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Real-Time Spare Parts Availability and Price Comparison System for Local Shops and Customers

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Abstract

This research focuses on the design and implementation of a digital platform created to reduce the communication and information gap between customers and local spare parts retailers. In many local markets, most small spare parts shops still depend on manual inventory methods such as handwritten registers or memory-based tracking. These traditional practices often lead to incorrect stock information, which creates frequent problems for both shopkeepers and customers. Customers, in particular, face inconvenience as they are forced to visit multiple shops just to check whether a required spare part is available and affordable. This process wastes time, effort, and money, making the overall purchasing experience inefficient and frustrating.

To solve this issue, the study proposes and develops a real-time, web-based system for spare parts availability and price comparison. The platform provides shopkeepers with a simple digital dashboard where they can update stock details, manage product information, and change prices instantly. At the same time, customers can use a single, easy-to-use interface to search for required spare parts, check real-time availability across nearby stores, and compare prices from different sellers without physically visiting each shop. The system is built using modern web technologies, including React.js with Next.js for the frontend, Node.js with Express.js for backend operations, and MySQL for database management. This technology stack ensures secure data handling, real-time updates, and scalability.

Pilot testing of the system with selected local vendors showed noticeable improvements in daily operations. Shopkeepers experienced better inventory accuracy and fewer missed sales due to incorrect stock information. Customers reported a smoother and faster buying process, highlighting time savings and price transparency as major advantages. Additionally, the platform encouraged digital adoption among small business owners who previously had limited exposure to technology. Overall, the study concludes that the proposed digital platform improves efficiency, transparency, and customer satisfaction in the local spare parts market. Future enhancements may include secure online payment options, delivery and logistics support, and advanced analytics for predicting demand, further strengthening the system's impact on the retail ecosystem.

Keywords: Spare parts, real-time inventory, price comparison, digital platform, local vendors, inventory management, customer convenience.

1. Introduction

1.1 Problem Statement

The existing working model of local spare parts shops has several limitations that affect both shop owners and customers. Most shopkeepers still rely on manual methods such as handwritten records to manage their inventory. This often leads to mismatches between actual stock and recorded stock, making it difficult to track fast-moving items or manage prices for a large number of products. Since there is no

digital system in place, stock information cannot be updated in real time, which directly impacts customer service especially when customers inquire remotely about the availability of specific spare parts.

From the customer's perspective, the buying process is inconvenient and inefficient. Because there is no centralized source of information showing which shops have a particular spare part and at what price, customers are forced to physically visit multiple stores or depend on unclear information obtained over phone calls. This lack of transparency makes it harder for customers to make informed purchasing decisions, increases the time and effort required to find the right product, and ultimately leads to frustration and dissatisfaction with the overall shopping experience.

Beyond individual transactions, this issue highlights a larger problem of digital exclusion faced by small spare parts retailers. While large e-commerce platforms and manufacturer-driven systems have embraced advanced digital solutions, local shops remain largely disconnected from the digital marketplace. This gap limits their ability to compete, expand their customer base, and grow their business. The absence of affordable, simple, and sector-specific digital tools clearly indicates a need for solutions tailored to the unique challenges of small spare parts retailers.

1.2 Secondary Data

Secondary data for this study was collected from various sources such as research papers, academic journals, online articles, and industry reports related to spare parts supply chains, digital platforms, and price comparison systems. Information was also gathered by studying existing e-commerce and inventory management systems to understand their features, working models, and benefits. This secondary data helped in understanding current market practices, technological trends, and the challenges faced by customers and local spare parts retailers.

1.3 Proposed Solution

The proposed solution is a **real-time digital platform designed to connect customers with local spare parts retailers**. The system allows customers to search for required spare parts, check their availability in nearby shops, and compare prices from different sellers through a single, easy-to-use interface.[5][6] This reduces the need for customers to visit multiple stores and helps them find the required product quickly and at a reasonable price.

In addition, the platform provides shopkeepers with a **simple digital dashboard** where they can add products, update stock availability, and modify prices whenever needed. This helps shop owners manage their inventory more efficiently and reduces errors caused by manual record keeping. Overall, the system improves transparency, saves time, and makes the spare parts purchasing process more convenient for both customers and local vendors.[7][8]

2. Literature Review

Spare parts retailing forms a crucial segment of the urban informal economy in India, generating livelihoods for a significant portion of the population and providing essential automotive and mechanical components at affordable prices to city residents. Local spare parts shopkeepers operating small-scale businesses are confronted with a variety of challenges impacting their sustainability and role in the urban retail environment. This literature review addresses the research that is currently available on these topics.

The challenges encountered by spare parts vendors in local markets. They include the uncertainty of inventory management due to manual record-keeping, the inability to handle customer inquiries efficiently because of lack of real-time stock visibility, and clashes with customer expectations regarding

part availability. Additionally, research identifies operational inefficiencies due to outdated processes and competitive disadvantages against larger digitally-enabled retailers [1]. Studies carried out through surveys of local spare parts vendors in urban areas also find that there are large numbers of vendors who are lacking digital skills and operate with limited technological resources [1].

A wider insight into the plight of spare parts retailers in India in general. As not targeted in specific cities alone, articles identify causes as limited access to digital tools, inadequacies of inventory management systems, as well as susceptibility to lost sales opportunities due to stock inaccuracies. The literature also emphasizes the need for technological intervention to bolster the sustainability of these small retailers [2].

Research highlights the important role that local spare parts shops play in the Indian automotive ecosystem by providing accessible components and repair services to a large population while also creating employment opportunities for semi-skilled workers and small entrepreneurs [3].

Our project builds on this by developing the **Real-Time Spare Parts Availability and Price Comparison System**, a digital platform designed to solve common retail challenges faced by local spare parts vendors, especially in urban markets. The system allows shopkeepers to easily upload their inventory, update prices, and manage product information through a simple web platform. At the same time, customers can conveniently browse spare parts from nearby vendors, check availability, and compare prices before making a purchase. By providing a location-based, real-time solution, the platform makes the process of finding spare parts faster, easier, and more transparent for both customers and local shopkeepers.

