

Readace: Prise Analytics Portal

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Abstract:

Online shopping has become a vital part of consumer life in the age of digital transformation, providing convenience and a vast array of options. However, as e-commerce platforms proliferate, consumers find it more difficult to find the best deals on products because prices and promotions vary greatly among retailers, often requiring them to visit multiple websites to compare prices, features, and reviews manually, which is inefficient and time-consuming. The goal of this project is to develop an online price comparison tool that addresses these issues by aggregating real-time pricing, product features, and customer reviews from various e-commerce platforms. This will allow users to view all pertinent information in a single interface, assisting them in making timely and efficient decisions about what to buy. The tool will save customers time and guarantee they find the greatest offers without doing a lot of searching by offering real-time updates and a consolidated picture of the finest pricing available. By providing a clear, user-friendly platform that streamlines the decision-making process, aids in cost savings, and encourages competitive pricing among retailers, this project seeks to improve the online shopping experience.

Keywords:- Online Shopping, E-commerce, Price Comparison, Real-time Pricing, Product Features, Customer Reviews, Decision-making, Competitive Pricing

I.Introduction

The rapid growth of e-commerce has transformed the way consumers shop, offering unparalleled convenience, a vast array of products, and competitive pricing. However, the abundance of online retailers presents a challenge: comparing prices, features, and reviews across multiple platforms can be time-consuming and overwhelming. As a result, consumers often struggle to identify the best deals, leading to either overpaying for products or experiencing decision fatigue.

Price comparison websites have emerged as a solution to this problem. These platforms aggregate real-time pricing information from various online retailers, allowing shoppers to effortlessly compare costs, read user reviews, and evaluate product specifications in one centralized location. By streamlining the shopping process, price comparison websites enhance decision-making, reduce the risk of impulse purchases, and help consumers save both time and money.

This project explores the role of price comparison websites in shaping online shopping behavior. It seeks to analyze their effectiveness in helping consumers make informed purchasing decisions, the factors that influence their adoption, and potential improvements that could enhance their usability. By understanding how consumers interact with these tools, we can identify ways to optimize their functionality, making them even more efficient and beneficial for online shoppers.

Ultimately, price comparison websites simplify the e-commerce experience, empowering consumers with the information needed to make smart purchases with minimal effort. As technology advances, these platforms will continue to evolve, integrating new features such as dynamic pricing alerts.

II. Literature Survey

This systematic review examines the role of digital price comparison tools in shaping online shopping behavior. The study highlights how these platforms have evolved over time, improving price transparency and reducing information asymmetry. It also discusses challenges, such as misleading discounts, price manipulation, and the limitations of current comparison models. The paper emphasizes the need for regulatory policies to ensure fair pricing practices [1]. This paper explores how online price comparison platforms impact market competition and efficiency. It argues that these tools create a more competitive marketplace by forcing retailers to offer better prices. However, it also warns that excessive reliance on price comparison sites can lead to "race-to-the-bottom" pricing strategies, affecting product quality and seller profitability [2]. This research investigates how pricing and product information influence consumer satisfaction and purchasing decisions. It highlights that detailed product descriptions, high-quality images, and transparent pricing models significantly improve consumer trust. The study also examines the role of packaging in influencing buyer perceptions [3]. This study examines how price comparison websites affect consumer trust and brand loyalty. The research finds that while consumers benefit from lower prices, they often

become more price-sensitive and less brand-loyal. The paper suggests that retailers must adopt competitive yet sustainable pricing strategies [4]. The paper explores the relationship between digital price transparency and consumer trust in e-commerce. It identifies that platforms with real-time price tracking, verified seller reviews, and AI-driven recommendations enhance consumer confidence [5]. This research explores the role of AI in improving price comparison platforms. It discusses how machine learning algorithms analyze user preferences, predict price drops, and offer personalized recommendations. The study also highlights challenges related to algorithmic bias and data privacy [6]. The study evaluates how dynamic pricing affects consumer perceptions of fairness. While real-time pricing adjustments benefit retailers, sudden price fluctuations can create frustration among consumers. The research suggests that clear communication about pricing policies can mitigate negative reactions [7]. This paper examines how mobile shopping apps influence consumer price sensitivity. The findings indicate that mobile users are more likely to compare prices across multiple platforms, increasing competition among retailers. The study also highlights how push notifications with discounts influence buying behavior [8]. This study explores the potential of block chain technology in ensuring price transparency and preventing fraudulent pricing practices. It proposes a decentralized price-tracking system where all price changes are recorded on a public ledger to enhance trust and accountability [9]. This research investigates how consumers make purchasing decisions when using price aggregation platforms. It finds that ease of use, intuitive filtering options, and personalized search results significantly impact consumer satisfaction. The study also highlights that too many options can lead to "choice overload," making decision-making more difficult [10].

