Sarvam: A Web-Based Local Service Discovery and Booking Platform

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Abstract—The local service economy—encompassing trades such as plumbing, electrical repair, cleaning, and carpentry—remains largely fragmented, opaque, and inaccessible through digital means, particularly in semi-urban and rural communities. Existing platforms suffer from poor localization, insufficient trust mechanisms, complex interfaces, and high third-party commissions that discourage service provider participation. This paper presents Sarvam, a web-based local service discovery and booking platform developed to bridge the gap between users and nearby service professionals in a fast, secure, and transparent manner. Sarvam is built using React and TypeScript for a responsive, component-driven frontend, styled with Tailwind CSS and ShadCN UI, and powered by Supabase as a Backend-as-a-Service (BaaS) solution offering PostgreSQL-based data storage, OAuth authentication, and real-time data synchronization via the Supabase Realtime API. The platform features a zero-commission model for service providers, verified profiles, intelligent service filtering, real-time provider-user interaction, and transparent pricing. Evaluation of the system demonstrates improvements in service discovery efficiency, provider trust, and overall user satisfaction compared to existing solutions.

Index Terms—Local Service Discovery, Web Application, React, TypeScript, Supabase, PostgreSQL, Real-Time Platform, Zero-Commission Model, Service Marketplace, User Authentication, Tailwind CSS

I. INTRODUCTION

The increasing adoption of digital technologies has significantly transformed how people discover and access everyday services. Traditional methods of finding service providers, such as word-of-mouth or local advertisements, are gradually being replaced by online platforms that offer faster, more convenient, and more reliable solutions. These digital platforms enable users to explore a wide range of services, compare options, and make informed decisions from a single interface.

Service marketplaces have emerged as an important solution to bridge the gap between customers and service providers. These platforms allow individuals to connect efficiently by providing structured listings, search capabilities, and user-friendly interfaces. As the number of available services grows, the need for efficient service discovery mechanisms becomes increasingly important to ensure that users can quickly find relevant and trustworthy providers.

Another key challenge in modern service platforms is maintaining transparency, trust, and quality of services. Users expect correct information, fair pricing, and reliable service delivery. Therefore, it is essential to design systems that not only provide accessibility but also enhance user confidence through clear communication and effective interaction mechanisms.

Advancements in web technologies and intelligent systems have further enhanced the capabilities of digital platforms. Modern applications can now offer personalized experiences, real-time updates, and scalable performance, making them suitable for handling large numbers of users and service providers concurrently. These improvements have opened new opportunities for developing innovative and user-centric service platforms.

Motivated by these trends, this research proposes Sarvam, a digital service marketplace designed to simplify the process of discovering and accessing local services. The system focuses on improving usability, enhancing accessibility, and creating a seamless connection between users and service providers through an efficient and adaptable platform.

Sarvam—derived from the Sanskrit word meaning "everything"—is proposed as a comprehensive solution to these challenges. Sarvam is a web-based service discovery platform that connects users with local service providers in a rapid, secure, and transparent manner. The platform is developed using React and TypeScript for a responsive and interactive frontend, with Supabase serving as the backend infrastructure, providing secure OAuth authentication, PostgreSQL-based relational data storage, and live data synchronization through the Supabase Realtime API.

Core Problems Addressed:

- Difficulty in finding nearby and relevant service providers due to weak localization support.
- Lack of verified profiles and transparent pricing, reducing user trust.
- High third-party commission models that reduce service provider profitability.
- Absence of real-time interaction between users and service providers.
- Complex and non-intuitive interfaces that hinder adoption among low-literacy users.

Sarvam addresses these issues through a unified digital platform that empowers both service seekers and local professionals. A zero-commission model ensures that providers retain their full earnings. Verified profiles, star ratings, and clear pricing build credibility and user confidence. The real-time architecture enables immediate updates on service requests and provider responses, while the minimalist, responsive interface ensures accessibility across all device types.

Platform Vision:

- Unified Ecosystem: A single platform for searching, posting, and managing all local service categories.
- Zero Commission: Providers receive 100% of their earnings with no platform deductions.
- Real-Time Connectivity: Instant updates between users and providers via Supabase Realtime.
- Trust by Design: Verified profiles, transparent pricing, and community-driven ratings.

