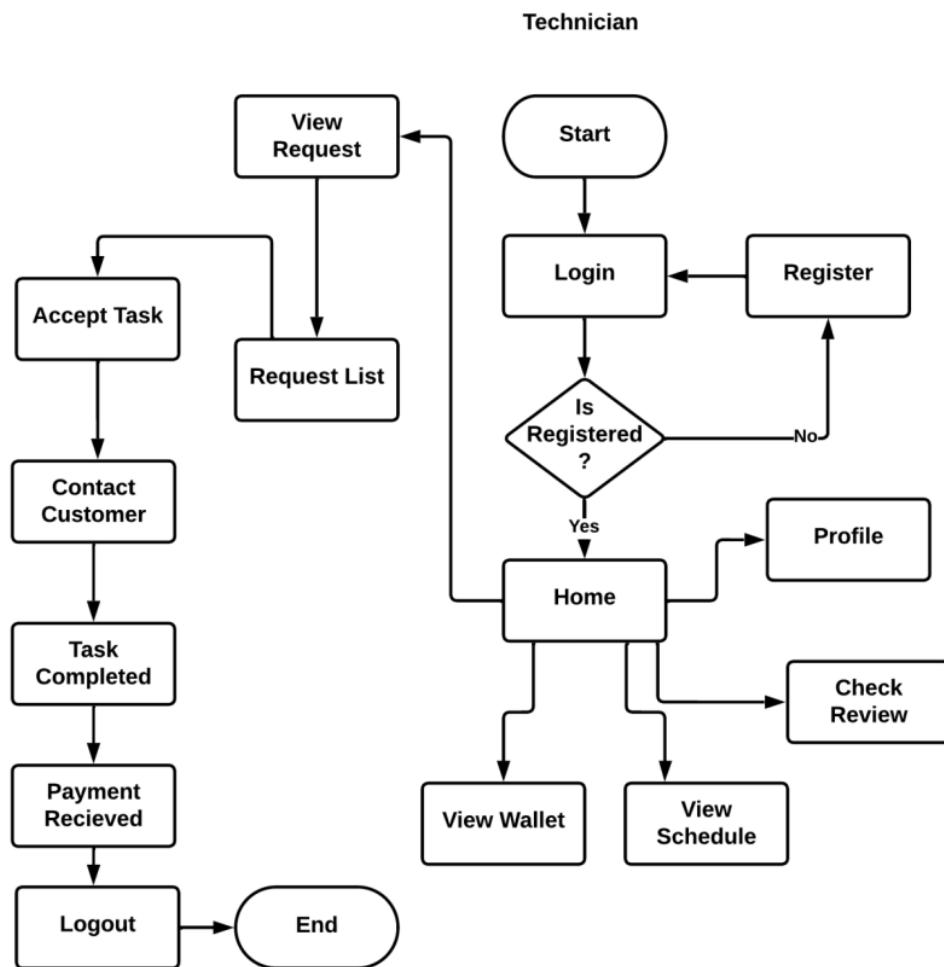


Figure 5 Technician Module

3.5.4 Class Diagram

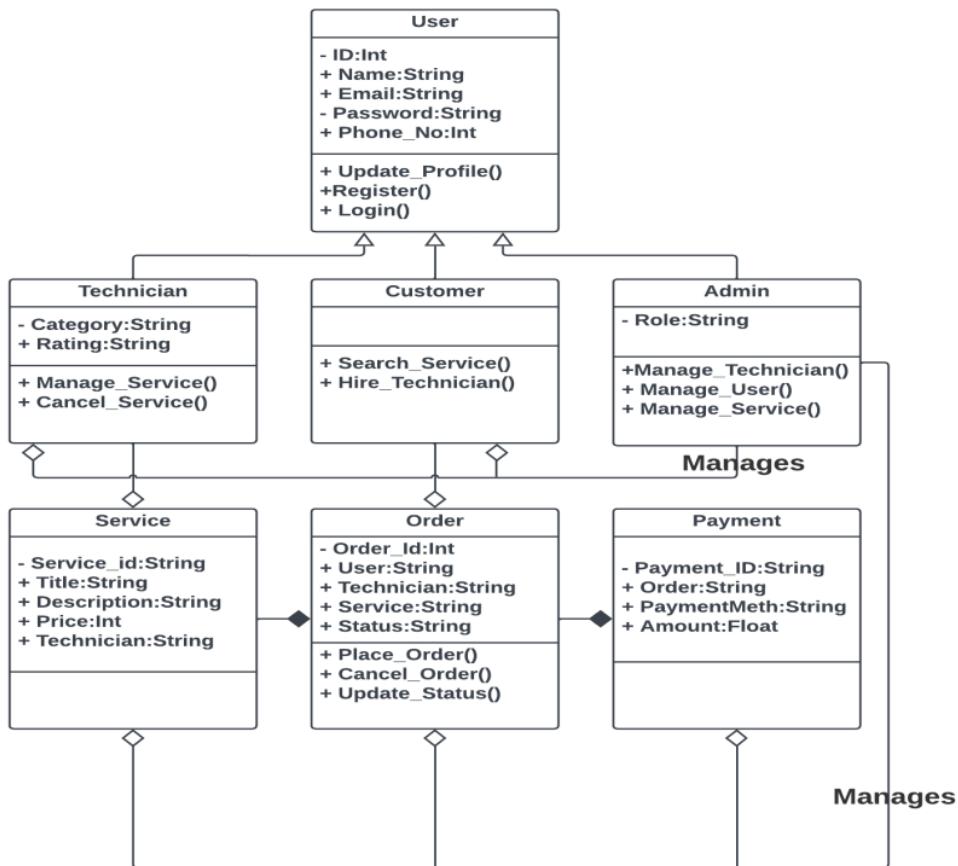


Figure 6 Class Diagram of E-Technician

3.5.5 Activity Diagram

3.5.5.1 Customer Module

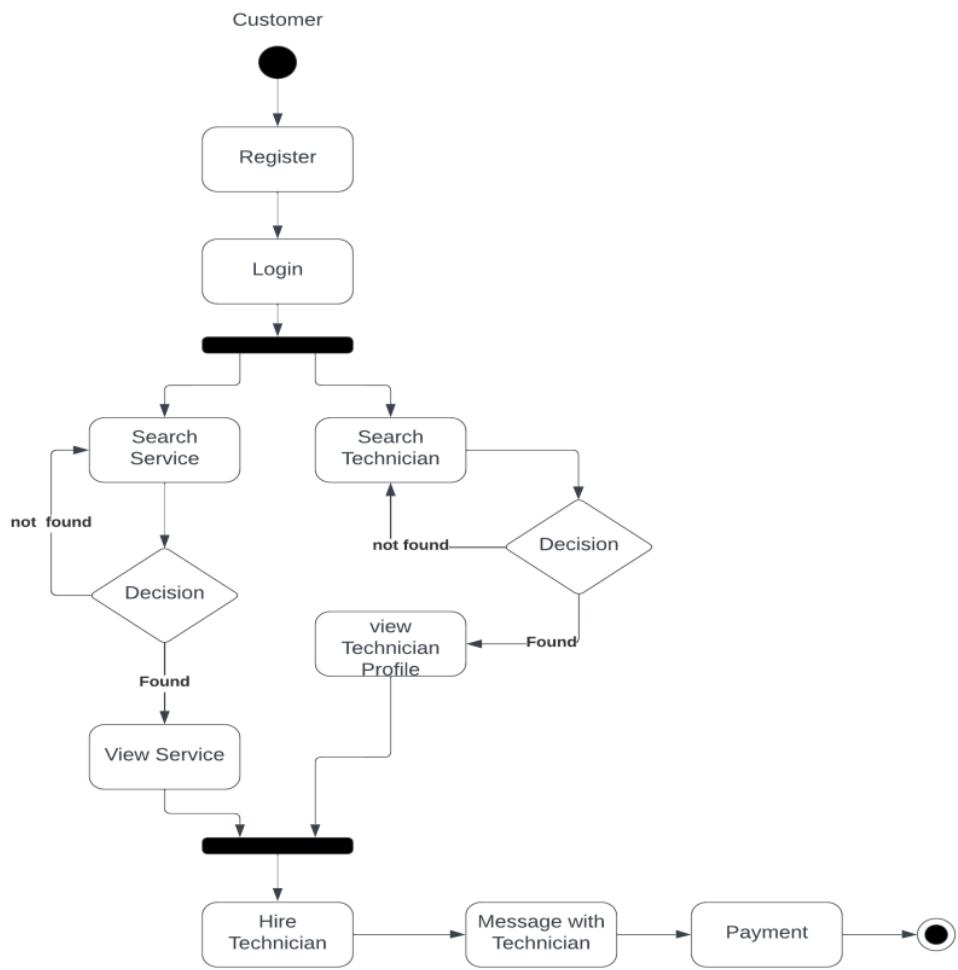


Figure 7 Customer Module Activity Diagram

3.5.5.2 Technician Module

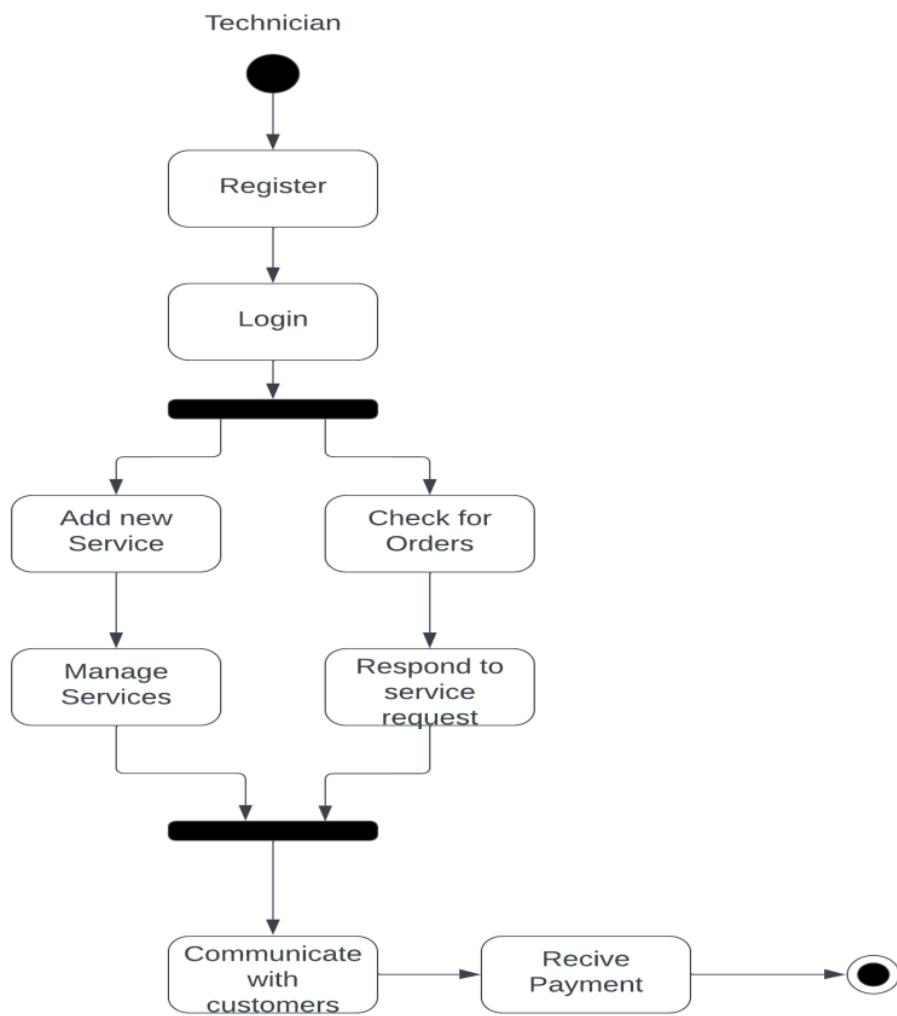


Figure 8 Technician Activity Diagram

Chapter No. 4

4 DEVELOPMENT AND TESTING

This chapter offers a thorough discussion of the E-Technician platform's implementation process and the numerous testing techniques used to assure its functionality, usability, and security. It provides thorough insights into the testing setup, procedures, and findings, emphasizing the meticulous process used to confirm the platform's functionality. To guarantee a comprehensive analysis of all facets of the platform's functioning and user experience, several testing techniques, including as unit testing, integration testing, system testing, and user acceptability testing (UAT), are explored in detail. This chapter proves the platform's reliability, adherence to standards, and capacity to satisfy the needs of both service seekers and technicians through the detailed explanation of testing procedures and their associated results. The chapter inspires trust in the platform's dependability, compliance, and ability to meet users' demands by highlighting the thorough testing methodology and outlining detailed results.

