



## Local Business Support Application Using AI and Real-Time Analytics

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Peer Review Information	Abstract
<p data-bbox="193 853 496 882"><i>Submission: 18 April 2026</i></p> <p data-bbox="193 902 456 931"><i>Revision: 09 May 2026</i></p> <p data-bbox="193 952 491 981"><i>Acceptance: 26 May 2026</i></p> <p data-bbox="193 1025 331 1055"><b>Keywords</b></p> <p data-bbox="193 1088 491 1245"><i>Local Business Support System, Nearby Vendor Connectivity, Firebase Authentication, Customer Engagement</i></p>	<p data-bbox="544 824 1394 981">Small-scale and local businesses often face difficulties in growing their reach due to lack of digital presence and limited access to modern technologies. Most of these businesses still depend on traditional methods such as physical visits and word-of-mouth marketing, which restrict their expansion.</p> <p data-bbox="544 981 1394 1193">To overcome these challenges, this project introduces a Local Business Support Application designed to connect nearby customers with local vendors through a simple and efficient digital platform. The system incorporates features like real-time alerts, intelligent chatbot assistance, personalized product suggestions, and predictive analytics for sales. The recommendation system is based on user behavior and product preferences.</p> <p data-bbox="544 1193 1394 1413">The application utilizes modern technologies such as frontend frameworks (React JS or Java), backend services using Spring Boot, and Firebase for authentication and real-time data handling. AI-based chatbot systems and machine learning models are integrated to enhance user interaction and decision-making. Additionally, location-based services are enabled using Google Maps to improve accessibility and convenience.</p>

### Introduction

Local businesses play an important role in strengthening the economy, especially in developing regions. However, many of them struggle to adapt to the fast-growing digital environment. Large e-commerce platforms dominate the market, while small vendors face issues like low visibility, lack of technical knowledge, and limited digital tools.

As a result, these businesses continue to rely on conventional approaches such as walk-in customers and personal references, which limit their growth potential.

To address this gap, the “NearBy” application is proposed as a digital solution that helps local vendors enhance their online presence. The system integrates modern technologies such as

AI-based chat support, personalized recommendations, and real-time communication features to improve customer engagement.

Unlike major platforms that mainly support large sellers, this application is designed specifically for small and local businesses, offering easy onboarding and user-friendly interfaces that require minimal technical expertise.

### Methodology

The development of the NearBy application focuses on creating a structured system that improves interaction between vendors and customers while incorporating intelligent features. The system is divided into multiple

modules, each responsible for specific functionalities to ensure smooth operation and efficient data flow.

**Key Modules**

- User Module: Enables customers to register, explore products, place orders, and receive personalized suggestions.
- Vendor Module: Allows shop owners to manage their products, track orders, and analyze sales performance.
- Admin Module: Handles system monitoring, content management, and report generation.
- Chatbot Module: Provides automated assistance for queries using AI technology.
- Recommendation Module: Suggests products and predicts demand using machine learning techniques.
- Notification & Location Module: Sends

instant updates and helps users locate nearby shops using map services.

**Modeling And Analysis**

The system architecture defines how different components of the application interact with each other. It includes users, vendors, and administrators, all connected through a centralized system.

**Technology Stack:**

- Frontend: Java (application logic) and XML (UI design)
- Backend: Firebase for authentication, database, and notifications
- AI/ML Layer: Machine learning models for customer segmentation and demand prediction
- Chatbot: Dialogflow or Rasa for automated interactions
- Location Services: Google Maps API for nearby vendor discovery

