

Design and Evaluation of Home Service ePortal for Skilled Trades and Household Services

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Abstract: *The study aimed to design and evaluate a Home Service ePortal application, with the primary goal of improving the job matching process between Customers and skilled Home Service Workers. Rapid application development methodology and object-oriented analysis and design were utilized to ensure well-structured platform. The system was implemented using the Laravel framework, offering a user-friendly interface for service requests, job applications, feedback, and more. The evaluation conducted by users yielded highly positive results, with a general average rating of 4.6 out of 5. The ePortal's automated processes enhanced user experience and satisfaction, streamlining interactions and fostering seamless connections within the skilled trades and household services sector.*

Keywords: household services ePortal, object-oriented design, Laravel

I. INTRODUCTION

In recent years, the demand for skilled trades and household services has been steadily growing [1], and there is an increasing need for an efficient and centralized platform to bridge the gap between skilled professionals and those seeking their expertise. The Home Service ePortal aims to address this pressing need by providing a user-friendly and intuitive interface that facilitates seamless interactions between job seekers, service providers, employers, and customers.

The primary purpose of the ePortal for Skilled Trades and Household Services is to streamline the process of hiring skilled workers and accessing household services. The platform is designed to revolutionize the way skilled tradespeople and household service providers connect with opportunities and clients [2]. By offering a centralized hub, the ePortal aims to simplify job searching and service requests for both individuals and businesses.

The significance of creating an ePortal for skilled trades and household services cannot be overstated. With the rapid advancement of technology and the increasing reliance on digital solutions in today's world, a centralized platform becomes an essential tool for optimizing talent acquisition and service procurement processes [3]. By leveraging digital platforms like the ePortal, several benefits can be achieved. Electronic portal streamlines the process of finding and hiring skilled professionals, significantly reducing the time and effort traditionally required for recruitment and service booking [1]. Skilled tradespeople and household service providers gain access to a broader market, expanding their reach beyond local networks and enabling them to showcase their expertise on a national scale [2]. The portal can also provide valuable data insights, allowing businesses and individuals to make informed decisions based on the platform's analytics and user feedback [4]. By implementing a robust verification system for skills and ratings, the electronic portals enhance transparency and fosters trust between service providers, employers, and customers [3]. By facilitating the efficient allocation of skilled labor and household services, the ePortal contributes to economic growth and development by connecting job seekers with suitable opportunities and enabling service providers to reach a wider customer base [5].

II. BACKGROUND OF THE STUDY

Skilled trades and household services have a rich history dating back centuries, rooted in the essential needs of communities for specialized skills and assistance in various tasks. Throughout history, skilled tradespeople, such as blacksmiths, carpenters, and tailors, played critical roles in the development and sustenance of societies [6]. Their expertise was essential in constructing buildings, crafting tools, and creating clothing and other goods necessary for

daily life. Similarly, household services, including domestic work, caregiving, and home maintenance, have been fundamental in supporting households and ensuring the smooth functioning of daily activities [7]. In traditional societies, household services were often performed by family members or community members who possessed the necessary skills.

Historically, job seeking and service procurement in skilled trades and household services predominantly relied on informal networks and word-of-mouth referrals. Skilled tradespeople often found work through apprenticeships or connections within their communities [6]. They would offer their services directly to local residents or businesses, relying on reputation and recommendations for acquiring new clients. Also, households seeking services, such as house cleaning or repairs, would seek assistance from neighbors, friends, or family members who could recommend skilled individuals for the required tasks. These traditional methods were effective to some extent, but they had limitations in terms of reach and scalability.

The advent of technology and the rise of the internet have significantly transformed the skilled trades and household services industry. Digital platforms, commonly referred to as ePortals, have emerged to connect job seekers and service providers with employers and customers more efficiently and effectively. Online job boards and service marketplaces have become prominent platforms for job seekers to find opportunities and for employers to post job listings [8][19]. Likewise, homeowners and individuals seeking household services can now access a wide range of service providers through digital platforms, allowing for increased convenience and flexibility [9][17].

These technological advancements have enabled faster and more accessible connections between skilled tradespeople and service providers with potential clients, transcending geographical boundaries. Furthermore, digital platforms have facilitated transparency and reliability through reviews and ratings systems, providing users with valuable insights into the quality of services offered [8][11]. The shift towards digital platforms has also contributed to the professionalization of skilled trades and household services, with certifications and skill verification becoming more standardized and accessible through online processes [6][20]. As a result, both job seekers and customers can make more informed decisions based on verifiable qualifications and credentials [10][18].