4.1 Test Results

4.1.1 Web Application

4.1.1.1 Navigation Bar

E-Technician's elegant and straightforward navigation bar, which provides quick access to essential features such as Home button, Become a Technician option, Sign In and Register options. As we can see in figure 9 below that illustrates the navigation bar.



Figure 9 Navigation Bar

4.1.1.2 Home Page

The E-Technician website welcomes you as a user or technician with an aesthetically pleasing and user-friendly interface. As we can see in figure 10 below that illustrates add new service section.

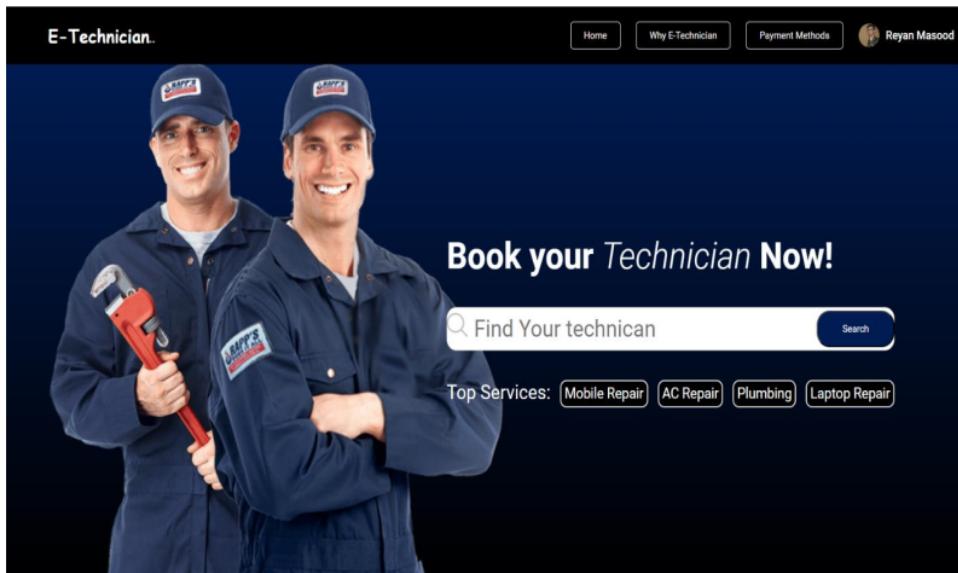


Figure 10 Home Page

4.1.1.3 Footer

The footer of our website is created to improve user surfing experience. Discover more about us in the about area, look through our various categories, find a variety of assistance options, and interact with our active community. Enjoy easy navigation and quick access to all the resources you require. As we can see in figure 11 below that illustrates the Footer.

Categories	About	Support	Community
Plumber	Press & News	Help & Support	Customer Success Stories
Electrician	Partnerships	Trust & Safety	Community hub
Electronics	Privacy Policy	Our Services	Forum
Electrical Repairs	Terms of Service	Payment Method	Blog
Wiring and Rewiring	Intellectual Property Claims		Influencers
