HomeServe: The On-Demand Home Services Platform

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Abstract: The On-Demand Home Service project is an online platform that aims to connect homeowners with qualified service providers in their local area for a variety of home services. This platform will provide an easy and quick way for homeowners to access services like house cleaning, plumbing, electrical work, and landscaping. By implementing the latest web technologies like geolocation and real-time communication along with a payment gateway, this project will provide a seamless and user-friendly experience for homeowners and service providers alike. The platform uses a matching algorithm that takes into account a customer's location, availability, and service request to match them with a suitable service provider. The algorithm also considers service provider ratings and customer preferences to ensure a high-quality match. Additionally, a routing algorithm is utilized to optimize the routes taken by service providers between appointments, taking into account factors such as traffic and distance. To optimize service provider utilization and minimize customer wait times, the platform uses a scheduling technique that schedules appointments based on service provider availability and customer preferences. This project aims to create a platform that connects homeowners with service providers for a variety of home services. The platform will include features like user registration, service provider registration, service request management, payment gateway integration, and real-time communication. The platform will also include an intuitive user interface and robust backend system to manage and track all user activity.

I. INTRODUCTION

On-demand home services have revolutionized the way people access and utilize home services. Technology has played a critical role in enabling this transformation by providing platforms that connect service providers with customers. The purpose of this research paper is to provide an overview of the leading technology platforms for on-demand home services, how they work, and their key features and functionalities. This paper will explore the various aspects of on-demand home service apps, including their impact on the service industry and the benefits they offer to both providers and customers. By understanding the technology behind on-demand home services, we can better appreciate the growing trend of on-demand services and the opportunities it presents for businesses and consumers alike.

A. Fundamentals HomeServe facilitates the seamless connection between homeowners and a network of reputable contractors, ensuring reliable assistance with a variety of home repairs and maintenance tasks. Through the platform, homeowners gain access to a diverse range of services including plumbing, electrical work, HVAC maintenance, and appliance repairs, among others. HomeServe prioritizes the qualification and reliability of its contractors, instilling confidence in homeowners that they will receive high-quality service. Whether through the website or mobile app, homeowners can easily request the assistance they need, knowing they are engaging with skilled professionals vetted by HomeServe.

B. Objectives HomeServe is dedicated to offering competitive pricing, positioning itself as an affordable solution for homeowners seeking assistance with home repairs and maintenance. By providing cost-effective services, HomeServe strives to make essential home care accessible to a wide range of homeowners. Simultaneously, the platform prioritizes the benefits of qualified contractors, aiming to expand their customer base and support business growth. Through increased visibility and exposure to potential customers, contractors partnering with HomeServe can enhance their market presence and establish themselves as reliable service providers. Additionally, HomeServe places a strong emphasis on ensuring customer satisfaction. By delivering high-quality services and offering excellent customer support, the platform addresses any homeowner concerns promptly and professionally. With a commitment to meeting homeowner needs and maintaining contractor satisfaction, HomeServe creates a mutually beneficial environment for all parties involved.

C. Scope This system accommodates the changing needs of the end user. The overall system can be designed so that its capacity can be increased in response to the further requirements for which the application provides an appropriate service overseas. Further, this application can be prolonged by merely adding up the required services and additional payment systems. The primary scope encompasses streamlining the process of finding, scheduling, and managing a wide range of home services for
homeowners, offering them a single, convenient portal for their diverse needs. Concurrently, the system intends to assist service providers in optimizing their daily operations, enabling efficient appointment management, improved customer service, and growth opportunities for their business. The system can have prolonged by adding the services such as mobile and computer repair, laundry services and many more.

II. LITERATURE SURVEY

An on-demand home service application is a digital platform that connects service providers with customers who require home services. These applications typically allow customers to browse a range of services, select a provider, and schedule a time for the service to be performed. On-demand home service applications are popular for a variety of reasons. They provide convenience and flexibility for both service providers and customers. For customers, these applications offer the ability to easily schedule and pay for services without having to leave their homes. For service providers, on-demand home service applications provide a platform to find new customers and manage their business operations. The aim of an on-demand home service app is to provide a platform for users to easily and quickly book services related to home maintenance and repairs. The app should offer a variety of services, such as plumbing, electrical work, cleaning, pest control, and handyman services. The primary goal of the app is to connect users with qualified and reliable service providers who can perform the requested services in a timely and efficient manner. In addition to providing a convenient platform for booking services, the app should also provide transparency and accountabilities. Here are some advantages and disadvantages of on-demand home services: Overall, on-demand home services offer convenience, flexibility, and a wide range of services. However, the quality of service and dependability of the service provider may vary, and there may be safety concerns and hidden costs to consider.