3.Methodology (Development Process)

3.1 Design of Research

The research followed a **design and development approach** to create a digital solution for challenges in the local spare parts market. The system was developed through stages such as design, development, testing, and improvement to ensure it works effectively for both customers and shopkeepers. The approach also considered real user needs, focusing on solving problems like checking spare parts availability, comparing prices, and managing inventory in local shops.

3.2 Technical Research

1. **Technology Analysis:** Various frontend and backend technologies were studied to select suitable tools for system development.
2. **Performance and Scalability:** The selected technologies were evaluated to ensure smooth performance and the ability to support future growth.
3. **Real-Time Data Support:** Technologies capable of handling real-time updates were chosen to provide accurate spare parts availability and price information.
4. **Responsive Design:** The platform was designed to work efficiently on different devices, making it accessible and easy to use for all users.
5. **Efficient System Architecture:** An appropriate system architecture was selected to ensure reliable data management, faster processing, and smooth communication between the frontend, backend, and database.

3.3 Architecture of the System

The system architecture follows a three-tier model separating presentation, application, and data layers to ensure modularity, scalability, and maintainability. The architecture was designed to support

concurrent user access, real-time data synchronization, and secure data management while maintaining responsiveness across different device types.

4.Design and Implementation

4.1 System Architecture

Frontend (Client Side): The frontend is developed using a modern component-based framework to provide a responsive and interactive interface. It enables users to search for spare parts, check availability, compare prices from local vendors, and place orders smoothly. The frontend communicates with the backend through RESTful APIs and supports dynamic content rendering and real-time updates.

Backend (Server-Side): The backend is built using Node.js and Express.js and handles core functionalities such as user and vendor authentication, spare parts management, price comparison, order processing, and billing. It validates requests, applies business logic, and ensures secure and real-time system operations.

Database (MySQL): The MySQL database stores structured data including vendor details, spare parts information, pricing, availability status, orders, and billing records. Its relational design ensures data integrity, efficient query processing, and scalability for future growth.

· **System Workflow**

1. The authenticated customer can access the web interface to search and view spare parts offered by nearby local shops.
2. The spare parts listings, prices, and inventory levels are updated by the authenticated shopkeeper in real time.
3. Customer requests for spare parts trigger the backend to receive an APIs request.
4. The backend processes and authenticates the request by fetching and updating data in the MySQL database.
5. The shopkeeper generates an electronic bill with proper GST breakup for the requested spare parts.
6. The system immediately updates the inventory and billing records after the transaction is completed.
7. The admin monitors shopkeeper activities, user data, and overall system data to ensure accuracy and proper system operation.

· **System Architecture Diagram**

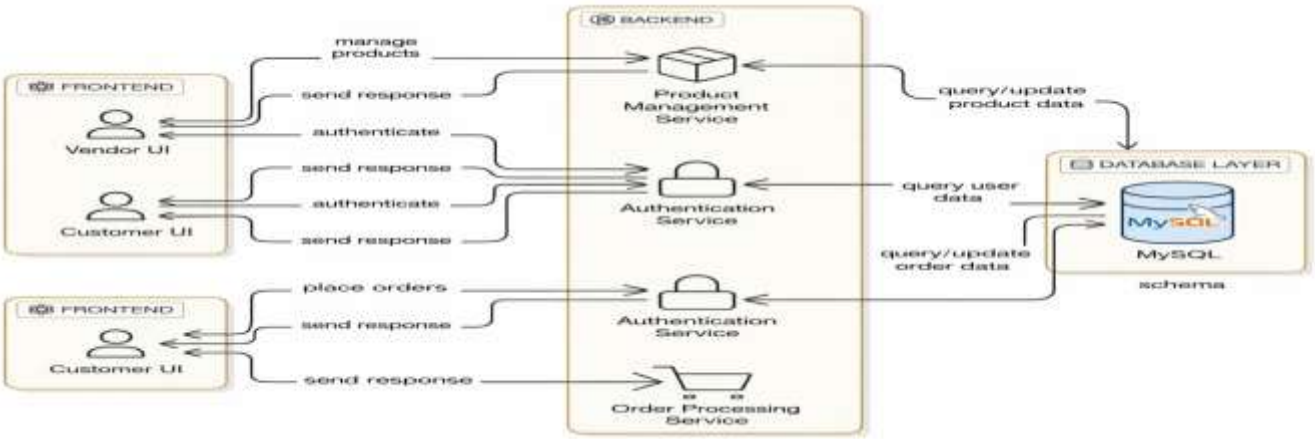


Figure 1: System Architecture of Spare Parts System

4.2 Technologies Used

The development of the **Real-Time Spare Parts Availability and Price Comparison System** uses a combination of modern programming languages, frameworks, and database technologies to ensure reliable, scalable, and user-friendly functionality. The system is designed to provide smooth performance for both customers and local shopkeepers while handling real-time product and price updates efficiently. The main technologies used for building and operating the platform are described as follows.

Table 1: Technology Stack for Spare Parts System

Component	Technology Used
Frontend	React.js, Next.js, HTML, CSS, JavaScript
Backend	Node.js, Express.js
Database	MySQL
Authentication	JSON Web token (JWT)
API Communication	REST APIs

4.3 User Interface (UI) & Screenshots

The Spare Parts website has a simple and smart interface designed so that vendors, buyers, and admins can easily do their tasks without any hassle. Whether on desktop or mobile, the site runs smoothly. The design focuses on easy and effective navigation so every user can quickly find the spare parts they need.

4.4 User Interface Overview

There are a number of role-based interfaces in the system:

- **Homepage**: The Homepage is accessible to all users and visitors, providing an overview of the site's features along with options to register or log in.
- **Registration Page**: New shopkeepers can register themselves to join the Spare Parts platform.
- **Login Page**: A unified login portal for admins and shopkeepers to access their accounts.
- **Shopkeeper Dashboard**: Allows shopkeepers to add and manage spare parts, update inventory and pricing in real-time, and generate bills with detailed GST information.
- **Customer Interface**: Allows customers to browse spare parts listed by nearby shops, check availability, and compare prices.
- **Admin Panel**: Manages shopkeeper accounts, monitors platform settings, and maintains system configurations.