Lighting Solutions	Investor Relations		Invite a Friend
Circuit Breaker Replacement	Contact Sales		Become a Technician
Surge Protection Installation			
Electrical Safety Inspections			
Outlet and Switch Installation			

Figure 11 Footer

4.1.1.4 Login Page

The login page for E-Technician provides a safe way to access your personalized account. As we can see in figure 12 below that illustrates add new service section.

The screenshot shows a 'Sign in' form with three input fields: 'Username' containing 'johndoe', 'CNIC' containing '54493823874987', and 'Password'. Below the fields is a dark blue 'Login' button.

Figure 12 Login

4.1.1.5 Register

Users and technicians can quickly register and create accounts on E-Technician by entering necessary details such their Name, Email, CNIC, and phone number in the Register section. As we can see in figure 13 below that illustrates add new service section.

The screenshot shows a 'Create a new account' form with several input fields: 'Username' (Your Name), 'CNIC Number' (SA402120023660), 'Email' (email), 'Password', 'Profile Picture' (Choose File), 'CNIC Picture' (Choose File), 'Country' (For example: Pakistan), 'I want to become a Technician' (checkbox), 'Activate the Technician account' (checkbox), 'Phone Number' (+91 234 567 89), and 'Description' (A short description of yourself). At the bottom is a dark blue 'Register' button.

