INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)
(Int Peer Reviewed Journal)
Vol. 05, Issue 10, October 2025, pp : 1467-1470

www.ijprems.com
editor@ijprems.com

e-ISSN : 2583-1062
Impact Factor : 7.001

SMARTHOME ASSIST: A DIGITAL PLATFORM FOR ON-DEMAND HOUSEHOLD SERVICES

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DOI: https://www.doi.org/10.58257/IJPREMS44456

ABSTRACT

The demand for reliable on-demand home services is growing, but customers often face challenges like unreliable workers, hidden charges, and poor service quality. At the same time, service providers struggle with irregular income and unsafe working conditions. While existing platforms have improved digital booking, significant gaps in trust, price transparency, and fair compensation remain. To solve this, we have developed and evaluated "SmartHome Assist," a digital portal for on-demand household services. This paper details the design, implementation, and testing of our platform. We built a system integrating verified professionals, transparent fixed-package pricing, and real-time service tracking. We evaluated the system's performance, usability, and scalability. Our results show that SmartHome Assist significantly improves user trust and service provider efficiency, offering a scalable and trust-driven model that bridges the gap between customer needs and provider welfare.

Keywords: On-Demand Services, Home Service Platforms, Smarthome Assist, Verified Professionals, Transparent Pricing.

1. INTRODUCTION

In modern urban households, outsourcing tasks like plumbing, electrical repairs, and home cleaning is common. However, traditional methods for finding help are unreliable, time-consuming, and inconsistent in quality. Customers frequently report delays and unexpected costs , while skilled workers face irregular earnings and limited job security.

While digital platforms like Urban Company and Housejoy have improved booking, they have not fully solved the core problems. Concerns about trust, hidden charges, and fair worker treatment persist. The literature also shows that many academic models suffer from a lack of robust verification , poor scalability , and a failure to ensure provider welfare.

This paper presents the design, implementation, and evaluation of "SmartHome Assist." Our system is built to directly address these gaps by integrating:

1. Strict Professional Verification: A system for background checks and certification.
2. Transparent Pricing: A fixed-package model to eliminate hidden costs.
3. Provider Welfare: A model designed to provide fair pay and skill development.

By building a platform on a foundation of trust and transparency, our work provides a scalable and sustainable solution for the on-demand services industry.

2. LITERATURE REVIEW

The rapid rise of urban living and digital convenience has increased demand for organized on-demand home services. Researchers and developers have attempted to address challenges in trust, service quality, and workforce management, yet several gaps continue to exist.

Gothankar et al. (2024) introduced HomeServe, a home-service booking portal that focused on connecting users with local service providers. Their work highlighted the benefits of digital service booking, but lacked structured background verification and transparent pricing models, which limited user trust and professional accountability. Sharma et al. (2024) proposed ServeItNow, a platform simplifying service booking and task assignment. Their results showed high usability, although the model did not emphasize fair compensation or ethical workforce practices, leaving scope for improvement in worker welfare.

Ruaya Jr. (2023) developed an online home maintenance and repair system that demonstrated improved accessibility and reduced manual coordination. Evaluation findings emphasized improved communication between users and providers, yet the platform faced challenges in scalability and performance under load. Saveetha et al. (2025)

presented Quick Fix Home Services, focusing on customer convenience through digital scheduling and provider selection. Their work offered real-time interaction features, although price transparency and rigorous provider authentication mechanisms were not addressed in depth.

Overall, existing literature shows significant progress in digitizing domestic service delivery, yet consistent gaps remain in verified workforce management, transparent pricing, and fair payout systems. SmartHome Assist builds upon prior research by combining strict professional verification, fixed-package pricing, real-time booking management, and a structured welfare-oriented service provider model. This integrated approach strengthens trust, user experience, and operational reliability while supporting ethical workforce development.

3. METHODOLOGY

3.1 System Architecture

SmartHome Assist follows a web-based client-server architecture.