5. UI Screenshots

The following figures show the Spare Parts application.

Figure 2: Homepage of Spare Parts System

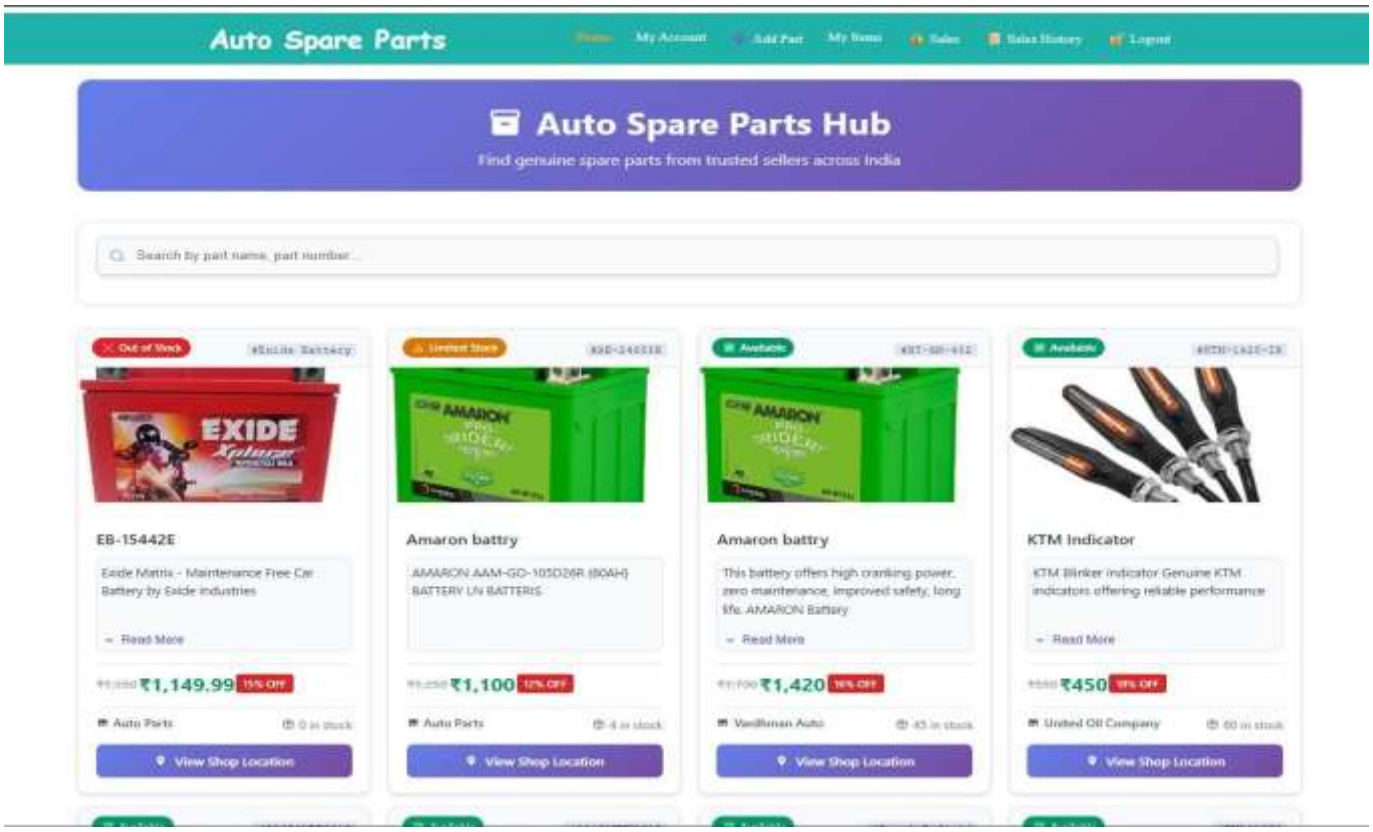


Figure 3: Shopkeeper dashboard landing page after login.