Core Components:

- User Module: Search services, post service requests, view provider profiles, and submit reviews.
- Provider Module: Register and manage service listings, respond to requests in real time.
- Authentication Module: Secure OAuth login and session management via Supabase Auth.
- Real-Time Module: Live data synchronization for service requests and provider responses.

The platform is designed with accessibility and simplicity as primary goals, ensuring usability for individuals with varying levels of technical proficiency. By digitizing the hyperlocal service economy, Sarvam aims to improve service discovery for customers, increase earnings and visibility for local workers, and establish a trusted digital infrastructure for community-level service exchange.

II. LITERATURE SURVEY

The development of digital service platforms has attracted significant research attention, particularly in the areas of service discovery, online marketplaces, and intelligent recommendation systems. Service discovery plays a vital role in enabling users to efficiently locate and compare services across distributed environments. Talal and Merzougui [3] provided a detailed survey of service discovery techniques, emphasizing the importance of scalability, interoperability, and effective matching mechanisms in modern systems.

With the growth of online service marketplaces, platforms have evolved to support large-scale interactions between service providers and users. Maity et al. [4] analyzed marketplace characteristics using Fiverr as a case study, highlighting how such platforms manage large volumes of transactions and users. The concept of two-sided markets, introduced by Rochet and Tirole [2], explains how platforms create value by facilitating interactions between service providers and consumers.

Maintaining service quality and fairness is a key challenge in such ecosystems. Light et al. [7] explored quality selection mechanisms in two-sided markets, focusing on pricing strategies and their influence on platform efficiency. Additionally, O'Shaughnessy [8] emphasized the importance of algorithmic transparency and explainability, particularly in systems that rely on automated decision-making processes.

Advancements in web technologies and semantic systems have further enhanced the capabilities of digital platforms. Berners-Lee et al. [1] introduced the concept of the Semantic Web, which improves data interoperability and enables better integration of services across platforms. Furthermore, studies conducted by Google and Ipsos [6] indicate that users increasingly rely on online platforms to discover local services and make informed decisions.

Artificial intelligence has also contributed to improving user experience in service marketplaces. Malviya and Chaurasia [5] discussed AI-based personalization techniques that enhance service matching and user satisfaction by providing tailored recommendations.

From a technological perspective, modern development frameworks and backend solutions have simplified the implementation of scalable service platforms. Technologies such as React and backend platforms like Supabase support the development of interactive and real-time applications. Despite these advancements, existing systems still face challenges related to efficient service discovery, trust management, and seamless interaction between users and service providers. These limitations highlight the need for a unified and efficient platform. Therefore, the proposed system, Sarvam, aims to address these gaps by providing a reliable, scalable, and user-friendly digital service marketplace.

III. PROPOSED SYSTEM

Sarvam is designed as a full-stack, real-time web platform that addresses each of the identified problem areas through a cohesive set of system features and design decisions.

- User Registration and OAuth Authentication: Secure user registration and login are implemented via Supabase Auth with OAuth support. Role-based access control differentiates between service users and service providers, ensuring each group accesses a purpose-built interface.
- Service Search and Intelligent Filtering: Users can search for services by category (e.g., plumbing, cleaning, electrical, carpentry) and apply filters based on location, pricing range, provider rating, and availability. This replaces ineffective keyword-only search with structured, contextual filtering.

- Provider Profile Management: Service providers can create and maintain detailed public profiles including their service offerings, experience, service area coverage, pricing, and availability schedule. Profile completeness and review scores are prominently displayed to assist user decision-making.
- Real-Time Service Requests and Updates: Users can post service requests that are immediately visible to relevant providers. Providers receive instant notifications and can respond, accept, or decline in real time using Supabase Realtime API, ensuring a dynamic and responsive booking experience.
- Zero-Commission Model: Unlike competing platforms, Sarvam charges no transaction commission. Providers retain 100% of their earnings, significantly improving economic incentives for platform adoption and long-term provider retention.
- Ratings and Reviews: Following service completion, customers can submit star ratings and written reviews. Aggregated ratings are displayed on provider profiles, enabling reputation-based trust and incentivizing service quality.
- Responsive and Accessible Interface: Built with React, TypeScript, Tailwind CSS, and ShadCN UI, the interface is fully responsive across desktop, tablet, and mobile devices. The minimalist design ensures usability for users with limited technical proficiency.
- Transparent Pricing: Service listings display pricing information clearly and upfront, with no hidden fees. This transparency builds trust and reduces negotiation friction during booking.