The literature establishes the significant impact of digital platforms on the skilled trades and household services sector [12]. These ePortals have provided new avenues for job seekers to connect with employers and service providers to reach potential clients. However, challenges related to transparency, accuracy, and communication require ongoing attention to further enhance user experiences and satisfaction [13].

The present study aims to address the aforementioned challenges and contribute to the existing body of knowledge through the design and development of a user-friendly ePortal for skilled trades and household services to enhance user experiences and satisfaction. Additionally, the research will investigate the role of digital platforms in connecting service providers with clients and examine the satisfaction levels of both parties in the system evaluation. By conducting this research using rapid prototyping, it is expected to generate insights that can inform the design and optimization of Home Service ePortal ultimately enhancing the user experience for skilled tradespeople, service providers, employers, and customers alike.

III. METHODOLOGY

The research employed the Rapid Application Development (RAD) approach in the development of the Home Service ePortal for Skilled Trades and Household Services. RAD emphasizes iterative development and prototyping, allowing for quick iterations and refinements based on user feedback [14]. This approach is particularly suitable for projects that require frequent changes and continuous improvement, such as digital platforms. Throughout the development process, multiple prototypes of the ePortal's user interface and functionality was created and tested with potential users, including home service providers, and customers. The use of prototyping will enable the researcher to gather valuable insights into user preferences, needs, and pain points, informing the continuous improvement and enhancement of the platform's design.

Object-Oriented Analysis and Design (OOAD) served as the foundation for the design of the ePortal's architecture and functionality. The research involved creating detailed use-case diagrams to outline the various interactions between users and the platform. The Use-case diagram defined user roles and illustrated the functionalities each role can perform. Additionally, the class diagrams was developed to model the relationships between different objects and

entities in the ePortal system. The class diagrams represented the data structures and relationships, including user profiles, job listings, service requests, quotes, and reviews. This approach will ensure that the ePortal is well-structured, scalable, and aligned with industry best practices in software design [15].

The ePortal for Skilled Trades and Household Services was implemented using the Laravel PHP framework [16]. The framework's built-in features, such as routing, database migrations, and authentication, will expedite the development process and ensure the security and performance of the ePortal. Laravel's support for object-oriented programming and model-view-controller (MVC) architecture aligns well with the object-oriented design approach, providing a seamless integration between design and implementation phases.

IV. RESULTS AND DISCUSSION

The results of this study underscore the significance of digital platforms in transforming the skilled trades and household services industry. By adopting a Rapid Application Development (RAD) approach and using prototyping, the ePortal was able to swiftly adapt to user needs and preferences, resulting in continuous improvement. The utilization of Object-Oriented Analysis and Design (OOAD) facilitated a well-structured and scalable platform, ensuring seamless interactions between various users and entities. The class diagrams provided a clear representation of relationships and data structures, enhancing the platform's efficiency and maintainability. Employing the Laravel framework proved to be a wise decision, as it expedited the development process and enabled the incorporation of robust backend functionalities. The framework's MVC architecture aligned seamlessly with the object-oriented design, contributing to the platform's performance and stability.

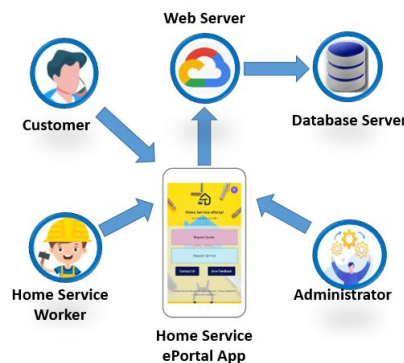


Fig. 1. System diagram

4.1 System Diagram

Figure 1 shows the components of the system. The Home Service ePortal App is the user-facing application accessible on mobile devices and web browsers. The ePortal app serves as the interface through which Home Service Workers and Customers interact with the platform's features and functionalities. The Home Service Worker component represents skilled trades people and service providers who offer their services through the ePortal app. Home Service Workers create profiles, list their skills, and service offerings. They can browse and apply for job listings posted by Customers seeking skilled workers for various tasks. The customer represents individuals or businesses seeking household services. Customers access the ePortal app to find Home Service Workers suitable for their service requirements. They can browse service provider profiles, reviews, and ratings before making a selection. Customers can also post service requests for specific tasks they need assistance with. The Web Server component acts as an intermediary between the ePortal app and the backend services. It handles incoming requests from Home Service Workers and Customers and processes the data exchanged between the app and the database server. The Web Server is responsible for managing user authentication, data validation, and routing requests to appropriate endpoints. Finally, the Database Server is where all the data related to Home Service Workers, Customers, job listings, service requests, reviews, and other platform-related information is stored. It stores user profiles, job postings, service request details, and verification status for Home Service Workers. The Database Server allows for efficient data retrieval and storage, ensuring the availability of up-to-date information to the ePortal app.