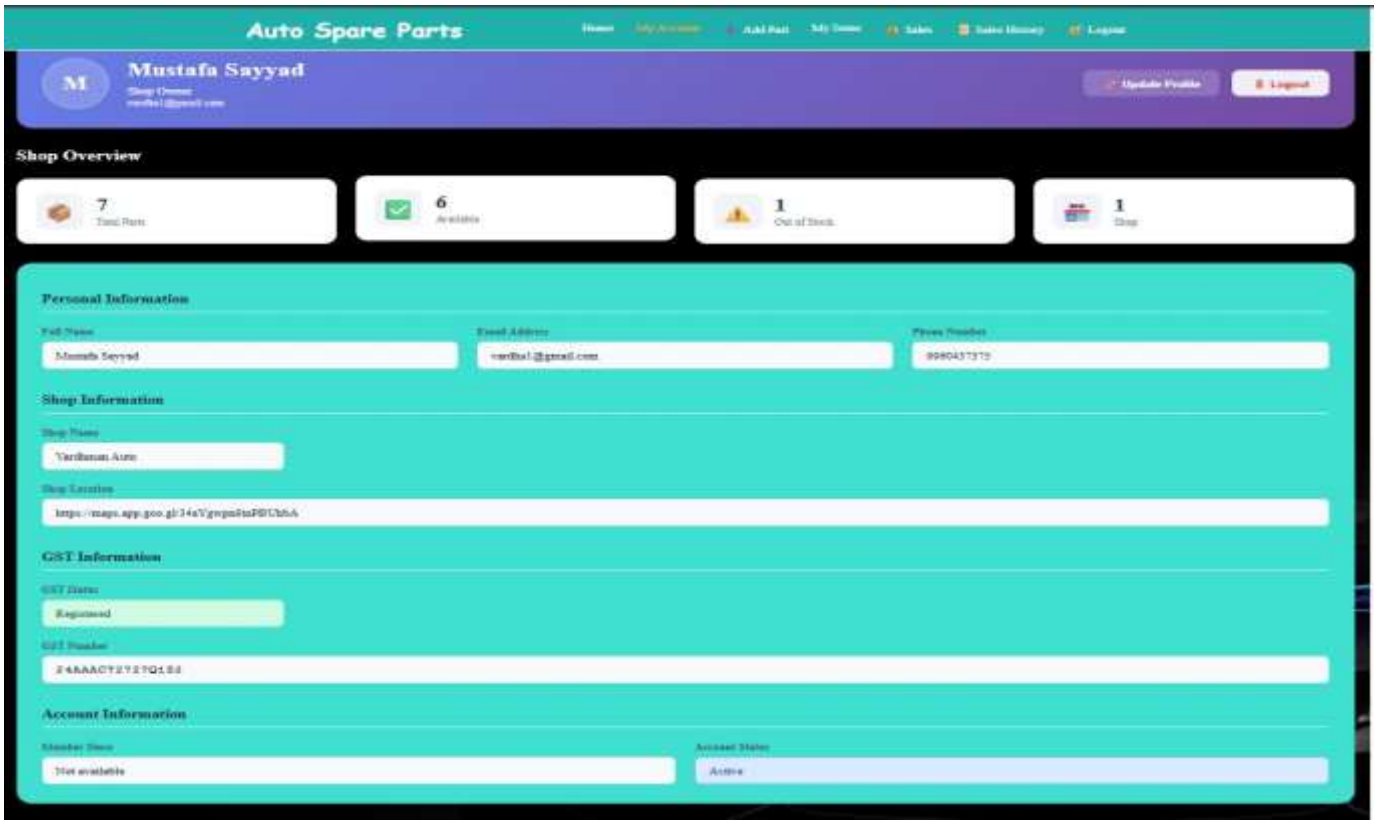


Figure 4: Shopkeepers can add multiple spare parts at once.

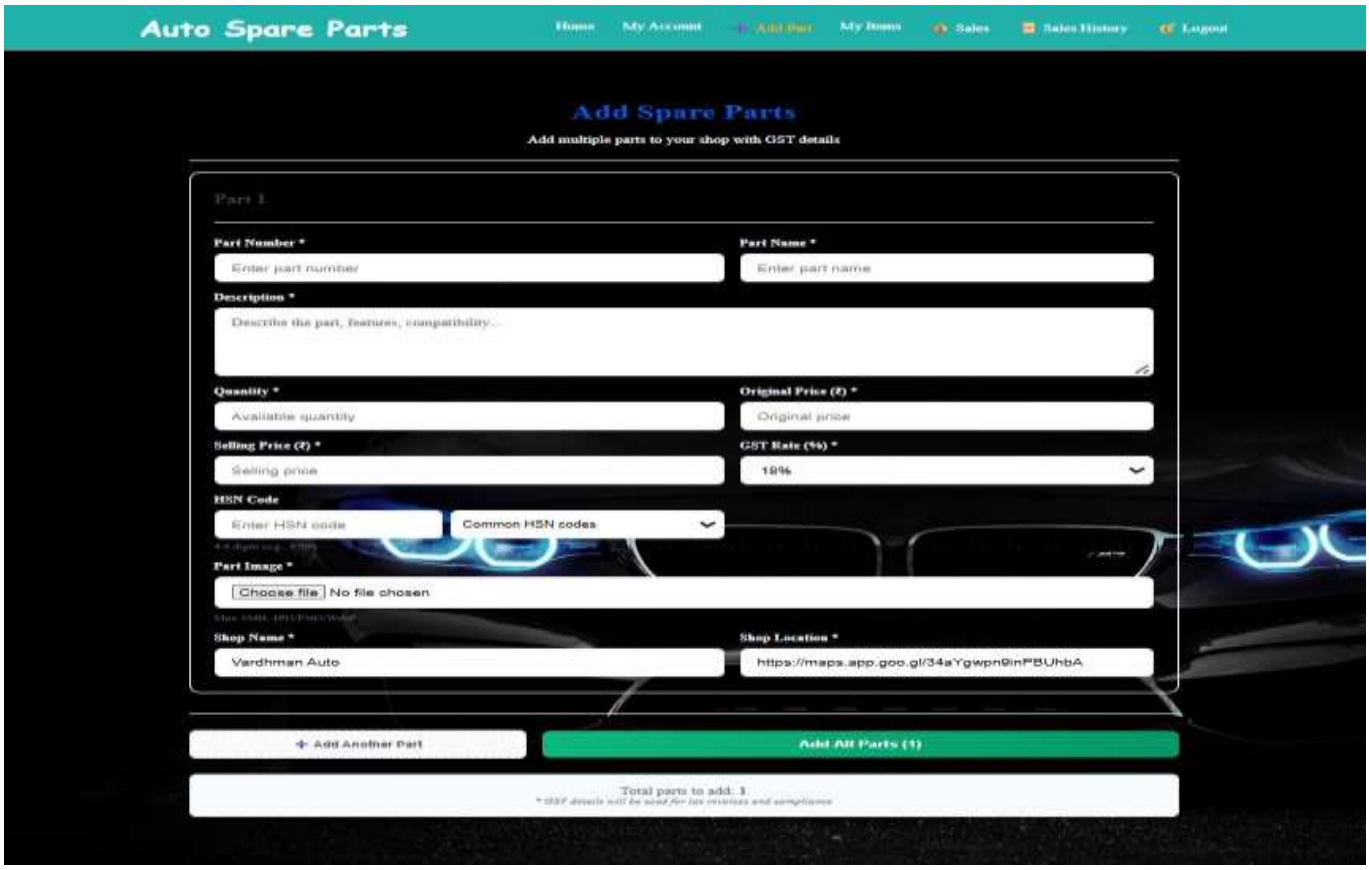


Figure 5: Shopkeeper interface to view, update, and delete all listed spare parts.