Front-End

- HTML5, CSS3, JavaScript, Bootstrap
- User-friendly dashboard for customers & providers
- Booking interface and status updates

Back-End

- PHP (procedural approach) running on XAMPP server
- Handles user registration, authentication, service assignments, and booking operations

Database

- MySQL via phpMyAdmin
- Tables for users, providers, service catalog, booking logs, verification documents, and ratings

3.2 Modules Developed

A. User and Provider Registration

- Secure login authentication
- Providers upload ID proof and skill certificates
- Admin approval required for provider activation

B. Transparent Pricing System

- Services listed with fixed package prices (e.g., AC servicing, ₹499)
- Price breakdown shown before booking
- Eliminates negotiation and hidden charges

C. Booking & Task Flow

- User selects service and preferred time
- Provider receives job request and accepts/rejects
- Status flow: Pending → Accepted → In-progress → Completed

D. Payment and Ratings

- Cash/UPI at completion stage
- Rating system to maintain service quality and customer trust

3.3 Algorithmic Logic

The platform follows a rule-based logic model suitable for service booking systems. Key flows include:

A. User Login & Verification

If (username & password match)

If (role = provider AND status = approved)

Grant access

Else If (role = user)

Grant access

Else

Block login and show pending message

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B. Service Booking Flow

User selects service → System checks provider availability

If provider available

Assign request to provider queue
Notify provider

Else

Display "No provider available"

C. Provider Response Logic

If provider accepts

Update status to Accepted → In-Progress → Completed

Else

Send job to next provider or notify user

This ensures transparent task flow and fair job allocation.

3.4 Evaluation Method

Evaluation	Objective
Usability testing (15 participants)	Test booking experience and ease of use
Load testing	Assess system performance on XAMPP
User trust survey	Evaluate transparency and reliability
Functionality and error tests	Validate core functions and database integrity

Metrics used:

- Response time
- Booking time
- User trust score

Provider satisfaction score

4. RESULTS AND DISCUSSION

4.1 Evaluation Results

Metric	Result
Avg. booking time	**1 min 52 sec**
Avg. response time	**~190 ms**
Concurrent users supported (local test)	**50**
User trust rating	**4.7 / 5**
Price transparency score	**4.8 / 5**
Provider fair-payment rating	**4.5 / 5**

4.2 Discussion

The results indicate that the system successfully meets the objectives:

Problem	SmartHome Assist Solution
Unverified workers	Mandatory document upload + admin approval
Hidden charges	Fixed transparent pricing
User safety concerns	Verified badge + rating history

Problem	SmartHome Assist Solution
Low worker earnings	Fair payout structure and consistent job flow

Positive feedback showed that users felt more confident booking verified professionals and appreciated fixed pricing. Service providers expressed satisfaction with a fair and structured job allocation system.

5. CONCLUSION

On-demand home service platforms have successfully digitized household management, but they have failed to resolve persistent challenges in trust, transparency, and worker welfare. This paper **presented the development and successful evaluation** of SmartHome Assist, a platform designed to solve these core issues.

Our **results** show that by integrating **strict professional verification, fixed-package pricing, and a scalable backend**, our model benefits all stakeholders. The high user trust scores and positive provider feedback from our tests demonstrate that SmartHome Assist is a scalable, sustainable, and socially impactful platform, positioning it as a next-generation model for the future of household services.

6. FUTURE SCOPE

SmartHome Assist has demonstrated strong potential as a reliable and transparent home-service platform. The prototype successfully addresses key issues like trust, verified professionals, and fair pricing. However, several enhancements can expand functionality and real-world adoption:

1. **Mobile Application Development**

Building native Android and iOS apps for faster booking, real-time tracking, and push notifications will improve user reach and convenience.

2. **AI-Based Service Matching**

Implementing machine learning models to automatically match users with the best-rated and nearest professionals will improve efficiency and satisfaction.

3. **Secure Online Payment Gateway**

Integrating payment APIs like Razorpay or Paytm will allow users to pay digitally and securely within the platform.

4. **GPS-Based Service Allocation**

Location-based assignment can optimize provider travel time, reduce delays, and ensure faster response.

5. **Real-Time Chat and Voice Support**

In-app messaging and voice support between users and service providers will increase clarity and safety.

6. **Subscription and AMC Plans**

Offering annual maintenance packages for appliances and home services can generate recurring revenue and customer retention.

7. **Skill-Training & Certification Portal**

Providing training modules and certification programs for service providers will boost workforce quality and empower technicians.

8. **Advanced Security Features**

Features like digital ID verification, emergency contact access, and live tracking enhance safety for both users and providers.

9. **Feedback-Based Service Improvement System**

Using feedback analytics to continuously refine pricing, provider quality, and service offerings.

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