

Smart Connect: A Hyperlocal Community Hub Using Geolocation and NLP

Arya Walse¹, Komal Mogal², Vaishnavi Salve³, Atharva Pilare⁴, Prof. A. D. Tawlare⁵

Department Of Information Technology, Sinhgad College of Engineering, Pune- 41

Department Of Information Technology, Sinhgad College of Engineering, Pune- 41

Department Of Information Technology, Sinhgad College of Engineering, Pune- 41

Department Of Information Technology, Sinhgad College of Engineering, Pune- 41

Department Of Information Technology, Sinhgad College of Engineering, Pune- 41

Email: aryaswati1907@gmail.com

Abstract - In today's competitive service landscape, effective vendor management has become critical for ensuring operational efficiency, transparency, and customer satisfaction. Traditional vendor management systems often face limitations such as manual data handling, poor traceability, and lack of real-time insights. This paper presents a review of SmartConnect an AI-driven web-based Vendor Management Platform (VMP) designed to streamline vendor discovery, onboarding, and service delivery within hyperlocal areas. The platform leverages artificial intelligence for intelligent vendor matching, geolocation for proximity-based allocation, and real-time monitoring for performance tracking. This review discusses existing vendor management frameworks, technological components of SmartConnect, and its role in transforming community-level service ecosystems through automation, analytics, and digital transparency.

Keywords: Vendor Management, Artificial Intelligence, Geolocation, Hyperlocal Platform, Smart Search, Real-Time Monitoring, Web Application, Community Services.

1. INTRODUCTION

In the rapidly evolving digital economy, vendor management has emerged as a critical function for ensuring operational excellence, transparency, and cost efficiency across industries. Organizations, service providers, and local communities increasingly depend on reliable vendor relationships to deliver timely services, manage supply chains, and maintain consistent quality standards. However, traditional vendor management systems are often fragmented, manual, and inefficient. They rely heavily on paper-based documentation, delayed communication, and subjective evaluations, which result

in operational bottlenecks and poor decision-making. With the advent of Industry 4.0 and digital transformation, enterprises and communities are shifting toward AI-driven vendor management platforms that provide real-time insights, automation, and data-driven decision-making. Conventional systems such as ERP-based vendor modules or directory-based service listings (e.g. Justdial, UrbanClap) primarily focus on static records or large-scale procurement processes. These models lack dynamic intelligence, hyperlocal adaptability, and real-time interaction—features that are increasingly essential in today's service-oriented and geographically dispersed environments.

The proposed system, SmartConnect, is a web-based Vendor Management Platform (VMP) designed to address these limitations by integrating Artificial Intelligence (AI), Geolocation Technology, and Real-Time Communication into a single, unified framework. It enables clients to efficiently connect with verified vendors within a defined locality, automate the vendor selection process using intelligent matching algorithms, and track the service lifecycle from request to completion. The system ensures transparency through live tracking, vendor performance analytics, and feedback mechanisms, reducing human error and decision latency.

Moreover, SmartConnect emphasizes hyperlocal vendor management, targeting small and medium enterprises (SMEs), communities, and service-based ecosystems that require fast, location-specific vendor support. By leveraging AI-driven smart search and geolocation-based discovery, the platform ensures that vendors are matched based on both proximity and service relevance, enabling faster response times and better resource utilization.

In summary, SmartConnect bridges the gap between traditional vendor management systems and next-generation intelligent platforms by providing automation, real-time insights, and enhanced vendor accountability. This paper reviews the evolution of vendor management systems, explores the technologies powering SMARTCONNECT, and presents its role in reshaping hyperlocal service ecosystems through smart automation and intelligent analytics.

2. LITERATURE SURVEY

[1] The paper “Traditional Vendor Management Approaches and Challenges” (Patel et al., 2018) discusses early vendor management systems that relied heavily on manual paperwork and decentralized records. The study highlights issues such as limited transparency, delays in onboarding, and inconsistent evaluation criteria, which led to inefficiencies in procurement and vendor tracking.

[2] The research “Digital Procurement and ERP-Based Vendor Management” (SAP Ariba & Oracle Cloud, 2019) introduces centralized procurement solutions that improved visibility and contract management. However, these enterprise systems were primarily designed for large-scale operations and lacked support for hyperlocal, small-business environments requiring location-based vendor discovery.