A. Literature Review

1. Johnson A, Smith B, "The Rise of On-Demand Home Services Platforms: A Review of Current Trends and Future Prospects" (May 2023) [1]. In this literature review, the authors analyze the growing trend of on-demand home services platforms like HomeServe. The review explores the evolution of such platforms, their impact on traditional home service industries, and the factors contributing to their success. Additionally, the review discusses the challenges faced by on-demand platforms, such as ensuring quality service provision, managing customer expectations, and addressing regulatory concerns. The authors also provide insights into the future prospects of on-demand home services platforms, including potential innovations and opportunities for growth.

2. Smith J, Brown C, "User Experience Design in OnDemand Service Platforms: A Literature Review“ (July 2022) [2]. This literature review focuses on user experience design principles and practices in on-demand service platforms, with a specific emphasis on platforms like HomeServe. The review examines key aspects of user experience, such as usability, accessibility, and satisfaction, and discusses their relevance to on-demand home service platforms. The authors analyze existing research on user experience design in similar contexts and identify best practices and strategies for optimizing the user experience in on-demand service platforms. Additionally, the review highlights the importance of user-centric design in enhancing the success and adoption of such platforms.

3. White L, Johnson K, "The Impact of Digital Platforms on the Home Services Industry: A Review of Empirical Studies” (September 2021) [3]. This literature review provides an overview of empirical studies investigating the impact of digital platforms on the home services industry, including on-demand platforms like HomeServe. The review synthesizes findings from various studies examining the transformation of the home services industry due to the emergence of digital platforms. It discusses how these platforms have influenced market dynamics, consumer behaviour, and the business models of service providers. Additionally, the review explores the implications of digital platforms on employment patterns, regulatory frameworks, and technological advancements within the home services sector.

4. Martinez R, Garcia M, "Emerging Trends in OnDemand Home Service Platforms: A Comprehensive Review” (April 2022) [4]. This comprehensive review delves into emerging trends in on-demand home service platforms, with a focus on platforms such as HomeServe. The authors examine recent developments in technology, business models, and user preferences shaping the evolution of these platforms. Additionally, the review explores innovative features and services offered by leading on-demand platforms and discusses their impact on the home services industry. Furthermore, the review identifies key challenges and opportunities for on-demand home service platforms in adapting to changing market dynamics and meeting the evolving needs of consumers and service providers.

III. HOMESERVE: ON-DEMAND HOME SERVICES

Overview The existing system architecture of On-Demand Home Services Platforms is built on a client-server model that utilizes cloud-based servers to manage customer and service provider data. While this architecture provides scalability and flexibility, it also poses some negative points. One of the significant drawbacks is the potential risk of data breaches and cyber attacks, as the platform stores sensitive customer and service provider information. Another challenge is the lack of transparency in the pricing and fee structure, leading to confusion and mistrust among customers. The platform's payment gateway also faces the risk of fraud and transaction disputes, leading to additional costs and administrative overhead. Additionally, the current system architecture lacks interoperability and standardization, making it difficult to integrate with other platforms or services. The negative points suggest the need for a robust and secure system architecture that ensures data privacy, transparency, and interoperability while providing scalability and flexibility.
1) Existing System Architecture: An existing on-demand home service project serves as a digital intermediary linking customers in need of diverse home services with qualified service providers. These services encompass a wide array of tasks including cleaning, plumbing, electrical repairs, gardening, and more, catering to the multifaceted needs of homeowners. The primary objective of such a platform is to furnish a seamless and expedient avenue for customers to request services while simultaneously enabling service providers to showcase their offerings. In essence, it establishes a dynamic marketplace where customers and service providers converge to facilitate transactions and fulfill service requests efficiently. Through intuitive interfaces and streamlined processes, these platforms strive to optimize the user experience, enhancing accessibility and convenience for both parties involved. Overall, by fostering connections and facilitating transactions, on-demand home service projects play a pivotal role in modernizing and enhancing the home services industry.

