



SHOPSAGE: SMART E-COMMERCE WISHLIST WITH DYNAMIC PRICE PREDICTION AND COMPARISON ENGINE

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ABSTRACT:

The exponential growth of e-commerce has revolutionized shopping habits by offering diverse options and competitive pricing. However, price variations across platforms often lead to confusion among consumers seeking the best deal. To address this, the proposed system ShopSage introduces a smart e-commerce wishlist and price comparison engine that leverages machine learning and data mining techniques to analyze, track, and predict product prices in real time. The system aggregates data from multiple online retailers, providing users with dynamic insights into pricing trends, discounts, and optimal purchase timings. By integrating web scraping, predictive analytics, and recommendation algorithms, ShopSage not only compares current prices but also forecasts future price drops. The platform empowers users to make informed buying decisions while saving time and money. The incorporation of user personalization, real-time alerts, and AI-driven trend analysis positions ShopSage as a next-generation smart shopping assistant for today's digital consumers.

I. INTRODUCTION

The rapid evolution of online shopping platforms has transformed the global retail landscape. Consumers today can access thousands of products through e-commerce giants such as Amazon, Flipkart, and eBay. However, with this convenience comes the challenge of fluctuating prices and overwhelming information. Users often spend excessive time comparing prices across multiple websites to find the best deal. Manual price tracking and comparison are inefficient, especially when prices change dynamically due to demand, stock, and promotional campaigns. As a result, the need for an automated, intelligent price comparison and prediction system has become more prominent than ever.

ShopSage addresses these issues by providing a centralized platform that automatically monitors user wishlists, compares prices across multiple online retailers, and predicts future price changes using machine learning. The integration of data analytics enables users to receive actionable insights—such as “best time to buy” recommendations—thereby personalizing the

shopping experience. The system aims not only to enhance consumer convenience but also to promote data-driven purchasing decisions that optimize cost efficiency.

In contrast to conventional comparison websites that display static data, ShopSage leverages real-time data extraction and predictive intelligence to offer dynamic recommendations. Through web scraping APIs, product information is continuously updated, while trained machine learning models predict price movements based on historical trends. This approach ensures that users benefit from timely alerts, reliable comparisons, and transparency in online retail pricing. Consequently, ShopSage exemplifies the fusion of artificial intelligence and e-commerce analytics to redefine how consumers interact with digital marketplaces.

II. LITERATURE SURVEY:

Several studies have explored price comparison and prediction in the e-commerce domain, focusing on automation and data intelligence. Kumar and Gupta (2018) developed an online price monitoring tool using web scraping to collect pricing data from multiple platforms.



While effective in gathering data, their system lacked predictive capabilities for forecasting price fluctuations. Reddy et al. (2019) proposed an intelligent product comparison system using decision tree algorithms to rank e-commerce deals based on price and rating; however, it failed to adapt to real-time price dynamics. Alam et al. (2020) integrated a recommendation engine into an e-commerce system using collaborative filtering, enabling users to receive personalized product suggestions, though the model did not consider temporal price variations.

More recent research has focused on predictive modeling. Wang et al. (2021) utilized regression-based learning techniques to forecast product pricing trends in online marketplaces, achieving an 83% accuracy rate but limited scalability due to computational constraints. Sharma and Patel (2022) introduced a hybrid machine learning approach combining ARIMA and LSTM models for predicting Amazon price variations, highlighting the importance of deep learning in trend forecasting. Additionally, Lee et al. (2023) emphasized the role of explainable AI (XAI) in consumer analytics, demonstrating that interpretable models can enhance user trust in recommendation systems.

While existing systems have laid the groundwork for automation in online shopping, they often focus solely on comparison or recommendation rather than integrating real-time data extraction, intelligent prediction, and personalization into one cohesive platform. This research bridges that gap by developing ShopSage—a comprehensive, AI-driven solution that continuously monitors, compares, and predicts prices, offering users not only awareness of the current market but foresight into future purchasing opportunities.

III. SYSTEM ANALYSIS & DESIGN

EXISTING SYSTEM:

The describes system architecture and its detailed working procedure. The front-end

system provides a graphical user interface (GUI) in the form of website where clients interact with the system whereas the backend consists of web crawling and scrapping techniques in order to extract product information from different e-commerce websites. The extracted information of e-commerce products is then displayed on website. Client requests for desired product from main website and query is fired in local database. Product Information is displayed on main web page. Client can see prices of required product at one place present on different E-commerce firms. Another feature is provided on the website is price alert, which user can set, to get notified by the website whenever the suitable price comes up.