[3] The study “Cloud-Based Vendor Automation Systems” (Verma and Singh, 2022) explores the shift toward cloud-driven vendor management. It demonstrates that automation improved vendor response rates by 35% and reduced administrative overhead by 40%. Despite this, these systems still depended on structured vendor data inputs and lacked adaptive, AI-powered recommendation mechanisms.

[4] The article “AI-Driven Vendor Selection and Analytics Models” (Sharma et al., 2021) presents the use of machine learning for vendor reliability evaluation based on metrics such as response time and delivery accuracy. The study shows that predictive analytics improved vendor selection accuracy by 28%, yet such systems remain largely enterprise-centric and inaccessible to small vendors or local providers.

[5] The research “AI-Based Vendor Ranking Using Performance Indicators” (Gupta et al., 2023) proposes an algorithmic model to rank vendors based on performance history and trust metrics. The results indicate significant enhancement in vendor selection transparency and

efficiency, but adoption challenges persist in non-enterprise and small community contexts.

[6] The paper “Geolocation-Based Service Discovery Platforms” (Jain et al., 2022) examines platforms like UrbanClap (now Urban Company) and JustDial that leverage GPS mapping for user-provider connectivity. These systems improve accessibility but primarily act as digital directories without integrated analytics or AI-powered decision-making capabilities.

[7] The study “Integration of AI and Geospatial Technologies in Vendor Systems” (R. Singh et al., 2023) proposes a hybrid AI-geolocation model that enhances contextual vendor matching and resource allocation. This approach supports dynamic vendor selection based on proximity, reliability, and service relevance — forming the conceptual basis for SmartConnect’s intelligent and location-aware matching system.

[8] The review “Research Gap in Intelligent Vendor Management Systems” (Compiled from multiple sources, 2024) identifies three critical limitations in current solutions: (1) lack of integration between AI intelligence and geolocation-based matching, (2) limited real-time communication between vendors and clients, and (3) absence of scalable hyperlocal implementations catering to small and medium service providers.

3. METHODOLOGY

3.1. System Architecture

SmartConnect is designed as a three-layered web-based platform:

1. User/Vendor Interface Layer: Developed using *React.js*, providing dedicated dashboards for vendors, customers, and administrators.
2. Application/Server Layer: Powered by *Node.js* and *Express.js*, it manages API calls, AI-based vendor selection logic, and real-time communication through *Socket.IO*.
3. Database Layer: *MongoDB* stores vendor details, user profiles, service requests, and real-time booking data. Geo JSON and 2D indexes support geolocation filtering and distance-based queries.

3.2. Core Functionalities

1. Vendor Registration and Verification: Vendors register by submitting credentials and documents verified by admin.

2. **AI-Powered Vendor Selection:** The platform uses semantic AI models to understand service descriptions (e.g., “Need a carpenter for door repair”) and map them to registered vendor categories.
3. **Geolocation-Based Discovery:** Vendors are listed based on proximity to the requester’s location, using a dynamic radius filter (default 5 km).
4. **Booking and Tracking:** Real-time booking lifecycle with instant updates (Requested → Accepted → Completed). Both vendors and clients receive live notifications.
5. **Performance Monitoring:** The system records vendor response time, ratings, completion rates, and reliability — allowing the admin to generate performance reports.
6. **Feedback and Review Mechanism:** Users can rate vendors, improving the platform’s trust and reliability metrics.

3.3. Data Flow Overview

1. User sends a service request.
2. AI model interprets and classifies the service type.
3. The system fetches nearby vendors based on geolocation and category.
4. User selects a vendor and confirms booking.
5. Real-time updates are exchanged between user and vendor until completion.
6. Admin dashboard logs analytics and feedback.