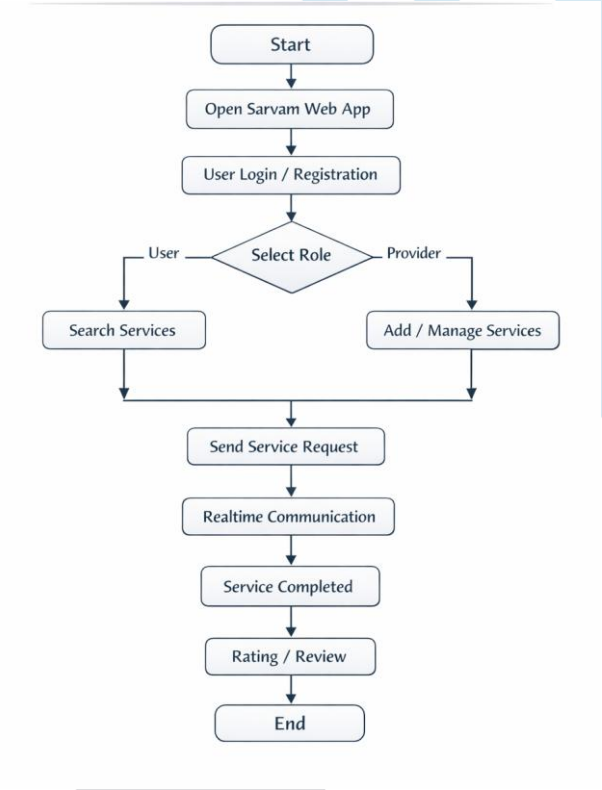

Fig. 1. Workflow of the Proposed Sarvam Service Discovery System

IV. METHODOLOGY AND IMPLEMENTATION

A. Frontend: React + TypeScript

The frontend is developed using React 18 with TypeScript, providing a strongly-typed, component-driven architecture that improves code reliability and developer experience. The user interface is designed with Tailwind CSS for utility-first responsive styling and ShadCN UI for pre-built, accessible component primitives. Key interfaces include the service search page, provider directory, profile pages, booking request forms, and user dashboards. React's virtual DOM ensures fast and smooth user interactions even with real-time data updates.

B. Backend: Supabase (Backend-as-a-Service)

Supabase serves as the complete backend infrastructure for Sarvam, providing:

- Authentication: OAuth-based login via Supabase Auth, supporting social login providers and email/password sign-up. Session management is handled securely by Supabase.
- REST and GraphQL APIs: Auto-generated APIs from the PostgreSQL schema handle all CRUD operations for users, services, requests, and reviews.

- Realtime API: Supabase Realtime enables WebSocket-based live data synchronization, powering instant notification of new service requests and provider responses.
- Storage: Supabase Storage manages profile images and service media uploads.

C. Database: PostgreSQL via Supabase

PostgreSQL is used as the primary relational database, hosted and managed through Supabase. Its robust support for relational data modeling, ACID transactions, and complex queries makes it ideal for managing the structured data relationships in Sarvam—users, providers, services, requests, and reviews. Row-Level Security (RLS) policies in PostgreSQL, enforced by Supabase, ensure users can only access and modify data they are authorized for.

D. Key System Workflows

1) User Service Request Workflow: User registers / logs in via OAuth → Searches service by category and location → Views and filters provider listings → Posts service request → Provider receives real-time notification → Provider accepts request → Service is delivered → User submits review and rating.

2) Provider Onboarding Workflow: Provider registers via OAuth → Creates detailed service profile → Lists service categories, pricing, and availability → Receives real-time service request notifications → Responds, accepts, or declines requests → Completes service → Receives and views customer feedback.

3) Real-Time Synchronization Workflow: User posts service request → Supabase Realtime broadcasts update → Subscribed providers receive instant alert → Provider response updates request status → User receives confirmation notification in real time.