Figure 13 Register

4.1.1.6 Category

The category Section offers a variety of specialized services. Where user can investigate subcategories including electronics, electrician, plumbing, and home appliance repair. As we can see in figure 14 below that illustrates add new service section.

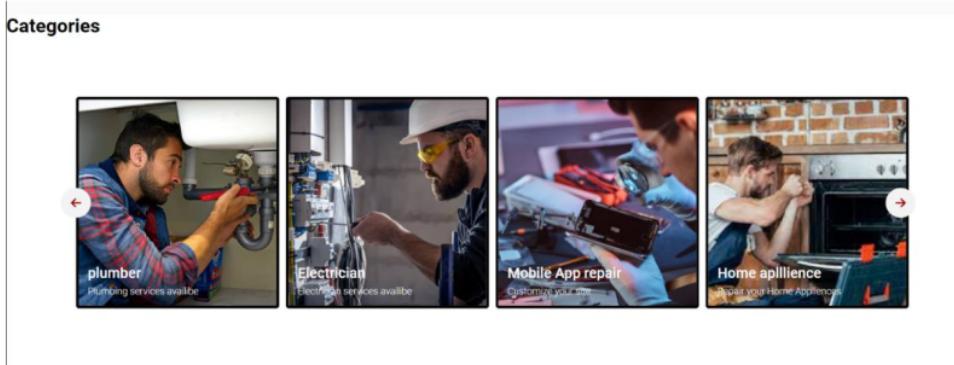


Figure 14 Categories

4.1.1.7 Services

Users can obtain a detailed overview of the services provided by various technicians in the E-Technician Services section. Each service's details are available to the user, including the hourly pricing, ratings, and biographies of the technicians. Users may easily find the correct professional in the services section and make knowledgeable decisions for all their technological needs. As we can see in figure 15 below that illustrates add new service section.

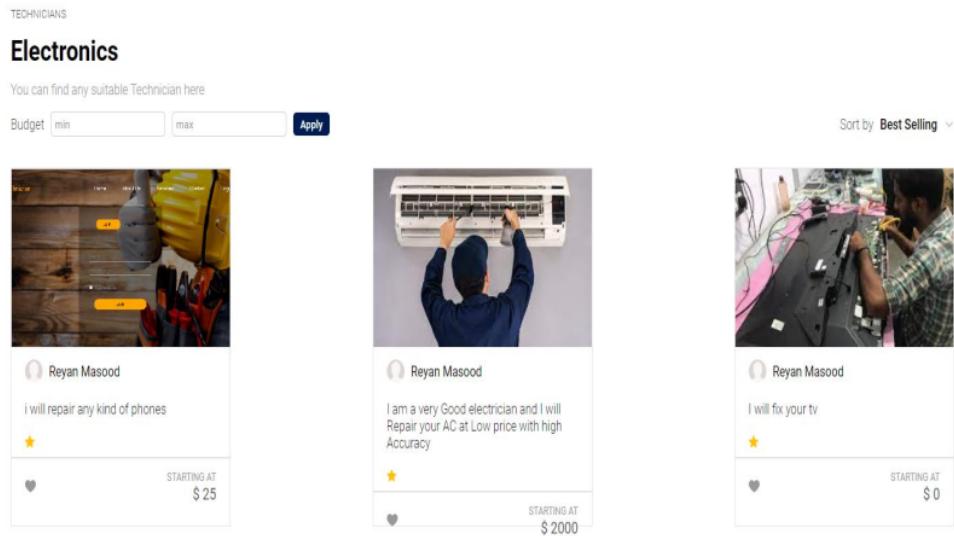
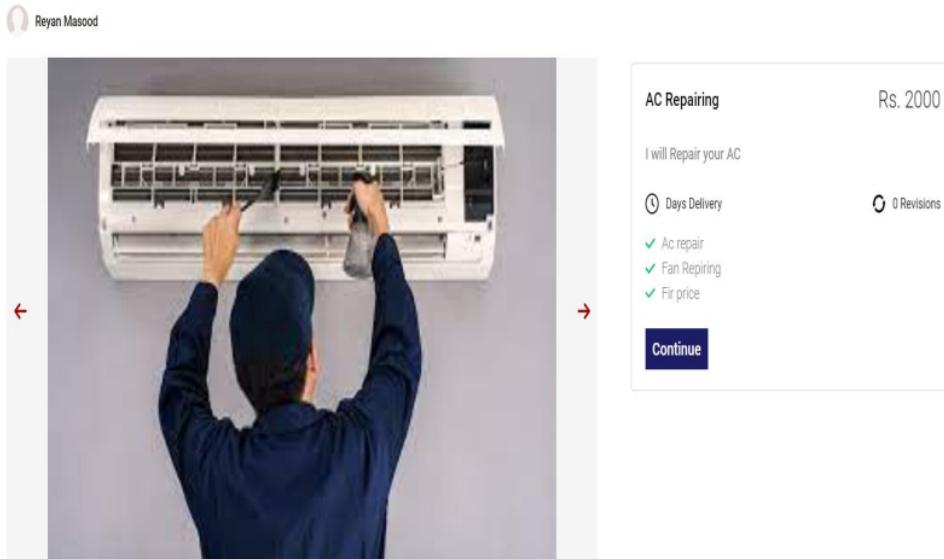


Figure 15 Services

4.1.1.8 Service

Users can browse and learn more about the services offered by technicians by visiting the Service section of E-Technician. Obtain comprehensive details about the service, such as technician profiles, credentials, and areas of specialization. Users can discover the ideal match for their unique requirements and benefit from outstanding technical solutions. As we can see in figure 16 and figure 17 below that illustrates add new service section.

