



Shop Tracker

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ABSTRACT:

The Shoptracker Project proposes a crowd-sourced platform that allows the public to update product details and prices at a specific shop in real time. The Public can easily input and manage product information, including descriptions, prices, and availability, through a user-friendly interface. Other users can access this data via a mobile or web application, viewing detailed shop information and comparing prices across different stores within a specified location, incentives such as visibility boosts and promotional features encourage retailers to keep their information up-to-date.

This promotes informed purchasing decisions, leading to increased consumer satisfaction. The platform aims to enhance the shopping experience by offering transparency, accuracy, and efficiency. It fosters a competitive retail environment, driving retailers to offer better prices and services while empowering consumers with the information they need to make smart purchasing choices.

1. Introduction

The retail landscape is evolving rapidly, with technology playing a pivotal role in reshaping how consumers interact with businesses. In this dynamic environment, ShopTracker emerges as a revolutionary solution to bridge the gap between consumers and retailers by offering a real-time, crowd-sourced platform for updating and accessing product details and prices. Designed to empower consumers and drive competitive practices among retailers, ShopTracker integrates cutting-edge features to address the limitations of traditional shopping platforms, ensuring an enhanced shopping experience for all stakeholders.

In today's digital world, consumers increasingly rely on online shopping platforms and price comparison websites to make informed purchasing decisions. However, these platforms often suffer from static, outdated information, limited vendor representation, and an inability to reflect real-time market dynamics. Our project aims to address these challenges by utilizing crowd-sourcing, a methodology where a large group of

users contributes valuable, location-based data about product details, prices, and availability. By enabling the public to input and manage product information through an intuitive interface, ShopTracker ensures accuracy, transparency, and accessibility across its platform.

At the core of the platform lies an innovative data management system that uses timestamps and geolocation to verify and update its database in real time. This enables consumers to access the most up-to-date information about local shops and compare prices across multiple stores in a specific area. For retailers, ShopTracker provides a comprehensive dashboard offering valuable insights into consumer behavior and market trends. This empowers shopkeepers to make data-driven decisions and improve their services, fostering a competitive retail environment.

One of ShopTracker's standout features is its inclusivity. Unlike traditional platforms that often overlook smaller businesses and mobile vendors, ShopTracker integrates these stakeholders, offering them visibility and leveling the playing field. Incentives such as visibility boosts and



promotional tools further encourage retailers to keep their information current, ensuring a continuous flow of updated data. This inclusivity not only enhances the shopping experience for consumers but also supports local economies by promoting smaller businesses.

By integrating real-time updates and user-contributed data, ShopTracker empowers consumers to make smarter purchasing decisions. Users can identify the best deals, check product availability, and choose shops based on detailed feedback from other shoppers. This transparency leads to increased consumer satisfaction and creates a more informed, efficient marketplace.

Moreover, ShopTracker's data-driven approach extends beyond basic price and product comparisons, offering valuable analytical tools for both consumers and retailers. By aggregating and visualizing data trends, the platform enables users to identify patterns in pricing, seasonal demand, and product availability. This feature not only empowers consumers to time their purchases strategically but also provides retailers with actionable insights to optimize inventory management, pricing strategies, and promotional campaigns.

In conclusion, ShopTracker represents a transformative approach to retail interaction, blending crowd-sourcing, real-time technology, and inclusivity to redefine the shopping experience. By addressing the limitations of existing platforms and fostering a competitive retail environment, it empowers both consumers and retailers to thrive in today's fast-paced market. With its focus on transparency, efficiency, and user-centric design, ShopTracker has the potential to become a game-changing tool in the retail sector, enhancing the way people shop and engage with businesses.

2. Literature Survey

Analyzing Consumer Decision-Making in Energy Consumption investigates the role of consumer behavior in shaping energy policy frameworks. Using the EVIDENT platform, the study employs crowdsourcing methods like polls, questionnaires, and serious games to collect data across the EU. Insights link consumer habits to financial literacy, enhancing decision-making models. The use of interactive tools ensures rich data sets, promoting accurate and engaging policy interventions for effective energy management.

Web Scraping Techniques for Price Comparison Tools examines how web scraping technology meets the growing demand for real-time price comparison tools. By collecting data from online retailers, the platform offers automated, accurate, and up-to-date pricing information. Advanced algorithms enhance data reliability, streamlining comparisons and saving time for users. The study highlights how this approach fosters trust, improves decision-making, and transforms the efficiency of e-commerce platforms.