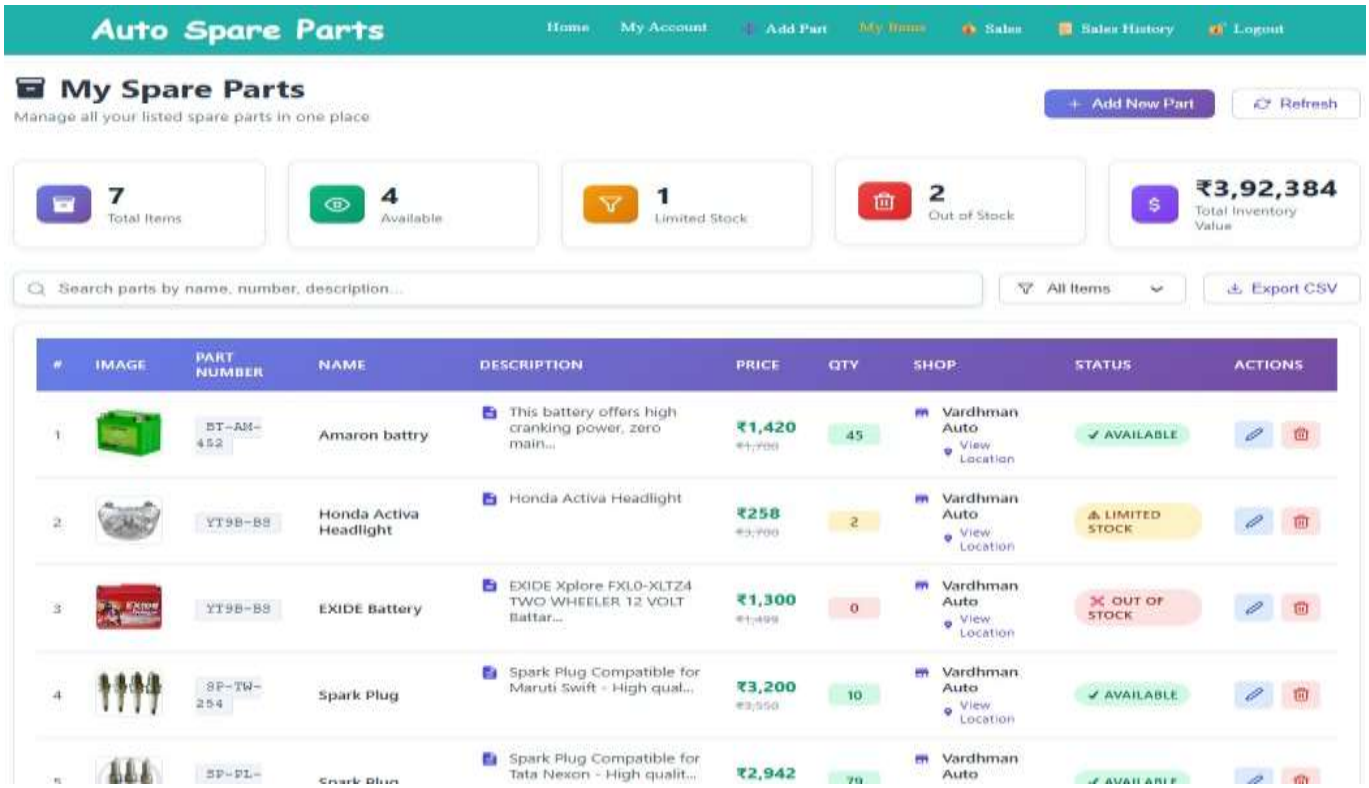


Figure 6: Shopkeeper sales interface to sell parts directly to customers and generate bills with GST details.