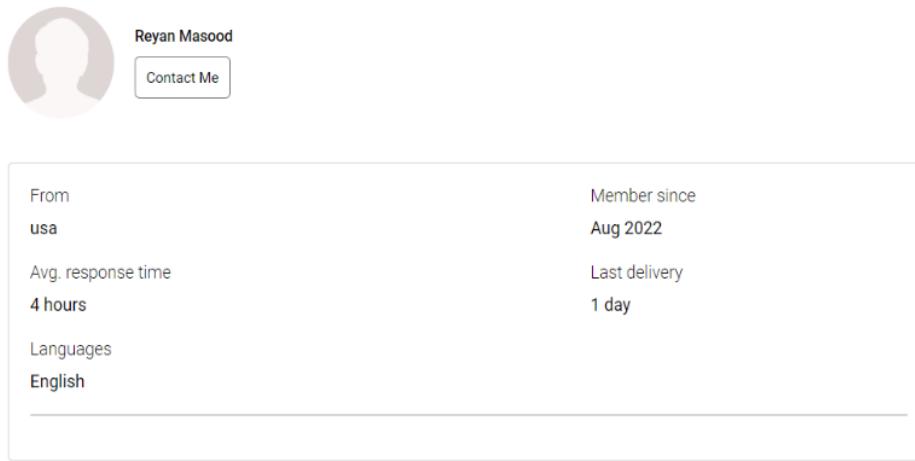


The screenshot shows a technician, Reyan Masood, performing maintenance on a white wall-mounted air conditioning unit. He is wearing a dark blue long-sleeved shirt and dark trousers. The service interface on the right side of the screen displays the following information:

- AC Repairing** (Service Type)
- Rs. 2000** (Price)
- I will Repair your AC** (Description)
- 1 Days Delivery** (Delivery Time)
- 0 Revisions** (Revisions)
- ✓ Ac repair**, **✓ Fan Repiring**, **✓ Fir price** (Service Details)
- Continue** (Action Button)

Figure 16 Service

About The Technician



The screenshot shows the profile of a technician named Reyan Masood. The profile includes the following information:

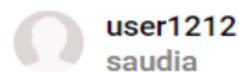
From	Member since
usa	Aug 2022
Avg. response time	Last delivery
4 hours	1 day
Languages	
English	

Figure 17 Technician info

4.1.1.9 *Reviews*

The reviews section of E-Technician, where users can learn about technicians' work and ratings. Dive through a wealth of comments and testimonials from our community to help you make well-informed hiring decisions. As we can see in figure 18 below that illustrates reviews section.

Reviews



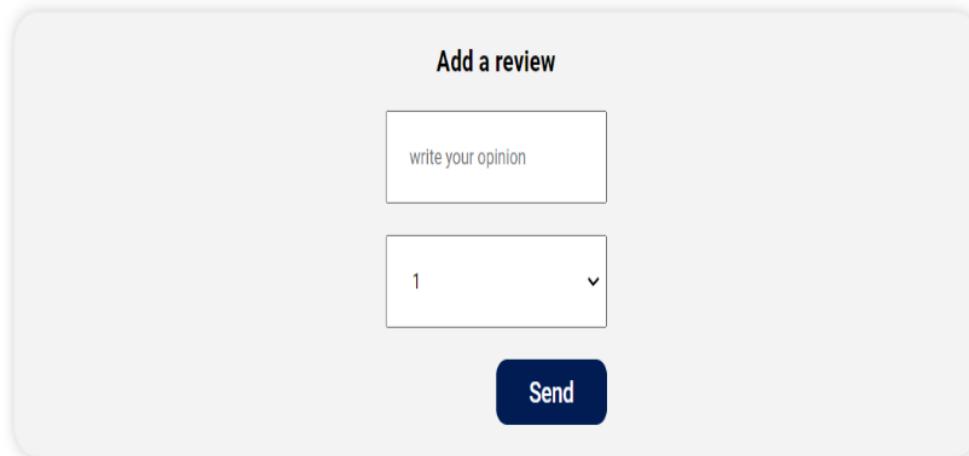
good job

Helpful? Yes No

Figure 18 Reviews

4.1.1.10 *Review*

Users can give review on the technician's work using the review feature as shown in figure 11 on our website, which is a useful tool. Users can review the performance of the technician and share their experiences, assisting others in making wise judgements. As we can see in figure 19 below that illustrates review option.



An interface for adding a review. At the top, the text "Add a review" is centered. Below it is a large input field with the placeholder "write your opinion". Underneath the input field is a dropdown menu showing the number "1" and a downward arrow. At the bottom is a dark blue rectangular button with the word "Send" in white.

Figure 19 Add Review

4.1.1.11 Add New Service

Add new service section allows technicians to add services such as plumbing and home appliance repair, among others. Technicians can simply display their services based on their expertise and broaden their reach using E-technician platform. As we can see in figure 20 below that illustrates add new service section.

The screenshot shows a web-based form titled 'Add New Service'. The form is divided into several sections:

- Title:** A text input field with placeholder text "e.g. I will do something I'm really good at".
- Service Title:** An empty text input field.
- Category:** A dropdown menu currently set to "Electronics Repairing".
- Cover Image:** A section with a "Choose File" button and a placeholder "No file chosen". To its right is a blue "Upload" button.
- Upload Images:** Another section with a "Choose Files" button and a placeholder "No file chosen".
- Description:** A large text area with placeholder text "Brief descriptions to introduce your service to customers".
- Add Features:** A section with a text input field for "e.g. wiring, short-circuit fixing" and a blue "add" button.
- Price:** An empty text input field.
- Create:** A large blue "Create" button at the bottom of the form.