Strategic Data Sharing for Demand Forecasting in Online Retail explores how demand forecast data is shared selectively in online retail ecosystems. The research highlights factors like platform encroachment, product substitutability, and commission rates as key influences on data-sharing incentives among stakeholders. Findings suggest that strategic sharing improves forecasting accuracy and operational efficiency, aligning business strategies with market dynamics while addressing challenges in maintaining competitive advantage.

Crowdsourced Data for Post-Pandemic C2B E-Commerce analyzes the use of crowdsourced data to enhance consumer-to-business interactions in e-commerce post-pandemic. The study highlights incentivized consumer feedback as a driver for streamlined product returns and satisfaction. This approach supports better strategies, operational efficiency, and consumer-centric improvements, catering to evolving demands in a rapidly changing retail environment.

Dynamic Pricing and Crowdsourced Data in Online Marketplaces examines the integration of crowdsourced data into competitive pricing strategies. Real-time inputs on consumer preferences and product availability help develop dynamic pricing models that adapt to market changes. Despite challenges like maintaining data accuracy, findings emphasize how integrating consumer feedback fosters agility and ensures competitiveness, ultimately driving sustainable growth in digital retail ecosystems.

Real-Time Inventory Management Systems by J. Smith et al. examines the role of real-time data integration in inventory management for retail stores. The study highlights how technologies like IoT and mobile applications allow retailers to maintain accurate stock levels and respond to consumer demand efficiently.



Real-time inventory updates improve customer satisfaction by reducing out-of-stock scenarios and enabling dynamic pricing strategies, making these systems crucial for modern, consumer-centric retail platforms.

Crowdsourcing for Retail Data Collection by K. Brown et al. explores how crowdsourcing can gather granular retail data, including pricing, product availability, and store performance. The study demonstrates that incentivized contributions from consumers enhance data reliability and coverage, particularly for smaller businesses. Findings suggest that this approach not only improves transparency and competitiveness in the market but also empowers consumers to make informed purchasing decisions, aligning with the objectives of platforms.

The studies highlight challenges in crowd-sourced retail platforms. Ensuring data accuracy and combating misinformation are ongoing issues. Smaller vendors may lack the resources to consistently update information. Incentivizing user participation without compromising data quality is complex. Additionally, integrating advanced analytics and ensuring scalability for real-time updates require substantial technological investment, which can limit accessibility for some retailers and regions.

3. Existing System

Many current retail comparison platforms rely on static databases that provide outdated or generic information about products and prices. These systems often lack real-time updates, resulting in inaccuracies that mislead consumers or fail to reflect market trends. Basic aggregation methods are commonly used, offering limited filtering options and making it cumbersome for users to compare prices or product availability effectively. Smaller vendors and local shops are frequently excluded, leading to incomplete market coverage. Additionally, these platforms rarely incorporate dynamic consumer feedback or provide actionable insights to retailers. The lack of transparency and insufficient incentives for businesses to maintain up-to-date information further reduce the reliability of these platforms. Without robust mechanisms for crowdsourcing, verification, or advanced analytics, existing systems fail to foster informed decision-making or drive meaningful competition. As a result, they offer

only basic price comparison features, leaving significant gaps in user engagement and retail market inclusivity.

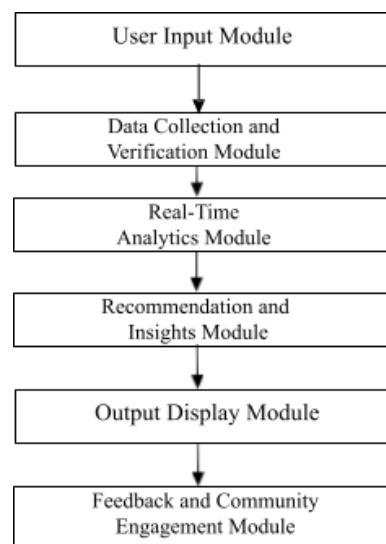


Figure 1. Existing System architecture

- **User Input Module:** This Module allows users to provide information such as the product name, category, or specific features they are looking for. Users can also input their location to receive localized results or specify preferences like budget range or preferred brands. The system collects this data through an intuitive interface, ensuring ease of use. The inputs serve as the foundation for generating tailored recommendations and market insights.
- **Data Collection and Verification Module:** This module collects product and price data from various sources, including crowdsourced user contributions and vendor uploads. It employs timestamping and geolocation features to validate the accuracy of the data, ensuring reliability. By integrating automated checks and user-reported corrections, the module eliminates outdated or incorrect information, providing a trustworthy database for users and vendors alike.
- **Real-Time Analytics Module:** This Module processes the gathered data to identify patterns, trends, and price fluctuations. It uses machine learning algorithms to predict pricing trends and provide insights on demand shifts. This ensures that the system stays dynamic and relevant, offering users up-to-date information on the best deals, seasonal discounts, and localized market behaviors.