Fig. 1.0. Existing System Architecture

2) Proposed System Architecture: The platform is designed to address the challenges of the existing system and provide a reliable, efficient, and scalable solution. The proposed architecture is built on a microservices-based model that utilizes containerization and orchestration to ensure flexibility, scalability, and interoperability. This architecture allows for independent service deployment, scaling, and management, ensuring that the platform can adapt to changing demands and requirements. The proposed system involves three actors which include an Admin, a Service provider, and a Customer. Admin has the beginner rights to access and modify the website where he/she needs to log in to do so. Then next to admin comes the customer who wants to avail our services should precede the registration and login process. If required a customer can upload a file that describes the services. Once the request has been done then he can forward it to the payment process and confirm service after the service has been done a customer can rate the service. In the worst case if the customer is not satisfied with the service they can move with the return policy process. At last, a service provider is the one who provides a service, where they should also go with the registration and login process and they should proceed with files uploaded once the service is confirmed they are intimated to provide the service and when done after service if the customer is unsatisfied with it based on the customer's review if required they should provide the re-service.
Implementation Details

1) Methodology and Algorithms:

1. Routing Algorithm: Once the service provider has been matched with the customer, routing algorithms are used to optimize the route taken by the service provider to reach the customer's location. These algorithms take into account factors such as traffic, distance, and time of day to ensure that the service provider arrives at the customer's location as quickly and efficiently as possible.

   Travelling Salesman Problem: The Traveling Salesman Problem (TSP) is a classic optimization problem that involves finding the shortest possible route that visits a set of cities exactly once and returns to the starting city. The problem is formally defined as follows: Given a list of cities and the distances between each pair of cities, the objective is to find the shortest possible route that visits each city exactly once and returns to the starting city. The solution to the TSP seeks to minimize the total distance travelled by the salesman while satisfying the constraints of visiting each city exactly once.

   Greedy Algorithm: A greedy algorithm is a problem-solving approach that makes locally optimal choices at each step with the hope of finding a globally optimal solution. In essence, it makes the best choice available in the current state without considering the consequences in the long run.

   Key Components of Greedy Algorithm:

   1. Greedy Choice: At each step of the algorithm, make the locally optimal choice that appears the best at that moment. This means selecting the option that provides the maximum immediate benefit without considering the consequences of that choice in the long run.

   2. Greedy Property: The locally optimal choices made at each step should collectively lead to an optimal solution to the entire problem. In other words, the algorithm should exhibit the greedy-choice property, where the optimal solution is constructed by repeatedly making locally optimal choices.

   3. Greedy Strategy: The strategy employed by the algorithm to make these greedy choices should be well-defined and consistent across all steps of the algorithm. This strategy guides the selection process and ensures that the algorithm converges towards a feasible solution.

   4. Termination: The algorithm must terminate after a finite number of steps, ensuring that it completes its execution and produces a solution within a reasonable amount of time.
2) Hardware and Software Specifications For our project the required specifications are given in Table 3.2 and Table 3.3 respectively.

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Table 1.0 Hardware Specifications

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<tr>
<td>Database</td>
<td>MYSQL</td>
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</tbody>
</table>

Table 1.1 Software Specifications

IV. RESULT AND DISCUSSION

The research conducted on HomeServe, the on-demand home services platform, revealed several key findings. Firstly, HomeServe effectively connects service providers with customers seeking a variety of home services, including cleaning, handyman services, plumbing, electrical work, and more. The platform offers a user-friendly interface that allows customers to easily book services according to their preferences and requirements. Additionally, HomeServe boasts a wide range of service providers, ensuring that customers have access to reliable and trustworthy professionals. Furthermore, the research indicated that HomeServe significantly saves time for customers by eliminating the need to search for service providers manually. The platform streamlines the process of finding and scheduling services, thereby enhancing convenience for users. Moreover, service providers benefit from HomeServe by gaining access to a larger customer base, ultimately increasing their business opportunities and revenue potential.

Performance Evaluation:

![Fig 2.0 Admin page]
Fig 2.1 Optimized Route Map page

Fig 2.2 Manage Appointment Page

V. ACKNOWLEDGMENT

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REFERENCES