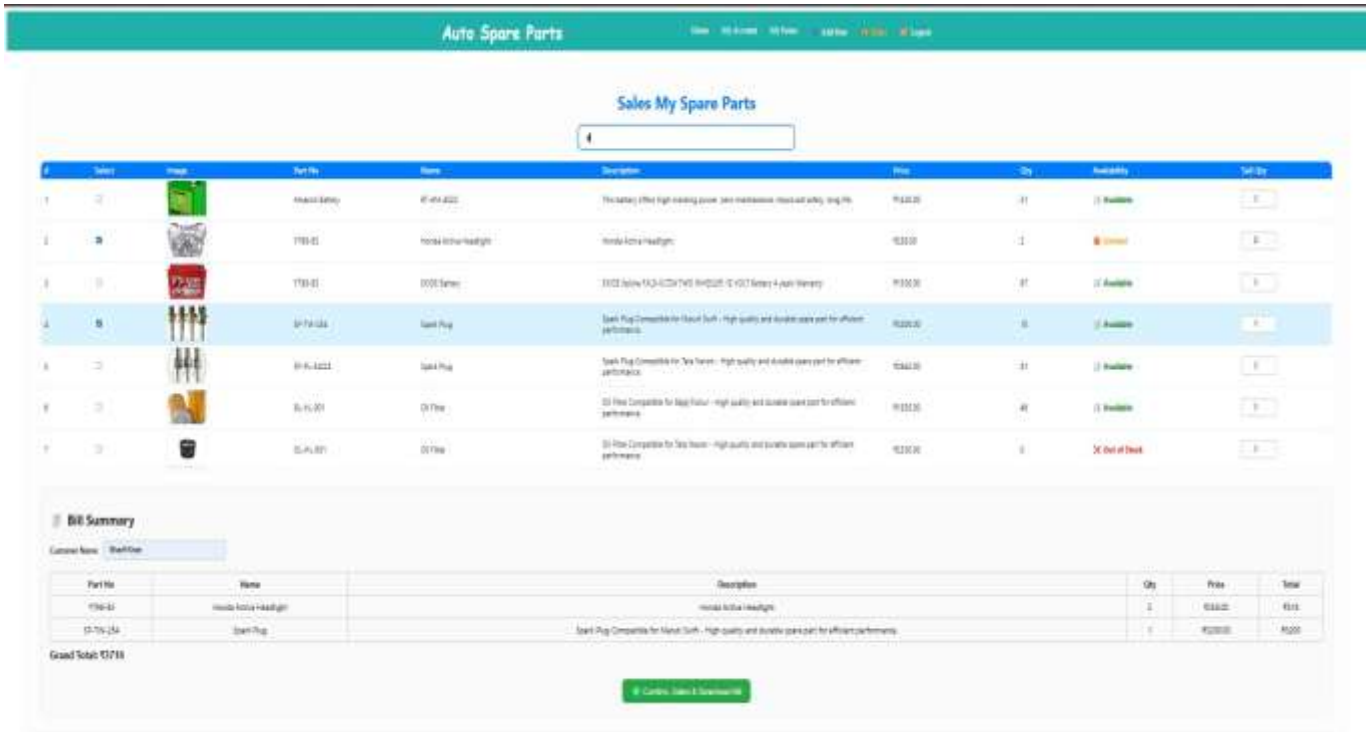


Figure 7: The Sales History page allows shopkeepers to easily view and track their past sales.

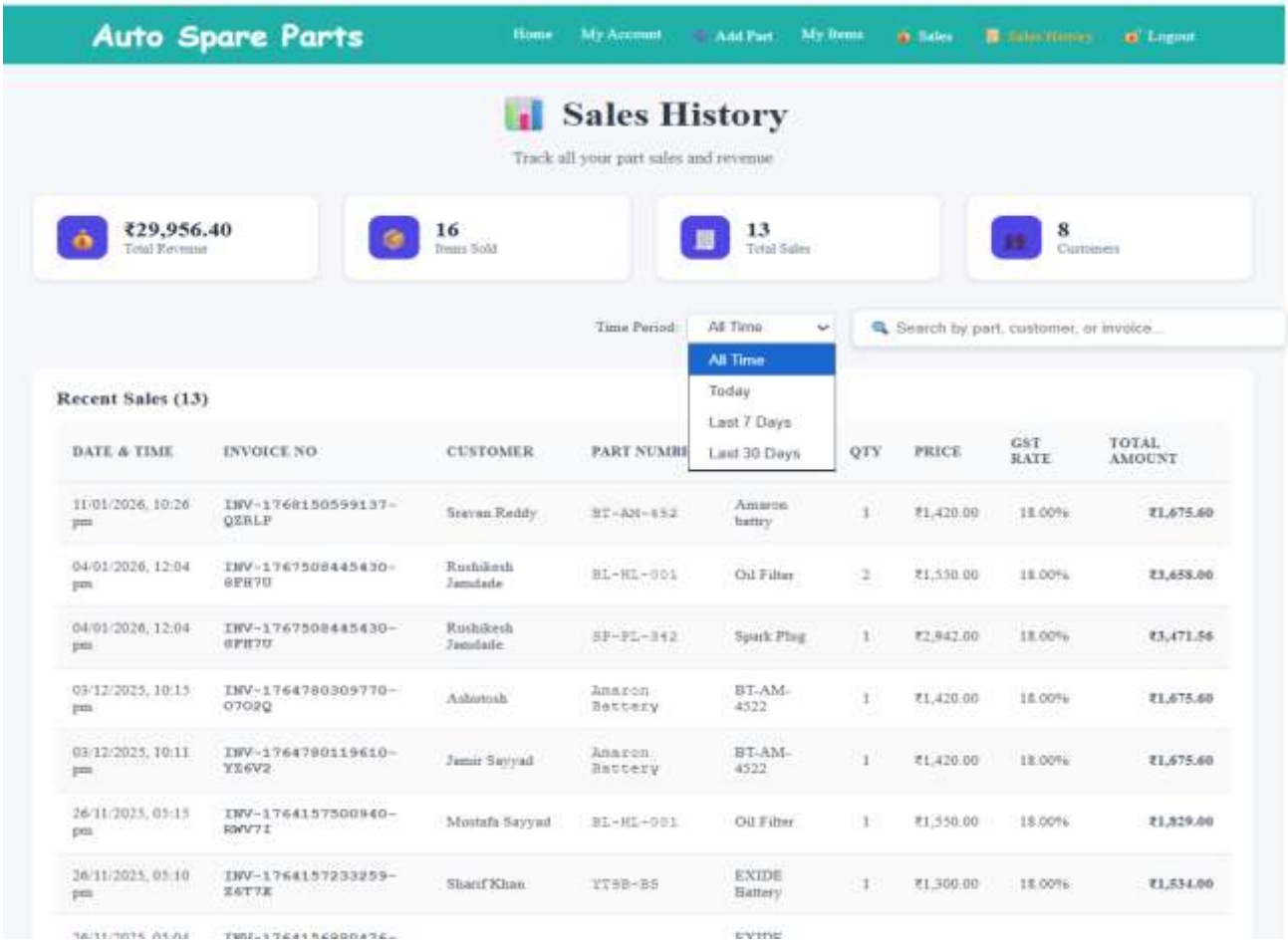


Figure 8: The shopkeeper can generate a bill for the customer

Figure 9: Customer interface for price comparison across multiple nearby shops.

