

Fixora: Smart Scalable Home Services

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Abstract

Fixora is a proposed online platform that intends to connect urban-based house owners with plumbing, electricity, cleaning, or other home service providers. The current process for finding a reliable and trustworthy home service provider is complicated and not transparent. Most approaches are based on social networks or local directories that do not ensure quality or offer any feedback after the service is done. The Fixora application allows its users to find and hire the closest available service provider by considering their location, availability, and past reviews. The software also provides the customer with the ability to view the status of their order, leave a review, and receive notifications about their order. Trust and reliability are achieved through a robust role management system and a transparent rating system for both sides of the platform. The database and APIs were designed in a way that allows simultaneous access to the application by thousands of users. It is anticipated that the proposed platform will help thousands of individuals to post their requirements for home services while enabling the providers to get a steady stream of customers.

Keywords—home services, service recommendation, role-based access, rating system, scalability, intelligent allocation

I. Introduction

The tempo of modern life has increased to such an extent that even the most routine matters of home maintenance can no longer wait for a neighbor to recommend a service provider. Today, people want a leaking tap, a faulty switchboard, or an appliance repaired with the same speed and certainty as for a food delivery or a taxi service. Yet, the home-services market has failed to develop a digital infrastructure commensurate with the needs of the modern consumer. The long tail of fragmented word-of-mouth recommendations, local classifieds, and superficial online research rarely gives the customer a sense of control over the hiring process, let alone an assurance of service quality.

While the home-services market may seem like a natural fit for independent providers, the absence of an integrated digital platform makes it challenging for both providers and customers to navigate the process. On the demand side, one may spend hours scouring classifieds, websites, or social media to find someone willing to take on the job. At the same time, the prospective provider has little opportunity to reach out to potential customers outside of their local network. The inability of both sides to meet halfway is undermining the market dynamics: with many qualified workers being forced to operate within a limited geographic area and customers struggling to identify competent providers within their budget, the entire system fails to deliver on its potential.

Fixora aims to address the shortcomings of the existing home-services market by introducing a web-based platform where customers can search and hire verified providers according to their individual needs. Rather than relying on chance encounters or local word-of-mouth, Fixora puts an

emphasis on a systematic allocation of tasks based on the customer's location, the availability of providers, and their overall rating. In terms of its internal structure, the proposed application will be based on the use of role-specific dashboards, a rating system, and the principle of least privilege to ensure its efficient work at a large scale, as well as the best security and privacy levels. By enabling both sides of the transaction to leave feedback and establish long-term relationships, Fixora will create a self-regulating ecosystem that promotes quality on both ends of the transaction.

While Fixora focuses on the short-term challenges of finding qualified providers and gaining the trust of the customer, its underlying technical infrastructure is designed to accommodate the long-term growth of the platform. In the context of the changing consumer behavior, where more and more homeowners are looking to hire professionals on an as-needed basis, the ability to operate at an enhanced scale becomes a necessity. Fixora's capacity to welcome a growing number of customers and service providers without compromising on the user experience will enable it to evolve with the market, adopting new categories of service and increasing the overall transaction volume.

II. Related Work

Ezhilnilavan A *et al.* [1] proposed a local community service provider system based on a machine learning framework that recommended the most reliable local service providers in accordance with the users' preferences, ratings, and reviews. The framework uses supervised machine learning and review mining to improve the accuracy of the recommended options. Moreover, the framework suggests provider verifica-

tion and authentication to increase the level of user trust. The discussed ideas are critical in developing the Fixora project because it aims to build a community where the most trustworthy local home service providers can be found and recommended to the users.

Amar Khelloufi *et al.* [2] proposed a context-aware service recommendation system for the social Internet of Things to recommend services based on users' locations, preferences, and service reviews. The framework uses factorization techniques to improve the accuracy of recommendations. The approach demonstrates a better recommendation system than conventional methods. Fixora can benefit from this technique by recommending the best local service providers based on the customers' context.

Wenmin Lin *et al.* [3] proposed a deep neural collaborative filtering-based service recommendation method with multi-source data for smart cloud-edge collaboration applications that enhances service recommendations by implementing a deep neural collaborative filtering technique. The framework reduces data sparsity and improves service prediction by considering cloud-edge computing. Besides, the framework is scalable to serve many users. This approach can be implemented in Fixora to recommend the best service providers during peak hours.

Lina Wang *et al.* [4] proposed a diversified and scalable service recommendation framework that improves the scalability and diversity of service recommendations. The framework uses indexing techniques to ensure it delivers accurate recommendations to a large number of users. It also enhances the diversity of the recommended services to ensure users choose their preferred service providers. This approach is essential for the Fixora platform because it ensures the framework provides accurate recommendations to a large number of customers.

Yashaswi Sharma *et al.* [5] proposed a hybrid recommendation system using a graph neural network and an NLP-based trend-aware filtering approach that enhances recommendation accuracy and diversity while addressing the cold-start problem. The framework also improves the recommendation of similar items and services based on users' preferences and behaviors. This approach can be incorporated into Fixora to ensure the framework can recommend appropriate local service providers to first-time users.