Proposed System

The diagram illustrates a price comparison and shopping trend analysis system that integrates machine learning, web scraping, and user data tracking to enhance online shopping experiences. The process begins with a user history fetcher, which retrieves past shopping data from a database and tracks online spending and order history from various e-commerce websites. Simultaneously, a

wishlist database stores products that users are interested in, which is then analyzed by an interest detector to identify shopping trends and preferences. Machine learning algorithms refine these interests, improving the accuracy of recommendations. A web scraper gathers real-time product information from different online stores, feeding the data into a price checker, which compares prices and identifies the minimum price for a particular product. This system enables consumers to make informed purchasing decisions by providing real-time price comparisons, ensuring they get the best deals while also gaining insights into their shopping habits. By automating the process, the system reduces the time and effort required for manual price comparisons and enhances overall shopping efficiency.

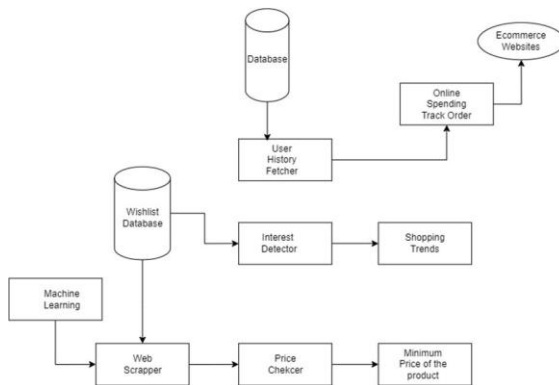


Figure1 Proposed System Architecture

- **Web Scraper:** This tool is like a robot that goes to different online stores and grabs product information for us. It collects details such as product names, prices, and reviews. It also needs to handle tricky websites that load content dynamically (like with JavaScript) and must follow the rules of each website to avoid any issues.

- **Data Collection Module:** Once the web scraper gathers all the product data, this part takes everything from the scraper and any other sources, like APIs, and puts it all together in one place. This includes details like prices, features, and customer reviews.

- **Data Preprocessing Module:** After we have all the data, this part makes sure it's clean and ready to be

analyzed. It removes any duplicates, fixes missing information, and makes sure things like prices are consistent (for example, converting all prices to the same currency so we can compare them easily).

- **Feature Extraction Module:** This part looks through the data and pulls out useful information that can help us understand customer opinions. It uses techniques like sentiment analysis (which analyzes customer reviews) to figure out if people are happy or unhappy with the product. This helps us see trends and patterns in customer feedback.

Machine Learning Model:

- **Price Prediction Model:** Implements regression algorithms (like Linear Regression or Random Forest) to forecast correct vendor based on data fetch.
- **Recommendation System:** Utilizes collaborative filtering and content-based filtering methods to suggest products tailored to user preferences.
- **Ranking Mechanism:** This component ranks products based on various criteria, including price, sentiment score, and popularity, helping users identify the best deals quickly.
- **User Interface (UI):** The front-end application where users can input search queries, view product comparisons, and receive recommendations. The UI interacts with the backend services to fetch and display data.
- **Database:** A database to store collected data, including product details, historical prices, user preferences, and feedback.
- **Analytics Dashboard:** An optional component for internal use, allowing developers to monitor system performance, data accuracy, and user engagement metrics.

Algorithms:

1. Data Acquisition Algorithm

Web Scraping: Use libraries like BeautifulSoup or Scrapy to send HTTP requests to multiple e-commerce platforms, retrieve HTML content, and extract product data (name, price, ratings, availability).

2. Data Preprocessing Algorithm

Data Cleaning: Remove duplicates, handle missing values (fill or drop), and standardize price formats.

Feature Extraction: Utilize NLP libraries (e.g., NLTK, spaCy) to tokenize reviews and calculate sentiment scores.

3. Comparison Algorithm

Price Comparison: Implement a function to filter and sort products by price based on user

queries, returning the best deals.

4. Ranking Algorithm

Product Ranking: Create a scoring system that weighs attributes (price, rating, sentiment) to rank products and display the top results.

5. Recommendation Algorithm

Recommendation System: Use collaborative filtering and content-based filtering to suggest products based on user behavior and preferences.

6. API Communication Algorithm

API Integration: Write functions for sending requests to any external APIs, with error handling for timeouts and rate limits.

7. Testing Algorithm

Unit Testing: Implement tests for each algorithm using frameworks like pytest to validate functionality and handle edge cases.

III. Conclusion

The proposed price comparison and shopping trend analysis system enhances online shopping by integrating machine learning, web scraping, and user data tracking to provide real-time price comparisons and consumer insights. By analyzing user history and wish list data, the system identifies shopping trends and personalizes recommendations, ensuring consumers make informed purchasing decisions. The web scraper automates price retrieval from multiple e-commerce platforms, and the price checker determines the lowest available price, eliminating the need for manual searches. This approach not only saves time but also promotes price transparency and cost efficiency, empowering users to get the best deals effortlessly. In the long run, such a system can drive more competitive pricing among retailers while improving the overall shopping experience for consumers.

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