E. Software and Hardware Setup

Software Stack:

- Frontend: React 18, TypeScript, Tailwind CSS, ShadCN UI.
- Backend: Supabase (BaaS) — Auth, Realtime, Storage, REST API.
- Database: PostgreSQL (hosted via Supabase Cloud).
- Authentication: Supabase OAuth (email/password and social providers).
- Version Control: Git with GitHub (itsneilgagan/sarvam).
- IDE: Visual Studio Code.

Database Design:

TABLE I
Database Schema

Sr.	Table	Description
1	users	User accounts, roles, and authentication data
2	providers	Provider profiles, skills, and availability
3	services	Service categories and listings
4	service_requests	User-posted requests with status tracking
5	reviews	Customer ratings and written feedback
6	notifications	Real-time alerts for users and providers
7	media	Profile images and service media (Supabase Storage)

F. Performance Evaluation Parameters

- Real-time update latency (target: under 500ms via Supabase Realtime).
- Page load time for service listings (target: under 2 seconds).
- System availability and uptime (target: 99.5%).
- Authentication success rate for OAuth login flows.
- User satisfaction score based on post-service feedback.

V. RESULTS

The Sarvam platform was successfully developed and deployed as a functional web-based service marketplace. The implemented system demonstrates the feasibility of using modern cloud technologies to build scalable and efficient digital platforms for local service discovery.

Experimental evaluation showed that the platform provides efficient service search and discovery through keyword-based queries and category filtering mechanisms. Users can easily explore service listings and submit service requests, while providers can manage their offerings through a dedicated interface. The integration of Supabase Realtime API enables instant synchronization of service requests and responses, improving interaction between customers and providers.

Performance testing indicated that the system achieves fast response times for service retrieval and database operations. The use of PostgreSQL indexing and optimized queries ensures efficient data access even with increasing numbers of service listings. Additionally, the responsive user interface provides a smooth experience across desktop and mobile devices.

The implementation also introduces a zero-commission model in which service providers retain full earnings from their services. This approach encourages provider participation and improves the economic fairness of the platform. Overall, the results demonstrate that the proposed system effectively addresses several limitations of existing service marketplaces, including poor localization, lack of transparency, and inefficient communication between users and providers.

FUTURE SCOPE

Sarvam's current architecture establishes a scalable foundation that supports a range of planned future enhancements. The most significant planned addition is an AI-based recommendation engine that will analyze user search history, location, preferences, and past booking behavior to surface the most relevant service providers proactively. This will transform the platform from reactive search to intelligent, personalized suggestion.

Mobile application development for Android and iOS is planned to increase accessibility for users in areas where mobile internet access predominates over desktop usage. Integration with online payment gateways such as Razorpay, Stripe, or UPI-based systems will enable cashless transactions, improving convenience for both users and providers while enabling platform-level financial analytics.

GPS-based real-time provider tracking during active service visits will add transparency and safety for users. Advanced provider analytics dashboards offering earnings reports, booking trends, and customer feedback summaries will help local workers manage and grow their businesses more effectively.

Long-term, multilingual support will be implemented to serve India's diverse regional communities, and the platform may explore semantic search and structured service taxonomies to further improve discovery accuracy. Integration with government skill development databases could enable automatic verification of provider credentials, strengthening the trust infrastructure of the platform.

CONCLUSION

Sarvam successfully addresses the fragmentation, opacity, and inefficiency of the local service economy by delivering a centralized, real-time, and community-centric web platform. Built on a modern technology stack comprising React, TypeScript, Tailwind CSS, ShadCN UI, and Supabase with PostgreSQL, the platform provides a robust and scalable foundation for local service discovery, booking, and provider management. The zero-commission model represents a significant departure from prevailing market practices, directly benefiting the local workforce. Core features—including OAuth authentication, real-time service request handling, verified profiles, intelligent filtering, and a transparent review system—collectively deliver a trustworthy and efficient service experience. The platform is particularly impactful for semi-urban communities where formal service directories are absent and digital alternatives are limited. With its current implementation addressing key functional requirements, Sarvam is well-positioned for expansion with AI-powered recommendations, mobile applications, and integrated payment processing.

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