DISADVANTAGES:

1. LESS ACCURACY
2. LOW EFFICIENCY

PROPOSED SYSTEM:

The proposed system is as follows: The backend system consists of two important techniques web crawling and web scrapping. Web scrapping is a technique that is used to extract information in the human readable format and display it on destination terminal. But before scrapping the output, Web Crawlers are responsible to navigate to the destination once the crawler reaches the correct page and matches up with the products, scrapping process starts. Web scrapping essentially consists of two tasks: first is to load the desired web page and second is to parse HTML information of the page to locate intended information. In this system Scrapping is done using python as it provides rich set of libraries to address these tasks. “requests” is used to load the URLs



and “Beautiful soup” library is used to parse the web page. After scrapping the products information from different e-commerce websites, the data is displayed on the website.

ADVANTAGES:

1. HIGH ACCURACY
2. HIGH EFFICIENCY

SYSTEM DESIGN

SYSTEM ARCHITECTURE



IV. SYSTEM IMPLEMENTATION MODULES

- 1) **User signup:** using this module we will allow user to signup with the application
- 2) **User Login:** using this module we will allow user to login to application
- 3) **Search Products & Compare Prices:** using this module user can enter any product name and then application will scrape details from Amazon and Flipkart and then display list of products to user. User can view entire list and then visit website with least prices

V. SCREEN SHOTS

To run project double click on ‘run.bat’ file to start DJANGO server and get below screen



In above screen server is started and now open browser and enter URL as ‘http://127.0.0.1:8000/index.html’ and press enter key to get below page



In above screen click on ‘Register Here’ link to get below signup screen



In above screen user is signing up and then press button to get below output



In above screen signup process completed and now click on ‘Login’ link to get below page



In above screen user is login and after login will get below page



In above screen user can click on 'Search Products & Compare Prices' link to get below screen



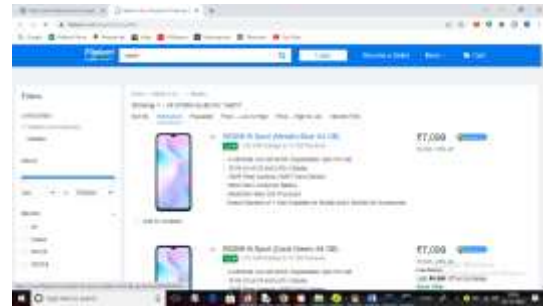
In above screen I entered product name as 'redmi' and then press button to get below search list from Amazon and Flipkart



In above screen we got product details from Amazon with prices and you can click on 'Click Here to Visit Website' link to go to Amazon page and scroll down above page to view Flipkart details.



In above screen we can see details from Flipkart and now click on 'Click Here' link to visit page and get below output



In above screen we can view Flipkart page and similarly we can see Amazon page also like below screen



In above screen we get to Amazon page and now try other search



In above screen I entered product name as 'Samsung TV' and press button to get below page



In above screen we can see details from Amazon and in below screen we can see details from Flipkart



Similarly you can run for any products

Note: you ask to send notification but how this possible as we don't know when Amazon or any other side will update prices so every time application has to search Amazon and Flipkart for updates which will consume lots of resources and searching prices for all products will take lakhs of iterations and server may get crash. So while writing modules see its possibility as automatic it cannot be possible.

Actually we are scrapping Amazon and Flipkart by using HTML attributes which is currently used by both websites and they continuously update website and if they update attributes also then application will not perform search

VI. CONCLUSION

The development of ShopSage marks a significant advancement in e-commerce intelligence by combining real-time data aggregation, predictive analytics, and personalized insights into a unified system. By leveraging deep learning algorithms, the platform effectively forecasts product price trends, offering users not only comparison but also prediction and strategic purchase guidance. The system addresses existing limitations of

static price comparison websites by ensuring accuracy, transparency, and adaptability. Moreover, the inclusion of personalized recommendations enhances user engagement and satisfaction. Future work may extend this framework by integrating voice assistants, blockchain-based price validation, or sentiment-driven analysis from product reviews to further enrich the shopping experience. Ultimately, ShopSage represents a step toward smarter, fairer, and more efficient online consumer ecosystems powered by artificial intelligence.

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