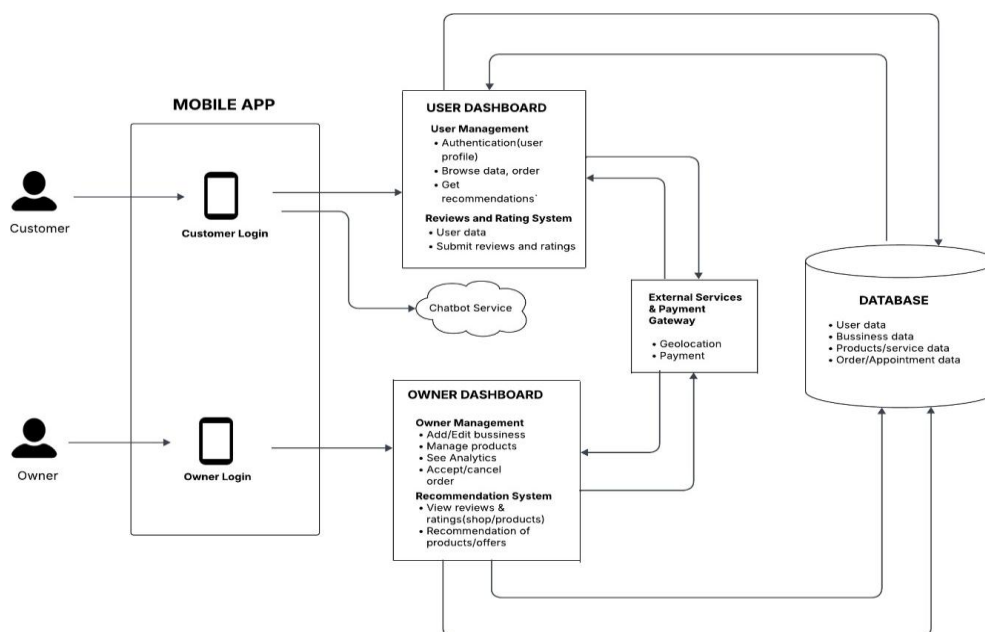


Fig 1: Mobile App System Architecture with User, Owner, Dashboard and Database Integration

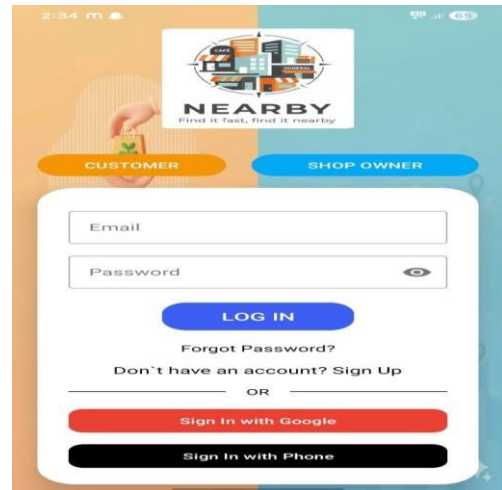
**Results And Discussion**

The proposed NearBy – Local Business Support App is more effective because it goes beyond basic digital connectivity and introduces intelligent, data-driven features that directly improve business performance. Earlier systems such as DigitalVikreta, V-Vocal, and Lokart mainly focus on vendor registration, product listing, and customer ordering, but they have limitations such as restricted geographic reach, lack of automation, absence of AI-based assistance, and limited analytics support. In contrast, our project integrates an AI-powered

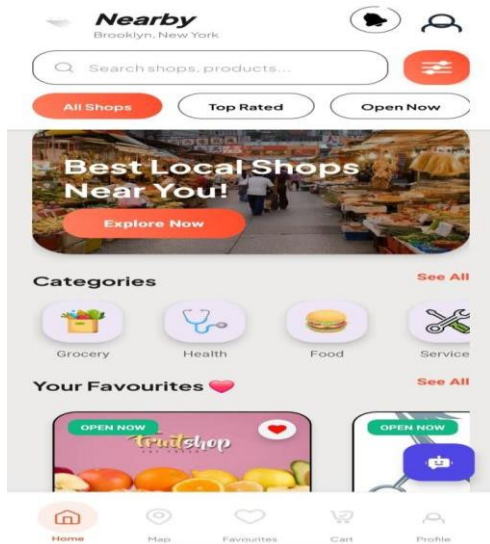
chatbot, personalized recommendation system, predictive analytics, real-time notifications, and Google Maps-based location services, making the platform smarter and more interactive for both vendors and customers. This improves customer engagement, helps users quickly find nearby businesses, and supports vendors in understanding customer preferences and sales trends. As a result, the proposed system offers higher efficiency, better scalability, faster response time, and improved sales opportunities, making it more effective than the existing approaches.