- **Recommendation and Insights Module:** Based on user inputs and processed data, this module generates personalized recommendations for products and vendors. It ranks results based on criteria like user preferences and market trends.
- **Output Display Module:** This Module presents the curated results in an interactive and visually appealing format. Users can view product details, prices, vendor ratings, and localized availability on a single dashboard. Filters and sorting options allow users to customize the display according to their preferences, ensuring a seamless browsing experience.
- **Feedback and Community Engagement Module:** This module enables users to contribute feedback on vendors, report inaccuracies, and share reviews about products. It fosters a community-driven approach to data accuracy and user satisfaction. Additionally, it facilitates user engagement through features like polls, recommendations for similar products, and forums for sharing shopping experiences, enhancing the overall value of the system.
- **User-Driven Contributions:** Enable consumers to contribute data such as pricing trends, product availability, and feedback, creating an interactive and community-driven platform.
- **Geolocation and Regional Insights:** Utilize geolocation to deliver localized market insights, making the platform valuable for both urban and underserved rural regions.
- **Personalized Dashboards for Vendors:** Offer shopkeepers analytics tools to optimize inventory, pricing, and marketing strategies based on consumer behavior and market trends.
- **Improved Consumer Experience:** Provide users with tools to filter and customize shopping preferences, enhancing usability and helping them make informed purchasing decisions.
- **Culinary Exploration and Creativity:** Enable users to experiment with new recipes, ingredients, and cooking styles by providing suggestions that foster creativity.

4. Proposed System

ShopTracker transforms the shopping experience by integrating AI, crowd-sourcing, and real-time data updates. It offers personalized product and price comparisons tailored to location, preferences, and availability. Features include dynamic feedback, price tracking, and real-time availability updates, enhancing accessibility for all consumers. The system leverages crowdsourced data to ensure accuracy and transparency, providing consumers with reliable and localized market insights. Designed to foster inclusivity, it empowers both small vendors and consumers, creating an efficient, engaging, and competitive retail ecosystem.

Objectives of the Proposed Work

- **Real-Time Product and Price Data Collection:** Implement a dynamic, crowd-sourced data collection mechanism to ensure up-to-date product and pricing information across local and regional markets.
- **Inclusivity of Small Vendors:** Integrate small businesses and mobile vendors into the system to promote market diversity and provide consumers with access to unique local products and deals.

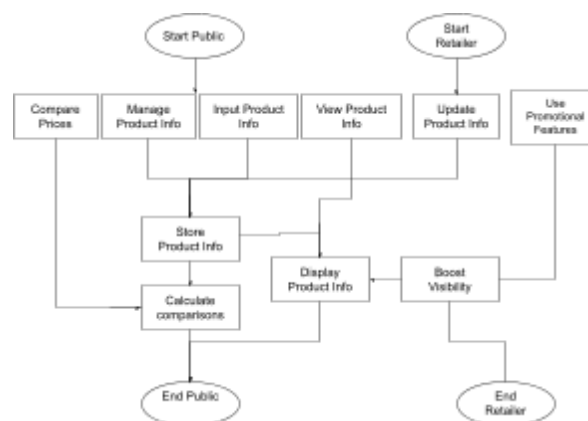


Figure 2. Proposed System Architecture

This architecture diagram outlines the workflow of ShopTracker, a platform designed to connect consumers, vendors, and businesses for a seamless shopping experience. The process begins with User Input, where users provide information such as product preferences, locations, and shopping goals. These inputs are critical for tailoring the platform's responses to user-specific needs.

After inputs are received, the system validates data through Crowd-Sourced Contributions. This module ensures accuracy by verifying timestamps, geolocation,



and community feedback, eliminating potential errors or outdated information.

If inconsistencies are found, the system uses real-time feedback mechanisms to suggest updates or corrections. Verified data proceeds to the Product and Price Analysis Module, where it is aggregated and categorized. This step integrates vendor data and user contributions, offering consumers a comprehensive view of market trends.

The Vendor Dashboard Module provides shopkeepers with insights into pricing trends, inventory management, and consumer behavior, allowing them to adapt dynamically to market demands. Simultaneously, the system delivers Localized Market Insights to users, ensuring accessibility to regional or niche products often overlooked by traditional platforms.

Finally, the Output Display Module presents tailored product recommendations, pricing comparisons, and vendor details in a user-friendly format. The system ensures an inclusive and transparent shopping experience, enhancing market accessibility for both consumers and vendors.

This architecture fosters a dynamic, interactive ecosystem where real-time updates, inclusivity, and user engagement drive transparency, efficiency, and innovation in the shopping process.