Figure 20 Add New Service

4.1.1.12 Message/Chat

E-Technician's website has a chat feature that connects users with technicians so they can have in-person talks about the needs of the work, ask questions, and make sure the hiring process runs well. As we can see in figure 21 below that illustrates add new service section.

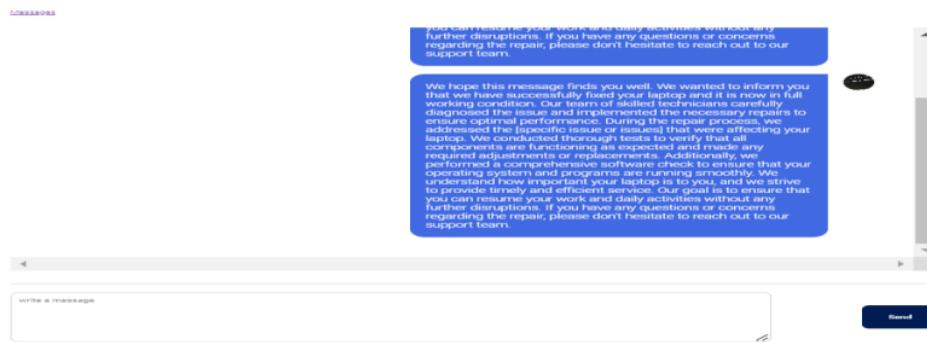


Figure 21 Message/Chat

4.1.1.13 Message Inbox

The inbox on E-Technician ensures that chat history between user and technicians is simply stored. At any time, user or technician can access previous chats, review information. As we can see in figure 22 below that illustrates add new service section.

Messages

Customer	Last Message	Date	Action
64a66e24737e595d11c3a27b	ok ...	a day ago	
64a451f5fccd6ac846594667	We hope this message finds you well. We wanted to inform you that we have successfully fixed your la...	a day ago	
64aa77444d658bb8f924bb12	hey can you fix my laptop.....	a day ago	
6487464654210761edee3df3	ytdfghjgfh...	6 days ago	

Figure 22 Message Inbox

4.1.1.14 My Service

Technicians can easily view all the services they have added by visiting the Services section of E-Technician. It's simple to manage and update your offerings, demonstrate your knowledge, and draw potential customers. Technician can manage service portfolio in a proactive manner to increase their online presence. As we can see in figure 23 below that illustrates add new service section.

My Services

My Services				
Image	Title	Price	Sales	Action
	test service 1	0	0	
	test service 1	0	0	
	test service 1	0	0	
	test service 1	0	0	
	test service 1	0	0	
	test service 1	0	0	
	test service 1	0	0	

Figure 23 Technician's Services

4.1.1.15 Order

The Orders section of E-Technician gives technicians a centralized view of all customer orders that have been received. The technician can easily handle and track incoming requests in order section. As we can see in figure 24 below that illustrates add new service section.

Orders

Image	Title	Price	Contact
	test service 1	0	

Figure 24 Technician's Received Orders

4.1.1.16 Profile

Technicians have access to and the ability to change their credentials and personal information through the profile section of E-Technician, that enables the technician to keep their profile up to date and improve their professional presence on the E-technician platform. As we can see in figure 25 below that illustrates add new service section.

User Profile

Username: Reyani Masood
Email: reyan69@gmail.com
CNIC:
Password:
Country: usa
Phone Number:
Description:
Image:

Update Profile

Username:

CNIC:

Update your CNIC:

Password:

Update your Password:

Phone Number:

Country:

Email:

Image:

Update Profile

Figure 25 Technician Profile

4.1.2 Mobile Application:

4.1.2.1 Launching App (*User Module*)

The app is launched which shows us two option whether you want to login as a user/customer or a technician as it is customer module introduction I am going with login as a user. As shown in the below figure 26.



Figure 26 Loading Screen

4.1.2.2 Login Form (*User Module*)

After choosing the user option A login form is shown an option is given if the user/customer has not registered then he should register otherwise the user can carry on with login credentials and login as shown in the below figure 27.

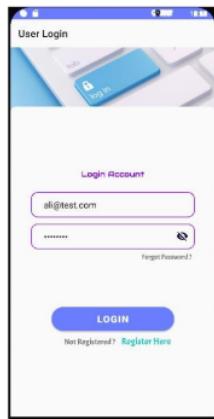


Figure 27 Customer's Login Form

4.1.2.3 Registration Form (User Module)

After clicking on the register here button a registration form will open up and the user should give their credential in this form we are using username “ali” for demonstration in this below figure through this process the user will be registered in our database which is also viewable to our administrative control panel. After pressing the register button registered successfully will be shown and it will redirect the user to login page as shown in figure 28.

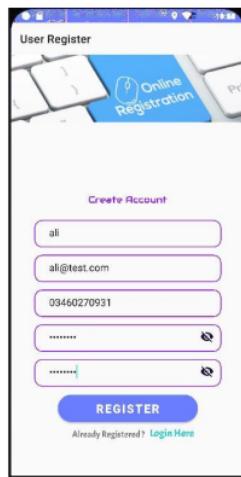


Figure 28 Customer's Registration Form

4.1.2.4 Admin Dashboard and Database

User “ali” through registration is created in our admin panel shown in Figure 29.

Users			
#	Name	Email	Contact
2	ali	ali@test.com	03000
5	Syed Zain	Szain@gmail.com	

Figure 29 Admin Dashboard & Database

4.1.2.5 Home Screen (User Module)

The Home screen is the main page where customer can hire the technician or other service providers and a recommend or top technician is popped up for featuring the bell icon is for notification that a user might get which is shown in below figure 30.