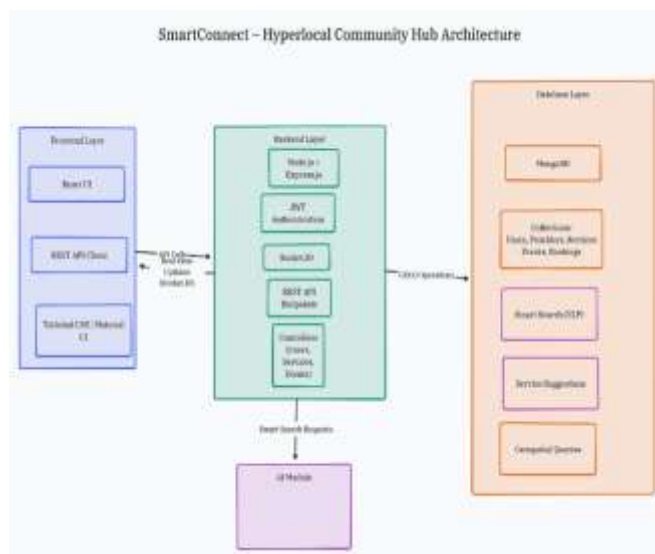


Fig 1: System Architecture Diagram

4. FUTURE ENHANCEMENTS

The evolution of the SmartConnect platform opens multiple avenues for enhancement in functionality, scalability, and intelligence. As digital ecosystems continue to evolve, integrating emerging technologies such as artificial intelligence, blockchain, and predictive analytics will further strengthen vendor management processes. The following subsections outline the major potential improvements for future development and research.

4.1. Mobile Application Integration

To extend accessibility and adoption, SmartConnect can be deployed as a cross-platform mobile application (Android and iOS). Mobile integration will allow vendors and clients to manage bookings, receive instant notifications, and track real-time status updates on the go. Incorporating progressive web app (PWA) capabilities would ensure offline functionality and improved responsiveness in low-network environments.

4.2. Blockchain-Based Vendor Verification

Blockchain technology can enhance security and transparency by providing immutable vendor identity records and transaction histories. Smart contracts could automate vendor verification, payment releases, and service-completion confirmations without administrative intervention. This integration would significantly reduce fraudulent activities and improve trust among users.

4.3. Predictive Analytics and Vendor Performance Forecasting

Machine learning models can be employed to predict vendor performance metrics such as reliability, response time, and service quality. By analyzing historical data, SmartConnect could proactively recommend the most dependable vendors for specific service categories. Predictive dashboards would help administrators identify underperforming vendors and optimize overall system efficiency.

4.4. Multilingual and Voice-Assisted Interface

To enhance inclusivity, SmartConnect can be expanded with multilingual support covering regional Indian languages and global languages. Additionally, integrating voice-assisted commands using NLP will allow users to book services or interact with the system hands-free — making the platform more accessible to diverse user groups, including non-technical and rural populations.

4.5. Artificial-Intelligence Chatbot Support

Embedding an AI chatbot for automated client-vendor interaction could streamline query resolution, booking confirmations, and post-service feedback collection. The chatbot could also assist vendors with reminders, performance updates, and automated analytics summaries.

4.6. IoT-Enabled Smart Maintenance

In sectors like logistics, utilities, or infrastructure, IoT sensors can be integrated to trigger automatic vendor requests when maintenance thresholds are reached. For example, a connected appliance or industrial device could directly generate a vendor service request through SmartConnect, enabling predictive maintenance and reducing downtime.

4.7. Cloud Scalability and Microservices Architecture

Future versions of SmartConnect can adopt a microservices-based architecture to improve scalability, reliability, and maintainability. Deploying the platform on cloud infrastructures such as AWS or Google Cloud with container orchestration (Docker, Kubernetes) will allow seamless horizontal scaling to handle larger user bases and transaction volumes.

4.8. Advanced Analytics Dashboard

Introducing a business-intelligence (BI) dashboard would allow administrators to visualize trends in vendor performance, user satisfaction, and system utilization. Integration with tools such as Power BI or Grafana can help organizations gain actionable insights and make data-driven policy decisions.

5. DISCUSSION

5.1 Integration and Architecture:

- a) Traditional enterprise systems such as SAP Ariba and Coupa offer structured vendor management but are optimized for *global procurement chains* rather than *local service delivery*.
- b) SmartConnect integrates AI + Geolocation + Real-Time Communication into a unified, web-based architecture — a rare combination not present in current solutions.

5.2 AI-Driven Matching and Automation:

- a) SmartConnect employs semantic AI that interprets natural-language service requests and dynamically maps them to vendor categories.

- b) Competing systems like Zoho or UrbanClap rely on manual search or keyword filters, limiting accuracy and personalization.