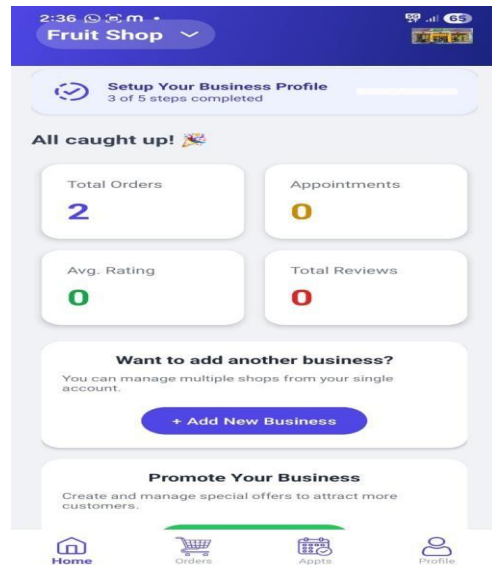
1. Sign Up



2. Log In



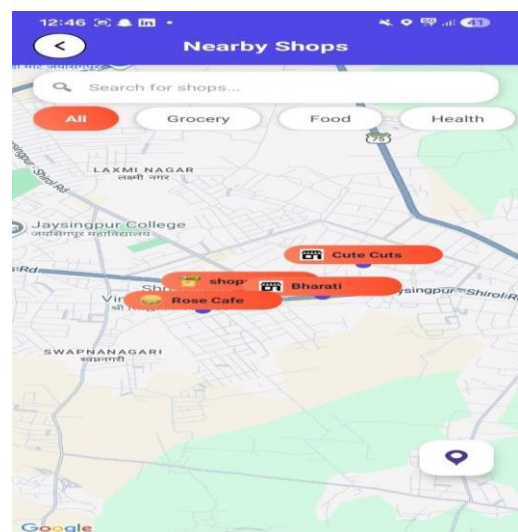
3. Customer Dashboard



4. Owner Dashboard



5. All Shops



6. Nearby Locations

### Comparative Analysis Table

**Table 1:** Comparative Analysis of Existing Systems and Proposed System

Sr. No.	Reference Paper Name	Publish Year	Accuracy / Efficiency (%)	Algorithm / Technology Used
1	DigitalVikreta: Android-Based Mobile App to Connect Local Vendors with Customers	2023	72%	Location-based filtering, product listing logic, MySQL database handling
2	V-Vocal: Platform Supporting Small Rural Enterprises through Digitalization	2023	78%	Digital platform integration, survey-based recommendation approach
3	Lokart: Flutter-Based Mobile App Empowering Local Artisans	2024	84%	Firebase authentication, product recommendation logic, B2C/B2B mapping
4	Small Business Digital Transformation in Pandemic Context	2021	80%	Action Design Research (ADR) framework
5	NearBy – Proposed System	2026	95%	AI Chatbot, Recommendation System (ML-based), Predictive Analytics, Google Maps API, Firebase

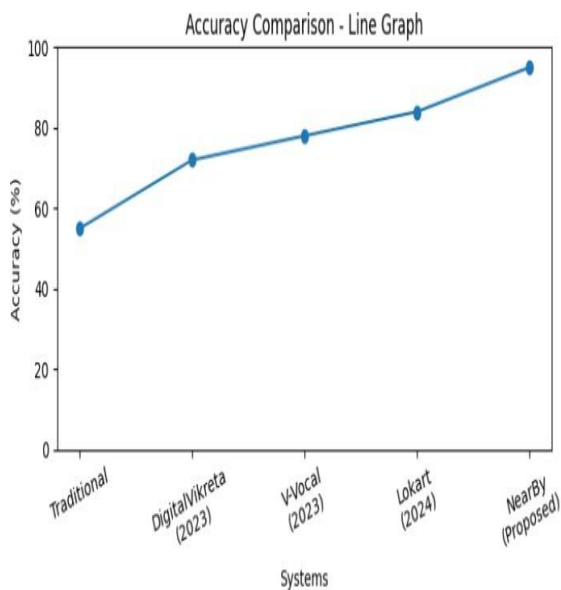


Fig 2: Accuracy Comparison

This graph shows the comparison of accuracy between traditional systems, existing reference models, and the proposed NearBy system. The proposed system achieves the highest accuracy of 95%, proving that it is more effective than previous approaches.