Haoyang Wan *et al.* [6] proposed a lightweight privacy-preserving IoT service recommendation framework based on the learning-to-hash model that enhances privacy preservation during service recommendations while maintaining accuracy. The framework uses a hash model to ensure it is lightweight while being effective in preserving users' privacy. This approach can be applied in Fixora to ensure the framework is privacy-preserving and reliable when recommending local service providers to customers.

Damilola Alao *et al.* [7] proposed an IoT service prediction and recommendation framework that predicts users' service requests and recommends the most appropriate services based on their Quality of Service. The framework improves the availability of services and ensures it utilizes the avail-

able resources efficiently. It also enhances the response time of service providers. This approach can be applied in Fixora to ensure the framework recommends the most appropriate local service providers while optimizing the utilization of resources.

Lingyan Zhang *et al.* [8] proposed HRec: Hierarchical Distillation for Enhanced LLM-based Recommendation Systems that enhances the performance of large language models in generating recommendation results. The framework improves recommendation accuracy by analyzing users' preferences and reviews of the service providers. In addition, it enhances the explainability of the recommendation results to improve user trust. This approach can be used in Fixora to ensure the framework provides accurate and reliable service recommendations to customers.

Ramya S *et al.* [9] proposed Local Hive: a blockchain-based microservices platform for AI-driven on-demand local service aggregation that enhances the aggregation of local services by implementing blockchain and artificial intelligence. The framework improves the reliability of the service providers by verifying their credentials and employing geofencing to ensure they offer services within a specific location. In addition, it improves the security of the service booking process by implementing a blockchain-based payment system. This approach can be used in Fixora to ensure the framework offers reliable and secure local service recommendations to customers.

Md. Sayeem Rahman *et al.* [10] proposed an e-commerce-based smart recommendation system that recommends products to customers based on their preferences and purchasing behavior. The recommendation system improves user engagement by providing accurate recommendations. This approach can be used in the Fixora platform to recommend the most appropriate local service providers to customers.

The NLP-based review analysis [11] is essential in implementing the Fixora platform because it highlights the importance of analyzing customers' reviews to enhance the performance of the recommendation system. The review analysis helps improve the accuracy of the recommendation results and increases user trust in the framework. In addition, it highlights the importance of using the results of the review analysis to enhance provider ranking and service quality. These concepts are essential in developing the Fixora platform because they ensure the framework offers high-quality local service recommendations to customers.

The hybrid recommendation approaches [12] are critical in improving the accuracy of the recommendation system. The approaches combine collaborative filtering, deep learning, context-aware recommendation systems, graph neural networks, privacy preservation, and explainable AI to enhance the performance of the recommendation system. These approaches are critical to developing the Fixora platform because they ensure that the framework offers reliable and accurate local service recommendations to the customers, making them more effective in today's world.

III. Methodology Used

1. **User Registration and Authentication:** The Fixora system will enable users, service providers, and administrators to register and log in with authorized authentication credentials to guarantee confidentiality in fixing services.
2. **Service Provider Management:** Authorized service providers will configure their data in the system, including their service category, location, availability, cost, and experience. The admin panel will approve the verified service providers to manage the system effectively.
3. **Intelligent Service Allocation:** Whenever a user posts a service request in the system, the Fixora system will recommend the best suitable service provider depending on the job location, service providers' availability, customer's reviews, and preferences using hybrid recommendation algorithms.
4. **Booking and Real-Time Tracking:** The Fixora online platform will enable users to book services online. It will also allow customers to track their service request progress through notification alerts. The notification function will also remind customers of the assigned professional, service completion, and payment capture.
5. **Rating and Recommendation:** The Fixora system will capture customers' ratings and reviews of the assigned professional after completing the requested service. The review feature will further recommend the best professional depending on the customer's location, reviews, and service's overall performance.
6. **Scalability and Future Enhancement:** The Fixora system will be designed to support multiple users and handle numerous service requests at a time. Additional features such as blockchain technology, artificial intelligence, and the Internet of Things (IoT) can be integrated into the system for it to perform more efficiently.

IV. Expected Results and Conclusion

A. Expected Results

- The above Fixora methodology system is expected to result in a reliable and efficient digital platform for facilitating and managing home services such as house cleaning, plumbing, and electrician services by recommending appropriate service providers through hybrid recommendation algorithms.
- The proposed Fixora system is anticipated to shorten the distance between the customer and the service provider by allocating services according to the user's location, service provider experience and availability, and customer's reviews.

- The Fixora design is expected to enhance transparency in fixing services by allowing users to book services online, track their service request status, receive notification alerts, and provide feedback to the service provider using a reliable authentication system.
- The new system is scalable to serve many users and to process thousands of service requests in a short time. The next level of development, including artificial intelligence and blockchain technology, will make the Fixora platform even more efficient in providing safe and intelligent digital services.

B. Conclusion

- The Fixora system is an innovative and smart digital platform that will enable users to book home services such as house cleaning, plumbing, and electrician while providing feedback on the overall experience of the service provider. The system recommends the best professional based on the user's location, service provider availability, and customer feedback, thereby enhancing service delivery efficiency.
- The Fixora design will incorporate features such as user registration, service provider authentication, a smart recommendation algorithm, and real-time tracking to enhance transparency, efficiency, and accessibility of fixing services. In addition, the system can include future technologies such as artificial intelligence and blockchain to ensure smart and secure digital services.

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