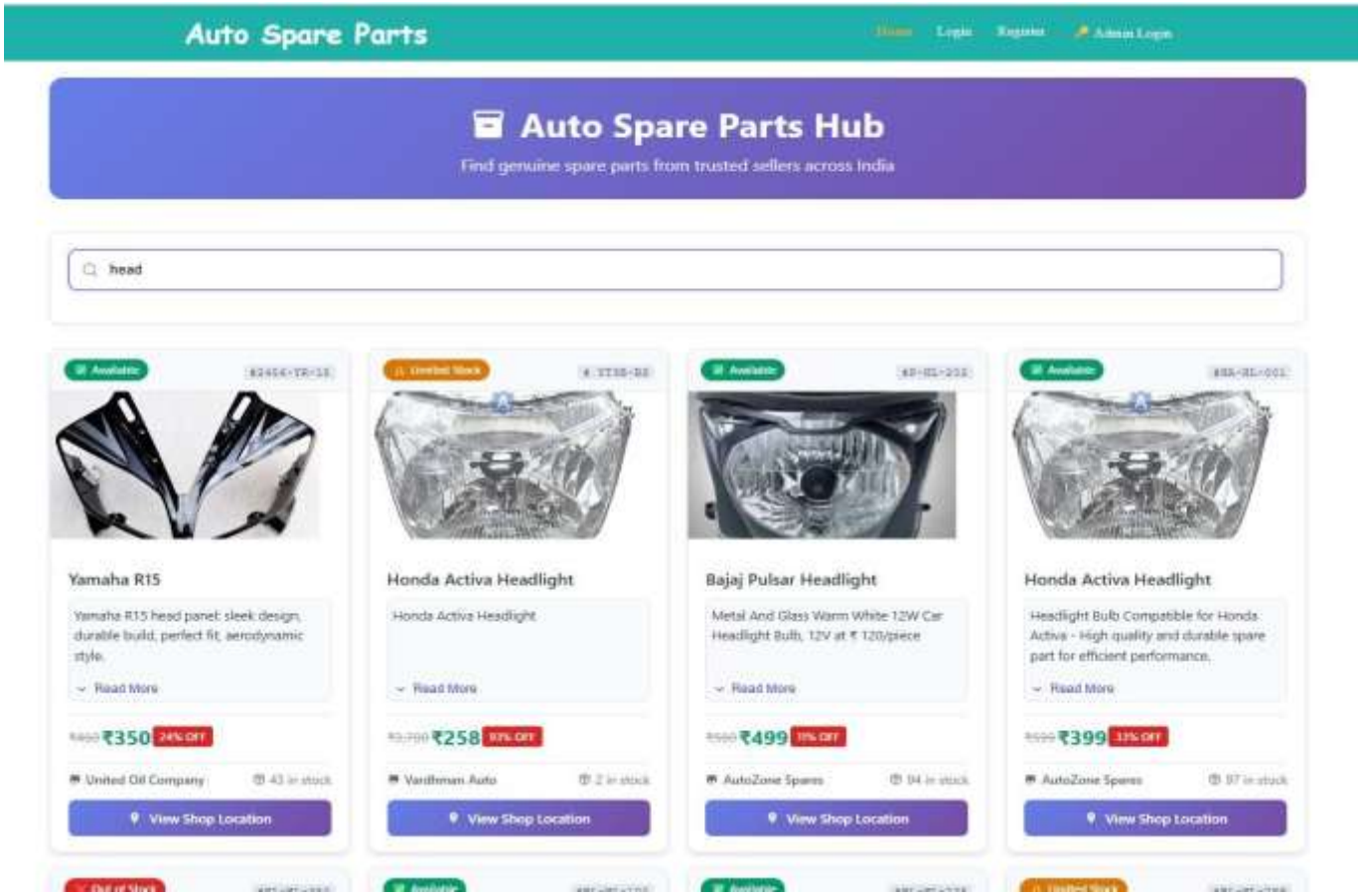
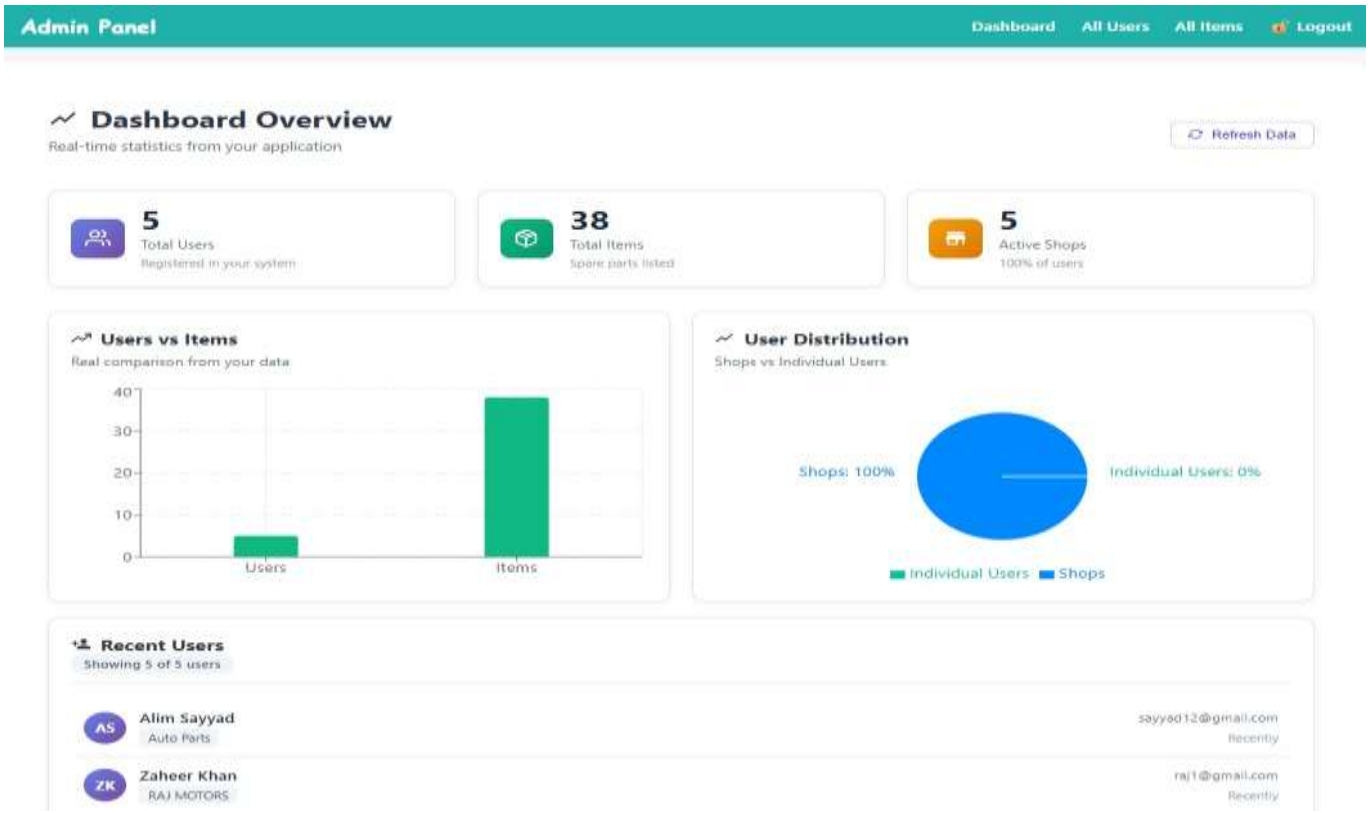


Figure 10: Admin dashboard showing total users, total spare parts, and platform statistics.