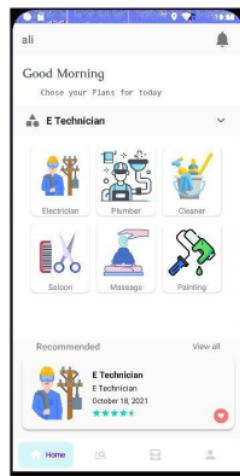


Figure 30 Customer's Home Screen

4.1.2.6 Services Screen (User Module)

This page shows list of categories where every service provider is shown to user from where the user can request for the desired technician and a user can also search for sellers which is shown in below figure 31.

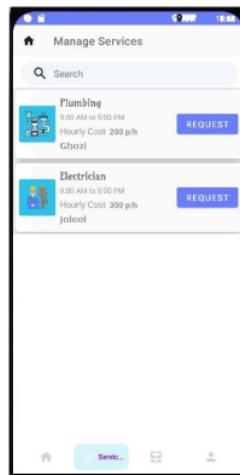


Figure 31 Customer's Service Screen

4.1.2.7 Requesting Screen (User Module)

In this section customer can select whether he wants a cash by hand option or online payment method and rating of customer for demonstration we have selected Electrician which is shown below in figure 32.

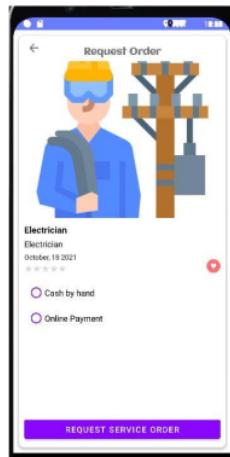


Figure 32 Customer's Request Screen

4.1.2.8 Confirming Screen (User Module)

In this screen the customer gives the technician a brief description of what is the problem their address name and contact number of customer is already given which is fetched from our database a chat option is given through which you can communicate and online payment option shown in figure 33.

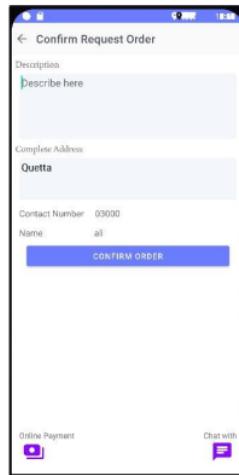


Figure 33 Confirming Screen

4.1.2.9 Rate and Review (User Module)

The rating dialogue box will pop up after the task is completed and the user can give a satisfactory review regarding the work and technician shown in figure 34.

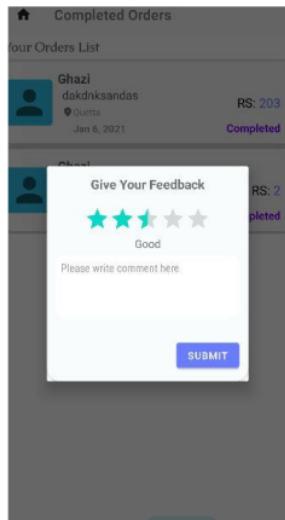


Figure 34 Rate And Review

4.1.2.10 Completed Orders Screen (User Module)

This screen shows the overall summary of all orders the customer has requested and in case customer did not rated the worker he can revisit and rate the technician through this screen which is shown in below figure 35.

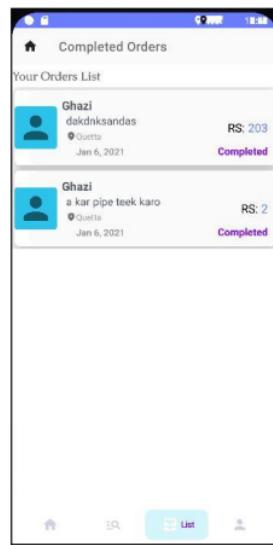


Figure 35 Completed Order

4.1.2.11 Profile Screen (User Module)

This screen is for the user itself username, address and contact number is displayed and gear icon which will navigate the user update screen shown in below figure 36.

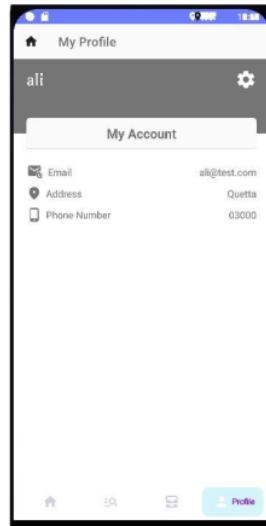


Figure 36 Profile Screen (User Module)

4.1.2.12 Update Profile (User Module)

This screen is for the user for updating their profile by changing name, contact, and address and the user can be logged out through logout button which is shown in below figure 37.

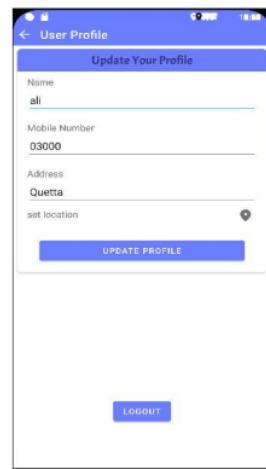


Figure 37 Update Profile (User Module)

4.1.2.13 Login Form (Technician Module)

The login form for the technician is same as the login and registration for the customer the technician can log in if it is not registered then he might get registered first then log in shown in below figure 38.

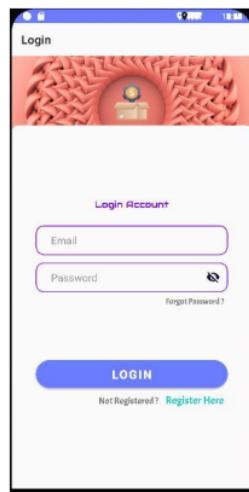


Figure 38 Login Form (Technician Module)

4.1.2.14 Home Screen (Technician Module)

In this screen the technicians progress summary is shown in what category the technician is and it can also create its service a navigation bar icon and bell icon is given for profile and notification shown in figure 39.