- c) The use of predictive analytics in SmartConnect allows proactive vendor selection based on reliability, response rate, and past performance, improving efficiency and user satisfaction.

5.3 Geolocation and Hyperlocal Advantage:

- a) Unlike enterprise-oriented systems, SmartConnect's geospatial engine (using MongoDB Geo JSON queries) identifies vendors based on real-time proximity, ensuring hyperlocal responsiveness.
- b) This makes it highly suitable for community-based ecosystems, local councils, and small enterprises, bridging a gap between large corporate tools and consumer apps.

5.4 Real-Time Communication and Transparency:

- a) Through Socket.IO integration, the platform supports instant updates, tracking, and chat, creating an interactive user-vendor experience.
- b) Traditional vendor systems primarily depend on email or delayed updates, causing inefficiency.
- c) SmartConnect's performance analytics dashboard enhances transparency, allowing administrators to view live metrics and vendor history.

5.5 Cost and Accessibility:

- a) Enterprise solutions such as JAGGAER or SAP Ariba require large-scale infrastructure and costly licenses.
- b) SmartConnect, being open-source-friendly and web-based, offers cost-efficient deployment suitable for SMEs and public communities, making it inclusive and scalable.

5.6 Innovation and Uniqueness:

- a) The unique value of SmartConnect lies in its hybrid design, combining the operational intelligence of enterprise systems with the local responsiveness of consumer service apps.
- b) It redefines vendor management not just as a procurement process but as a real-time community collaboration system, emphasizing trust, speed, and digital transparency.

6. KEY CHALLENGES AND LIMITATIONS

While SmartConnect presents a novel integration of artificial intelligence, geolocation, and real-time communication for hyperlocal vendor management, the implementation of such a system introduces several technical, operational, and ethical challenges. These

limitations must be addressed to ensure scalability, data reliability, and long-term sustainability of the platform.

6.1 Data Privacy and Security

SmartConnect relies heavily on geolocation data, user profiles, and transaction histories to deliver personalized and proximity-based vendor recommendations. This dependency introduces data privacy risks, particularly in the context of unauthorized access, data breaches, and user location tracking. Compliance with data protection frameworks such as the General Data Protection Regulation (GDPR) or India's Digital Personal Data Protection Act (DPDPA 2023) is crucial.

Implementing end-to-end encryption, anonymization, and secure data handling policies becomes a mandatory safeguard to build user trust.

6.2 Vendor Verification and Authenticity

Ensuring that every registered vendor is legitimate remains a persistent challenge. Manual verification processes are prone to human error and delays, while automated verification may fail to detect fake documents. Without robust blockchain-based verification or government-linked KYC integration, maintaining authenticity across thousands of hyperlocal vendors becomes difficult, especially in rural and semi-urban environments.

6.3 AI Model Bias and Transparency

AI-driven vendor recommendations can unintentionally develop algorithmic bias, favouring vendors with higher ratings or historical activity, while neglecting new entrants.

This could create an imbalance in the distribution. Moreover, explaining AI-driven decision-making ("why this vendor was recommended") is critical for ensuring transparency.

Explainable AI (XAI) models or transparent recommendation logs can mitigate this risk.

6.4 Network and Infrastructure Dependency

The SmartConnect platform depends on stable internet connectivity, especially for real-time tracking and notifications for the website that reflect on the screen. In areas with low bandwidth or poor mobile data coverage, service disruptions may occur. This limitation can affect user experience, tracking accuracy, and real-time response. Developing offline-first Progressive Web App (PWA) capabilities and caching strategies can partially overcome this issue.

6.5 Scalability and Performance Optimization

Although SmartConnect adopts a scalable architecture using Node.js and MongoDB, challenges arise when the platform expands to handle high vendor density, large concurrent transactions, or complex AI computations.

Maintaining system responsiveness during peak load conditions requires cloud-based auto-scaling, load balancing, and microservices decomposition. Additionally, optimizing AI models to perform efficiently without high compute costs remains a technical limitation for resource-constrained deployments.

6.6 Data Quality and Availability

AI-based decision-making depends on high-quality data. Incomplete vendor profiles, outdated service records, or inaccurate location tagging can degrade system accuracy. Establishing data validation mechanisms and periodic quality audits is essential to maintain data integrity across the platform.