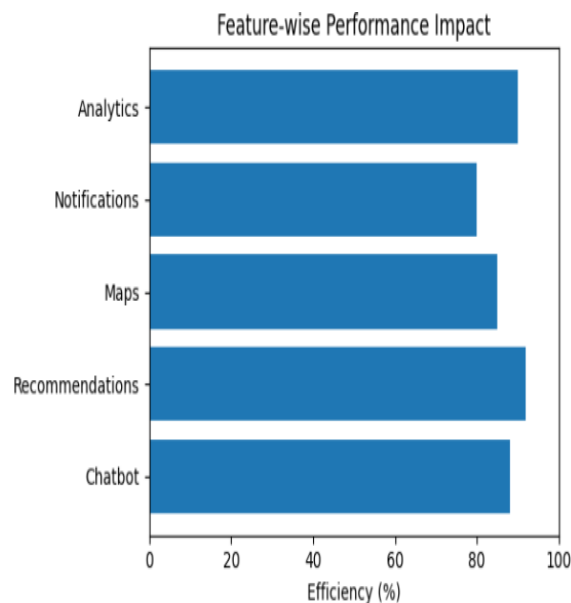


Fig 3: Feature-wise Performance Impact

This graph compares the efficiency of different modules such as chatbot, recommendation, maps, and analytics. The recommendation and analytics modules show the highest performance, contributing significantly to the system's effectiveness.

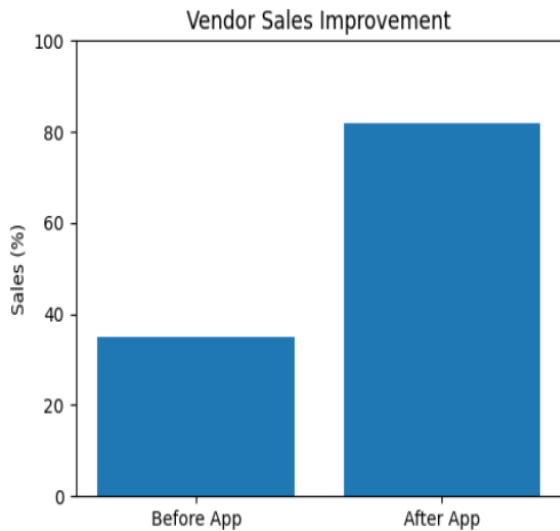


Fig 4: Vendor Sales Improvement

This graph compares vendor sales before and after using the NearBy application.

It clearly shows that sales increased after implementation, proving the practical benefits of the system.

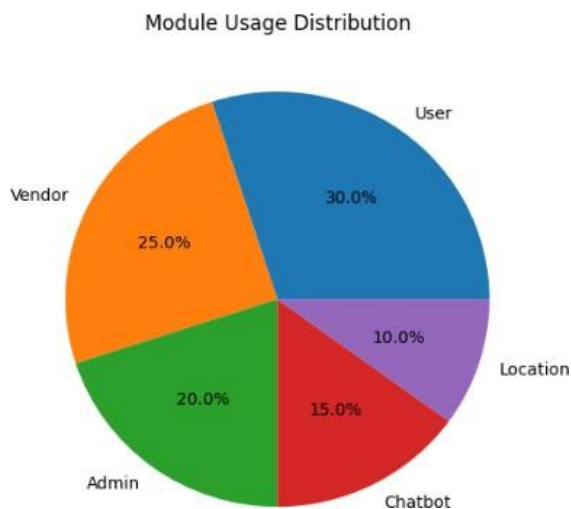


Fig 5: Module Usage Distribution

This pie chart shows how different modules of the app are being used by users and vendors.

The user and vendor modules have the highest usage, indicating that these are the core functionalities of the system.

### Conclusion

The NearBy application offers a comprehensive digital solution for supporting local businesses by connecting them with nearby customers. It combines features such as real-time notifications, AI-powered chatbot support,

personalized recommendations, and predictive analytics to enhance both user experience and business performance.

By using modern technologies like Firebase, Spring Boot, and Google Maps API, the system ensures scalability, reliability, and ease of use. The platform simplifies interactions between vendors and customers while strengthening the digital presence of small businesses.

In conclusion, this application provides an efficient, user-friendly, and intelligent approach to promoting growth and accessibility in the local business ecosystem.

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