4.2 Design and Development

To ensure that the application achieved its functional requirements, the researcher constructed a use-case diagram and class diagram. These diagrams were designed to encompass the necessary objects and classes required to support the application's functionality effectively. The use-case diagram served as documentation for the system's requirements and provided guidance throughout the development process.

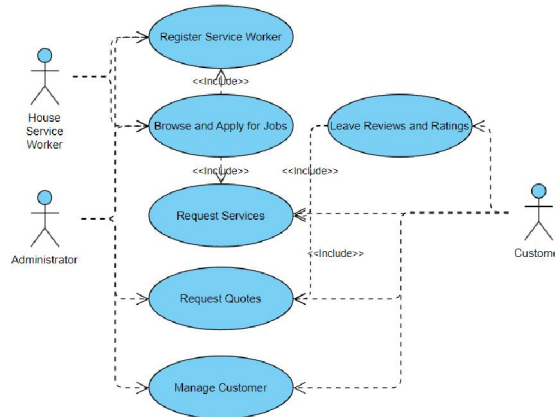


Fig. 2. Use-case diagram

Fig. 2 shows the design use-case diagram. It shows the main interactions between the users and the ePortal app. The Home Service Worker actor will register a new profile on the ePortal app by providing personal information, qualifications, certifications, and a portfolio of previous work experiences. The workers can also search and browse through job listings posted by Customers. They can apply for relevant jobs by submitting their application and relevant experience. In the same way, the Customer actor can register a new profile on the ePortal app by providing personal information and contact details. The customer can also post a service request with specific details about the task they need assistance with. Home Service Workers can view and respond to these service requests. The Customer actor can request a quote from Home Service Workers for a specific service. Home Service Workers can respond with their price estimates and details. The administrator plays a pivotal role in ensuring the efficient operation of the Home Service ePortal App. Their functions involve ensuring the smooth functioning of the platform, maintaining security and integrity, and user management, verification of home service workers, and providing support to users.

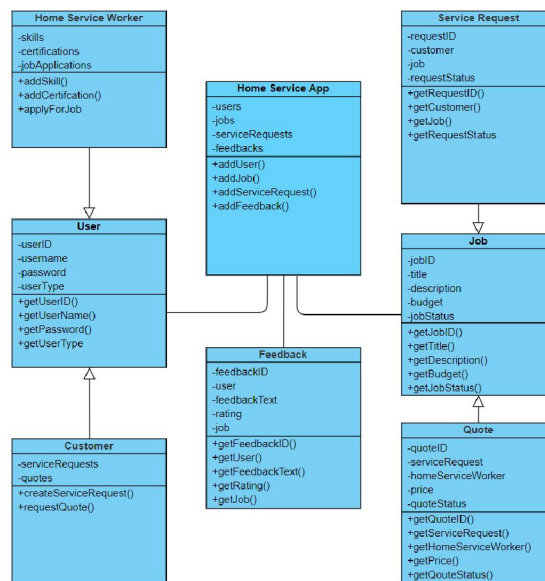


Fig. 1. Class diagram

Fig. 3 shows the class diagram to provide a visual representation of the system's architecture. The class diagram represents the key entities and their relationships within the Home Service ePortal App. It provides an overview of the

main classes and their attributes and methods. The HomeServiceApp class serves as the central point of the application and holds collections of users, jobs, service requests, and feedback. It provides methods to add new users, jobs, service requests, feedback, and comments to the system.

The User class is an abstract base class representing both HomeServiceWorkers (skilled tradespeople) and Customers. It includes common attributes such as userID, username, password, and userType (denoting the role of the user). Subclasses, such as HomeServiceWorker and Customer, inherit from this class and can have additional attributes and methods specific to their roles. The HomeServiceWorker class represents skilled tradespeople who offer services through the platform. It includes attributes for skills and job applications. Methods are provided to add skills, and apply for jobs. The Customer class represents individuals or businesses seeking household services. It includes attributes for service requests and quotes (price estimates). The class provides methods for creating home service requests and requesting quotes from HomeServiceWorkers.

The Job class represents job listings posted by Customers on the ePortal. Attributes include jobID, title, description, budget, and jobStatus (indicating the status of the job). The class includes methods to access the job details. The ServiceRequest class represents service requests made by Customers for specific tasks. Attributes include requestID, the Customer who made the request, the associated Job, and requestStatus (denoting the status of the request). Methods are provided to access the details of the service request. The Quote class represents quotes provided by HomeServiceWorkers in response to service requests. It includes attributes for quoteID, the associated ServiceRequest, HomeServiceWorker, price, and quoteStatus (indicating the status of the quote). Methods are provided to access the details of the quote.