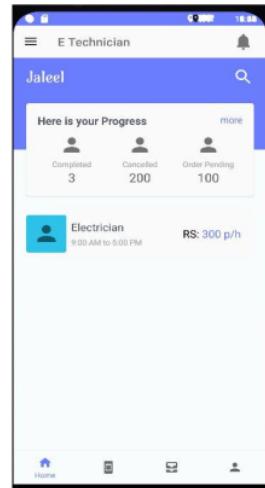


Figure 39 Home Screen (Technician Module)

4.1.2.15 Service Creation Page (Technician Module)

By clicking the create service button it will navigate the technician to this section is the main part of technician module where a technician can describe its occupation, hourly cost and specify its category shown in below figure 40.

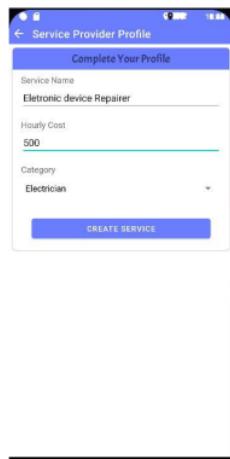


Figure 40 Service Creation Page (Technician Module)

4.1.2.16 Side-Bar (Technician Module)

The side bar gives the technician a multiple option of logout, profile sharing and rating the app overall shown in figure 41.

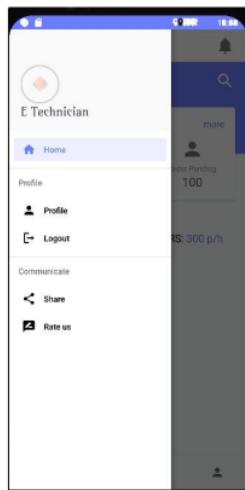


Figure 41 Side-Bar (Technician Module)

4.1.2.17 Order Screen (Technician Module)

In order screen the technician's all pending order will be shown for accepting and declining them shown in figure 42.



Figure 42 Order Screen (Technician Module)

4.1.2.18 Accept Order Screen (Technician Module)

In this section Description of the work is shown the address contact and name of the customer and chat icon is given for communication the technician can accept the orders through this screen shown in figure 43.

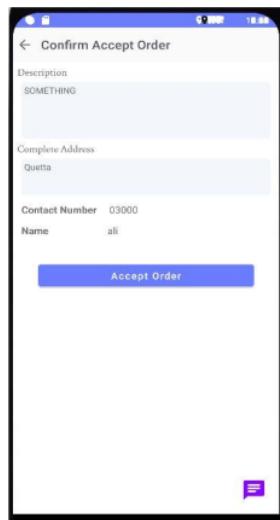


Figure 43 Accept Order Screen (Technician Module)

4.1.2.19 Start Screen (Technician Module)

In this screen the technician can start a stop watch for hourly pay a section of extra work description and its charges is also given after completing the task and stopping the timer a subtotal will be generated automatically and paid button is given for confirmation of payment shown in below figure 44.

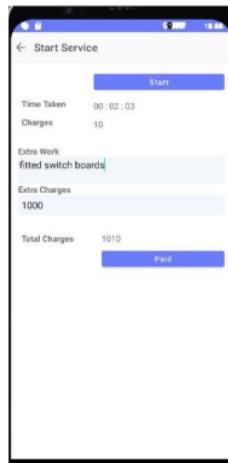


Figure 44 Start Screen (Technician Module)

4.1.2.20 Task Completed Screen (Technician Module)

This screen shows the list of completed task an their brief description shown in below figure 45.



Figure 45 Task Completed Screen (Technician Module)

4.1.2.21 Profile Screen (Technician Module)

The profile screen of technician module is also same as the user profile screen showing the overview of information to the technician a show online button is given which is for the sake of users and through setting icon the technician can update its profile show in below figure 46.

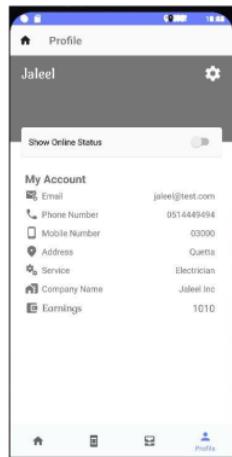


Figure 46 Profile Screen (Technician Module)

Chapter No. 5

5 CONCLUSION AND FUTURE WORK

5.1 Conclusion

In conclusion, by offering a user-friendly platform for recruiting technicians, discovering job openings, and maintaining the system, the E-Technician project has effectively satisfied the demands of customers, technicians, and administrators. The project's functionality, usability, and security have been proven by careful implementation and testing. The platform offers simplicity and efficiency by linking customers with skilled technicians, while also giving technicians a platform to advertise their services and grow their clientele. The admin's responsibility for ensuring efficient operations and preserving platform integrity is vital. Overall, the E-Technician initiative has enormous potential to transform the repair and maintenance sector, streamline workflows, and improve the user experience for all parties involved.

5.2 Future Work

The creation of a cutting-edge matching algorithm for effective technician selection based on proximity, availability, and user preferences is one of the key future enhancements for the E-Technician platform. In order to meet the needs of various user groups, service categories should be expanded to include HVAC technicians, computer repair experts, and carpenters. Security and convenience will increase with mobile app improvements like face recognition and tracking technician shop locations via Google Maps. Additionally, the website should incorporate an inventory management system to make it easier for technicians to access the equipment they need. This will speed up the service process and guarantee quick problem resolution.

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