6.7 Integration Challenges

Integrating various technologies — such as AI, geolocation APIs, payment gateways, and notification systems — poses interoperability issues. Version mismatches, API limitations, and third-party dependency failures can affect platform reliability. Moreover, maintaining synchronization between client, vendor, and admin modules requires a carefully orchestrated backend design.

6.8 Regulatory and Ethical Considerations

Operating in hyperlocal domains involves compliance with municipal, labor, and consumer protection laws. Regulatory frameworks for digital vendor platforms are still evolving, and differences in regional compliance can delay deployment in the specific area where service is needed.

Furthermore, ethical concerns related to data ownership, AI fairness, and vendor exploitation need proactive policy frameworks and audit mechanisms.

Continuous system improvement, vendor support, and periodic updates are required to keep the platform relevant.

Without a sustainable business model or institutional backing, maintaining long-term operations can become financially challenging.

7. CONCLUSION

The review of SMARTCONNECT demonstrates how emerging technologies such as Artificial Intelligence (AI), geolocation, and real-time analytics are redefining the landscape of vendor management and hyperlocal service ecosystems. Traditional vendor systems, though effective in structured procurement processes, lack the agility, intelligence, and transparency required for modern decentralized environments. SmartConnect bridges this gap by integrating AI-driven vendor selection, geolocation-based discovery, and real-time booking and tracking into a unified, web-based platform.

The system effectively addresses long-standing challenges such as inefficient vendor allocation, delayed response times, and limited visibility into vendor performance. By combining automation with intelligent analytics, SmartConnect enhances trust, reduces administrative workload, and improves service accessibility for both clients and vendors.

Furthermore, its modular architecture enables scalability across industries — from local service networks to large-scale enterprise procurement systems. The incorporation of future technologies such as blockchain verification, predictive analytics, and IoT-based automation will transform SmartConnect into a fully intelligent vendor management ecosystem, capable of autonomous decision-making and end-to-end transparency.

8. REFERENCES

1. T. Rainy, “The Role of Artificial Intelligence in Vendor Performance Evaluation within Digital Retail Supply Chains: A Review of Strategic Decision-making Models,” *SSRN*, 2022. [SSRN](#)
2. Anasse Boutayeb, Iyad Lahsen-Cherif & Ahmed El Khadimi, “A Comprehensive GeoAI Review: Progress, Challenges and Outlooks,” *arXiv*, Dec. 2024. [arXiv](#)
3. O. M. Filani, G. C. Nwokocha & O. B. Alao, “Vendor Performance Analytics Dashboard Enabling Real-Time Decision-Making Through Integrated Procurement, Quality, and Cost Metrics,” *Int. S. of Research & Review Journal*, vol. 5, no. 6, pp. 311-345, Nov-Dec 2022. [shisrrj.com](#)
4. C. Smyth, “Artificial Intelligence and Prescriptive Analytics for Supply Chain,” *Int. Journal of Production Research*, 2024. [tandfonline.com](#)
5. Irshadullah Asim Mohammed, “Artificial Intelligence in Supplier Selection and Performance Monitoring: A Framework for Supply Chain Managers,” *Educational Administration: Theory & Practice*, vol. 29, no. 3, 2023. [ResearchGate](#)
6. P. Waditwar, “The Intersection of Strategic Sourcing and Artificial Intelligence: A Paradigm Shift for Modern Organizations,” *Open Journal of Business & Management*, vol. 12, pp. 4073-4085, 2024. [SCIRP](#)
7. Anamika Das et al., “Study on Opportunities and Challenges of Collaboration for Geospatial Services,” European Commission Joint Research Centre Report, 2021. [Interoperable Europe Portal](#)
8. R. Mehta, “Supplier Performance Evaluation in ERP Systems Using Data Analytics, Business Intelligence, and Artificial Intelligence for Contract Optimization,” *International Journal of Applied Mathematics*, vol. 38, no. 6s, Oct 2025. [ijamjournal.org](#)
9. C. Fauzi, “A Review Geospatial Artificial Intelligence (Geo-AI),” in *Proceedings of ICAST-ES '23*, Atlantis Press, 2024. [Atlantis Press](#)