Lastly the Feedback class represents feedback provided by users about their experiences with each other. Attributes include feedbackID, the User who gave the feedback, feedbackText (containing the feedback message), and rating (denoting the user's rating). Methods are provided to access the feedback details.

In the implementation of the Home Service ePortal App, object-oriented programming (OOP) techniques are employed to model real-world entities as classes with attributes and methods. Classes such as User, HomeServiceWorker, Customer, Job, ServiceRequest, Quote, and Feedback are created, encapsulating their respective functionalities. Inheritance and abstraction are utilized to establish relationships and share common behavior between classes, while polymorphism allows for customized implementations of certain methods. Data encapsulation ensures controlled access to class attributes, enhancing data security. On the other hand, the Laravel framework is used to facilitate the development process. Routes are defined to handle HTTP requests, directing them to corresponding controllers that contain the application's business logic. Eloquent models represent database tables, enabling smooth interaction with the database. Laravel's Blade templates are utilized for the frontend views, and middleware handles authentication, authorization, and other cross-cutting concerns. The framework also provides tools for form validation, error handling, and database relationships. By combining OOP principles and the Laravel framework, developers create a well-structured and efficient Home Service ePortal App, enhancing maintainability, scalability, and user experience.

4.3 The Home Service ePortal for Skilled Trades and Household Services

The following gives the important details of the resulting Home Service ePortal for Skilled Trades and Household Services. The homepage of the Home Service ePortal App, as shown in Fig. 4, welcomes users with an intuitive and user-friendly interface. It prominently features four essential links, making it easy for users to access key functionalities. The "Request Quote" link allows Customers to request price estimates for specific services, ensuring transparent communication with Home Service Workers. The "Request Home Service" link empowers Customers to seek skilled tradespeople for household services, streamlining the process of finding reliable Home Service Workers. The "Contact Us" link provides a direct means for users to reach out to the platform administrators, addressing any inquiries or concerns promptly. Lastly, the "Give Feedback" link encourages users to share their experiences and rate the services they have received or provided, fostering trust and accountability within the community.

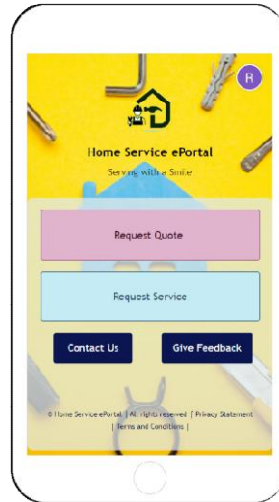


Fig. 4. Home page

The homepage serves as a gateway to essential functionalities, enhancing user engagement and making the Home Service ePortal App a convenient and efficient platform for connecting Customers and Home Service Workers.

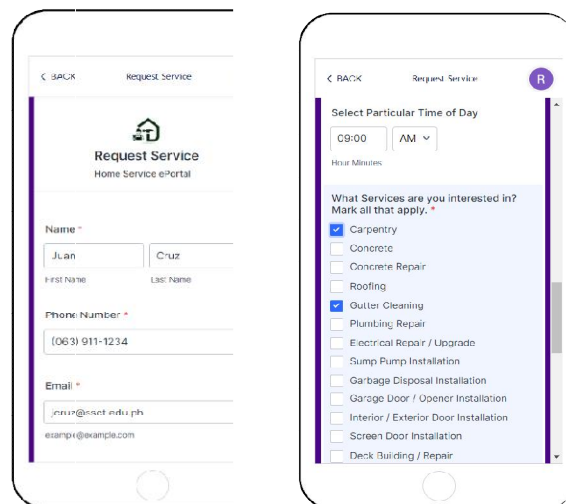


Fig. 5. Request service page

In Fig. 5, The Request Service page in the Home Service ePortal App provides a user-friendly interface for Customers to submit their service requirements effortlessly. Users can input their name and contact number, ensuring smooth communication with Home Service Workers. Date and time fields allow Customers to specify their preferred service schedule accurately. Additionally, a range of service types is available for Customers to select, ensuring precise indication of their specific needs, whether it's plumbing, electrical, gardening, or other household services. This streamlined process makes it easy for Customers to submit their service requests and find suitable Home Service Workers efficiently.