6. Discussion

6.1 Strengths of the System

- **Operational Efficiency for Shopkeepers:** The system keeps inventory records digitally, which helps shopkeepers avoid mistakes and saves the time normally spent checking stock manually. It makes it easier for them to track products and update stock whenever needed. The built-in sales and billing feature also helps complete customer transactions faster.
- **Enhanced Customer Experience:** The system reduces the time and effort customers spend searching for spare parts by providing information from multiple shops in one place. It allows customers to easily compare prices before making a purchase decision. This transparency encourages healthy competition among sellers and helps customers get better deals.
- **Competitive Digital Presence:** Provides local shops with a "digital storefront," making them discoverable to customers who prefer to search online first. This is a critical step in competing with larger e-commerce players.
- **Low Barrier to Entry:** The system requires only a standard computer or smartphone and an internet connection. No investment in specialized hardware like scanners or printers is mandatory, making it highly accessible.
- **Data-Driven Insights (Potential):** The accumulated data on sales and searches can, in future iterations, provide valuable insights into demand trends, popular parts, and pricing benchmarks for shopkeepers.

6.2 Challenges and Limitations

- **Manual Update Required:** The system depends on shopkeepers regularly updating their stock after every sale or restocking. If a shopkeeper forgets to update the inventory, the online information may become inaccurate.
- **Digital Learning Curve:** Some shopkeepers, especially older or less tech-savvy users, may face initial difficulty using the system, making a simple interface and basic training important.
- **No Online Payment or Delivery:** The platform only provides information about spare parts availability and prices. It does not support online payments or delivery services. The final purchase and payment are completed offline between the customer and shopkeeper.
- **Limited Value with Fewer Shops:** The usefulness of the system increases as more shopkeepers join the platform. If only a few shops are registered in an area, customers may not find enough options to compare, reducing overall value.

6.3 Future Scope

- **Mobile Application Development:** Developing Android and iOS mobile apps will improve accessibility for shopkeepers and customers and allow features like push notifications for stock updates.
- **Online Payment Integration:** Adding payment gateways such as Razor pay or Stripe will enable online payments, making the platform more convenient and moving it from information-based to transaction based.

- **Multilingual and Voice Search Support:** Supporting regional languages and voice-based search will help non-English-speaking and less tech-savvy users use the system more easily.
- **Machine Learning for Demand Prediction:** Using machine learning to analyze past sales data can help shopkeepers predict demand, manage stock levels better, and reduce overstock or shortages.
- **Automated Inventory Tracking:** Implementing QR code or RFID-based inventory tracking can reduce manual work for shopkeepers and improve the accuracy of stock updates.

7. Conclusion

This research successfully developed and implemented a real-time spare parts availability and price comparison system specifically designed for local shops and customers. The platform addresses significant gaps in the digital retail landscape by providing an affordable, accessible solution that enhances operational efficiency for vendors and purchasing convenience for consumers.

The system demonstrates that appropriate technology can effectively bridge the digital divide in informal retail sectors without requiring substantial financial investment or technical expertise from users. By focusing on real-time inventory management and transparent price comparison, the platform creates value for all stakeholders while maintaining simplicity and usability appropriate for the target audience.

The project validates the feasibility of community-focused digital marketplaces that leverage local business networks to create collective digital presence. It represents a step toward greater inclusion of informal retailers in the digital economy, potentially enhancing their competitiveness and sustainability in an evolving retail landscape.

Future enhancements, including mobile applications, payment integration, and advanced analytics, could further increase the platform's impact and utility. However, the current implementation provides a functional foundation that demonstrates both the need and opportunity for targeted digital solutions in traditionally underserved retail segments.

8. References

1. Mirco Peron, “Digital Twin and Additive Manufacturing in Spare Parts Supply,” *International Journal of Advanced Manufacturing Technology*, 2024.
2. Jan Holmström, Janne Partanen, Jari Tuomi, & Mikko Walter, “Rapid Manufacturing in the Spare Parts Supply Chain: Alternative Approaches to Spare Parts Logistics,” *Journal of Manufacturing Technology Management*, 2019.
3. Dmitry Ivanov & Alexandre Dolgui, “Digital Supply Chain and Industry 4.0: Smart and Resilient Supply Chain Models,” *International Journal of Production Research*, 2021.
4. Holger Kohl, Matthias Wuest, & Detlef Zuehlke, “Digital Twin Applications in Smart Manufacturing and Supply Chains,” *Procedia CIRP*, 2021.
5. Liang Zhang et al., “Price Comparison Engines in E-Commerce,” *Journal of Consumer Technology*, 2021.
6. Vishal Patel, “Real-Time Data and Customer Satisfaction in Automotive Retail,” *International Journal of Retail Science*, 2022.
7. Gaurav Iyer, “Barriers to Digital Transformation in Indian SMEs,” *Asian Business Review*, 2022.
8. Atanu Chaudhuri, Jayanth Jayaram, & Jan Holmström, “Digitalisation of Spare Parts Provision,” *International Journal of Production Research*, 2025.

9. Wojciech Lewicki & Bogdan Stankiewicz, "Influence of Spare Parts Availability on Car Servicing Costs," *ResearchGate / Automotive Research Studies*, 2019.
10. Marco Iansiti & Karim R. Lakhani, *Competing in the Age of AI: Strategy and Leadership When Algorithms and Networks Run the World*, Harvard Business Review Press, 2020.