5. Implementation & Results

Backend Architecture:

The backend of ShopTracker is developed using Python, incorporating machine learning models for accurate and real-time data management. Crowdsourced inputs, including product details, pricing, and availability, are verified through timestamps and geolocation to ensure data reliability. Advanced preprocessing techniques ensure seamless integration of user-contributed information into the centralized database. Libraries such as Pandas handle data manipulation, NumPy performs numerical computations, and Scikit-learn powers predictive models for market trend analysis. This architecture ensures scalability and responsiveness, enabling accurate updates across diverse locations. By leveraging these tools, ShopTracker ensures its database remains current, fostering a transparent retail ecosystem

that benefits both consumers and vendors through reliable, verified information.

Frontend Design and User Interaction:

ShopTracker's frontend emphasizes user accessibility, providing an intuitive interface for consumers and shopkeepers alike. Users can input and access details like product prices and availability, while shopkeepers manage store profiles through personalized dashboards. Real-time feedback and price trends are presented clearly, enhancing user experience. Designed for

inclusivity, the platform supports smaller vendors and underserved areas. Responsive layouts ensure compatibility across devices, while analytics features help shopkeepers understand customer preferences. The interface encourages active consumer participation by simplifying data entry and browsing. With its efficient design, ShopTracker facilitates seamless navigation, promoting engagement and bridging gaps between users and the retail market.

Real-Time Data Integration and Analysis:

ShopTracker excels in aggregating and analyzing retail data in real time, offering consumers reliable insights and helping businesses optimize strategies. Verified user contributions are cross-referenced with geolocation data to maintain accuracy and prevent misinformation. Retailers and vendors benefit from advanced analytics, identifying pricing trends and market dynamics effectively. The platform fosters competition through dynamic price comparisons, while consumers access transparent and localized data. Real-time updates ensure the system remains reflective of market changes, making it a valuable tool for informed purchasing. This robust data integration connects enhancing shopping efficiency and retail competitiveness.

Market Insights and Retail Optimization:

ShopTracker provides valuable market insights by analyzing consumer behavior, sales trends, and competitive pricing strategies. Shopkeepers gain access to personalized dashboards featuring data-driven recommendations for inventory management and pricing adjustments, enabling them to respond effectively to market demands. The platform highlights regional trends and product popularity, helping retailers refine marketing efforts. Small businesses benefit from visibility



enhancements, empowering them to compete with larger retailers. By leveraging predictive analytics, ShopTracker optimizes stock levels and improves customer satisfaction. This strategic approach fosters a competitive and efficient retail ecosystem, ensuring that businesses stay adaptable while consumers enjoy a more informed and rewarding shopping experience.

Understanding user's current reliance on digital platforms, word-of-mouth, and traditional media for product and price information is also crucial to its success.

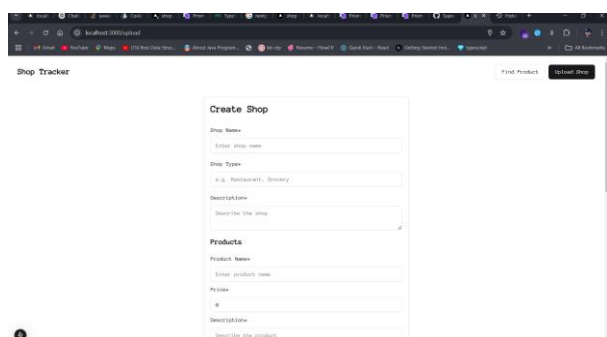


Figure 3. Product search page

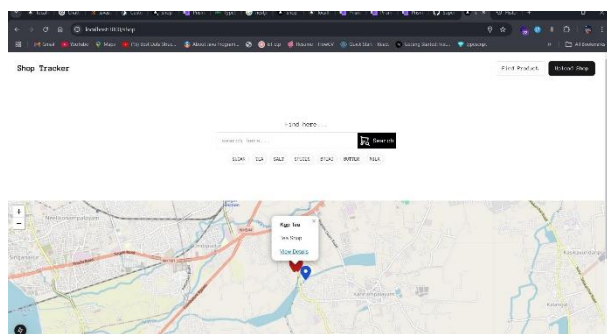


Figure 4. Final output Page

6. Conclusion

The proposed system offers a transformative approach to managing price and product information through a crowd-sourced platform that empowers users to contribute real-time updates while incorporating features for often-overlooked vendors. By supporting small businesses and street vendors through temporary shop pinning, the platform promotes inclusivity and diversifies product offerings. The integrated review system fosters community engagement, enhancing the user experience and providing valuable insights to guide purchasing decisions. Information is current and user-centric, setting a new standard for accuracy.

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