Fig. 6 shows the Request Quote page within the Home Service ePortal App offers Customers to request price estimates for their desired services. Customers can conveniently provide their name and contact number, facilitating effective communication with Home Service Workers. Moreover, the page allows Home Service Workers to input estimations of the cost for each specific service they require, ensuring transparency and clarity during the quotation process. Additionally, the details of the Home Service Worker making the quotation are presented, enabling Customers to review the provider's profile and credibility before finalizing their decision. This seamless integration of information empowers Customers to make informed choices when selecting Home Service Workers for their various needs.

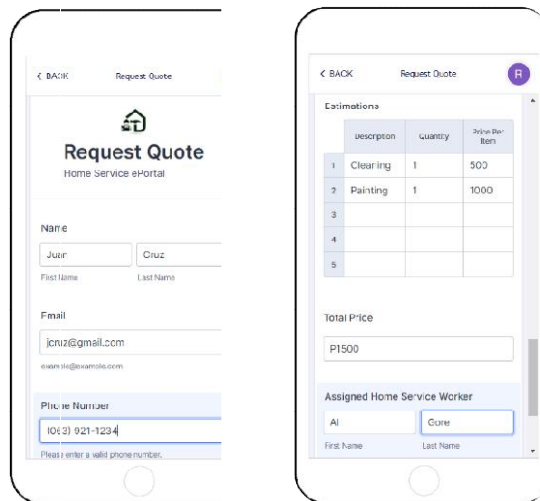


Fig. 6. Request quote page

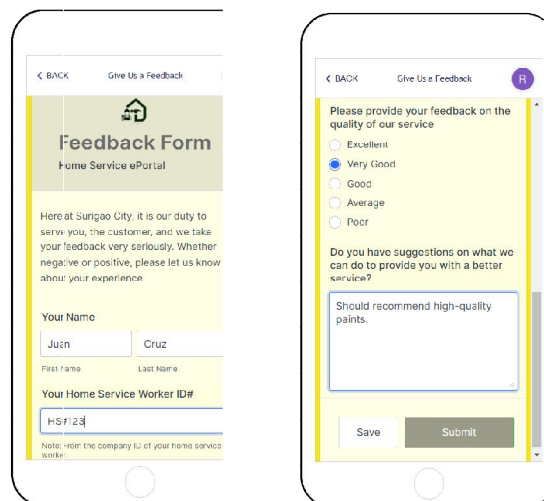


Fig. 7. Request feedback form

The Feedback form in the Home Service ePortal App, as shown in Fig.7, provides a valuable platform for Customers and Home Service Workers to share their experiences and contribute to the continuous improvement of the platform. Customers can input their name and Home Service Worker's ID, ensuring that the feedback is associated with the right service provider. The feedback rating system allows Customers to express the quality of service received, ranging from poor to excellent, offering valuable insights to others considering the same Home Service Worker. Additionally, a suggestion box is available, encouraging Customers to provide constructive feedback and suggestions on how the service can be further improved. This interactive feedback mechanism fosters transparency and accountability, allowing both Customers and Home Service Workers to learn from each other's perspectives and elevate the overall service standards on the ePortal.

4.4 System Evaluation

The system evaluation as perceived by Customers and Home Service Workers, shows favorable ratings across usability, relevance, functionality, maintainability, and portability. In terms of usability, the platform receives a rating of 4.7 out of 5.0, with its user-friendly interface and ease of navigation, allowing both Customers and Home Service Workers to effortlessly access functionalities. Relevance is scored at 4.6 out of 5.0, indicating that the system effectively addresses the specific needs of users, ensuring that service requests match the skills and expertise of Home Service Workers. Functionality receives a commendable rating of 4.5 out of 5.0, demonstrating the platform's ability to efficiently perform essential tasks, such as job applications, service requests, and feedback submissions. The maintainability rating

of 4.5 out of 5.0 underscores the platform's robustness and ease of maintenance, contributing to its long-term sustainability. Furthermore, the system's portability is highly regarded with a rating of 4.6 out of 5.0, highlighting its adaptability across various devices and platforms, ensuring seamless access for both Customers and Home Service Workers.

V. CONCLUSION

In conclusion, the Home Service ePortal has been successfully created, demonstrating the effective application of object-oriented analysis and design principles in its development. The utilization of the Laravel framework further enhanced the implementation process, resulting in a well-structured and efficient platform. The ePortal has met its project objectives, providing a user-friendly interface that connects Customers with skilled Home Service Workers seamlessly. The platform's functionalities, including service requests, quotes, feedback, and more, have been well-received by both Customers and Home Service Workers, indicating its relevance and usefulness. The system evaluation conducted by users reveals an impressive general average of 4.6 out of 5, showing high satisfaction levels with the platform's usability, relevance, functionality, maintainability, and portability.

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