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Price Comparison& Price-Tracking Platformwith AI Prediction

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Abstract: ***The rapid growth of e-commerce platforms has provided consumers with multiple choices for purchasing products online. However, comparing prices across different websites manually is time-consuming and inefficient. This project proposes a Price Comparison and Price-Tracking Platform with AI Prediction that automatically collects product prices from multiple online stores and displays them in a single interface. The system uses web scraping techniques to extract product details from popular e-commerce websites such as Amazon, Flipkart, and Meesho. The collected data is stored in a MySQL/SQLite database and processed using machine learning algorithms to predict future price trends.The platform helps users make better purchasing decisions by showing real-time price comparisons, historical price charts, and price drop alerts. This system reduces the time spent searching for the best deals and improves the overall shopping experience.***
Keywords: Price Comparison, Price Tracking, E-commerce, Machine Learning, Price Prediction, Data Analysis, Online Shopping, Artificial Intelligence, Market Analysis, Product Price Monitoring.

I. INTRODUCTION

The rapid growth of the internet and digital technology has significantly changed the way people shop. Online shopping platforms have become very popular because they offer convenience, a wide variety of products, and the ability to shop from anywhere. Many e-commerce websites such as Amazon, Flipkart, and Meesho sell similar products but often at different prices. Because of this price variation, customers usually spend a lot of time visiting multiple websites to compare prices before making a purchase.Price comparison has therefore become an important part of online shopping. Consumers always want to buy products at the lowest possible price while ensuring good quality. However, manually checking prices on multiple platforms is time-consuming and sometimes confusing because prices frequently change due to discounts, seasonal sales, and promotional offers.

To solve this problem, a Price Comparison and Price-Tracking Platform with AI Prediction can be developed. This system automatically collects product price data from various e-commerce websites and presents it in a single platform. The system uses web scraping techniques to extract product information such as product name, price, rating, and availability. The collected data is then stored in a database for further analysis.In addition to price comparison, the platform also uses Artificial Intelligence (AI) and Machine Learning techniques to analyze historical price data and predict future price trends. This helps users decide whether they should purchase a product immediately or wait for a possible price drop. The system may also provide price alerts or notifications when the price of a product decreases.

The main aim of this project is to design a smart system that simplifies online shopping by providing real-time price comparison, price tracking, and intelligent price prediction. By integrating modern technologies such as machine learning, data analysis, and web technologies, the platform helps users make better purchasing decisions and saves both time and money..

A. Research Objectives

- To develop a platform that compares product prices across multiple e-commerce websites.
- To implement web scraping techniques for automatic data collection.
- To store product price data in a structured database.
- To implement machine learning algorithms for price prediction.
- To provide price alerts and notifications for users.

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II. LITERATURE SURVEY

These systems aim to reduce the time required for consumers to search for products and compare prices manually. Early price comparison tools mainly focused on collecting product prices from multiple websites and displaying them on a single platform. However, these systems lacked intelligent features such as price prediction and automated price tracking.

Some studies have proposed the use of web scraping techniques to collect product information from e-commerce websites. Web scraping allows automated extraction of product data such as price, ratings, and availability from different online stores. Technologies such as Python libraries like BeautifulSoup and Requests are commonly used to collect this information. These systems have proven effective in gathering large amounts of product data in real time.

In recent years, researchers have also introduced machine learning algorithms to improve price comparison platforms. Machine learning models such as Linear Regression, Decision Trees, and Time Series Forecasting are used to analyze historical price data and predict future price trends. These models help users determine the best time to purchase a product by predicting whether the price will increase or decrease.

Other research has focused on consumer decision support systems, where intelligent algorithms provide recommendations to users based on price trends, user preferences, and product popularity. These systems improve the overall shopping experience by helping customers make more informed purchasing decisions.

Despite the availability of several price comparison tools, many existing systems still have limitations such as limited website coverage, lack of accurate prediction models, and difficulty handling dynamic web pages. Therefore, the proposed Price Comparison and Price-Tracking Platform with AI Prediction aims to overcome these limitations by integrating advanced web scraping techniques, efficient database management, and machine learning models for accurate price prediction.

This literature survey provides the foundation for developing a more efficient and intelligent price comparison platform that helps users save time and money while shopping online

III. SYSTEM ARCHITECTURE

The system is designed using a three-layer architecture, which includes the Frontend Layer, Backend Layer, and Database Layer. These layers work together to provide price comparison, price tracking, and prediction services.

A. Hardware Components:

The hardware requirements for the Price Comparison and Price-Tracking Platform with AI Prediction are minimal because the system is mainly a web-based software application. A computer system with at least an Intel Core i3 processor or equivalent is required to run the development tools and application efficiently. The system should have a minimum of 4 GB RAM, although 8 GB RAM is recommended for better performance when running multiple applications such as the database, web server, and machine learning libraries simultaneously. For storage, a minimum of 256 GB hard disk is needed to store the operating system, project files, datasets, and development software, while a 512 GB SSD is recommended for faster processing and improved system performance. A standard monitor with a resolution of at least 1366 × 768 is required for development and testing purposes. Basic input devices such as a keyboard and mouse are necessary for coding and interacting with the system. Additionally, a stable internet connection is required for collecting product data from e-commerce websites, downloading required software libraries, and testing the web-based application. Together, these hardware components provide a suitable environment for developing and running the proposed system efficiently.

B. Software Components:

The software components of the Price Comparison and Price-Tracking Platform with AI Prediction include all the software tools, programming languages, frameworks, and libraries used to develop and run the system. These components help in building the frontend interface, processing data in the backend, collecting product information, and performing machine learning predictions.

The development of the AI-Based Price Comparison and Price Tracking System requires several software components to ensure efficient functionality and performance. A code editor such as Visual Studio Code is used for writing and managing the application code. Programming languages like Python and Node.js are used for implementing backend logic, web scraping, and server-side operations. For data storage, MySQL is used to manage product details, user data, and price history. Web scraping tools such as Selenium, Beautiful Soup, and Scrapy are used to extract product information from various e-commerce websites. Additionally, machine learning frameworks like TensorFlow are used to analyze data and predict price trends.

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For testing and debugging, tools like Postman and web browsers such as Google Chrome are used. These software components work together to build a robust and efficient price comparison system.

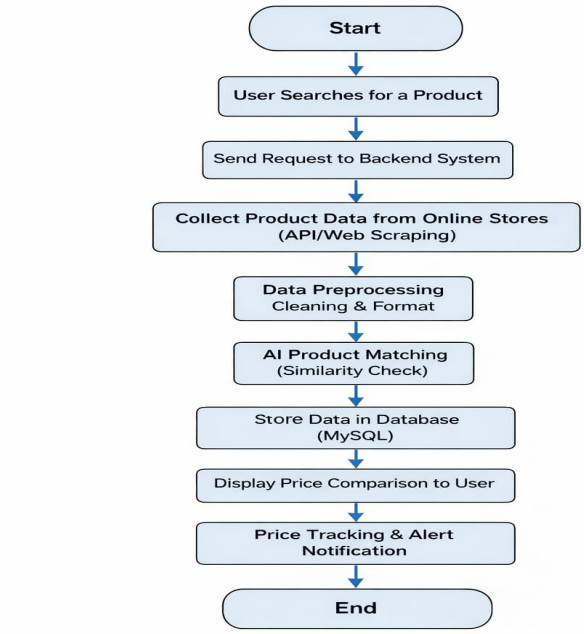


Fig1: System flowchart

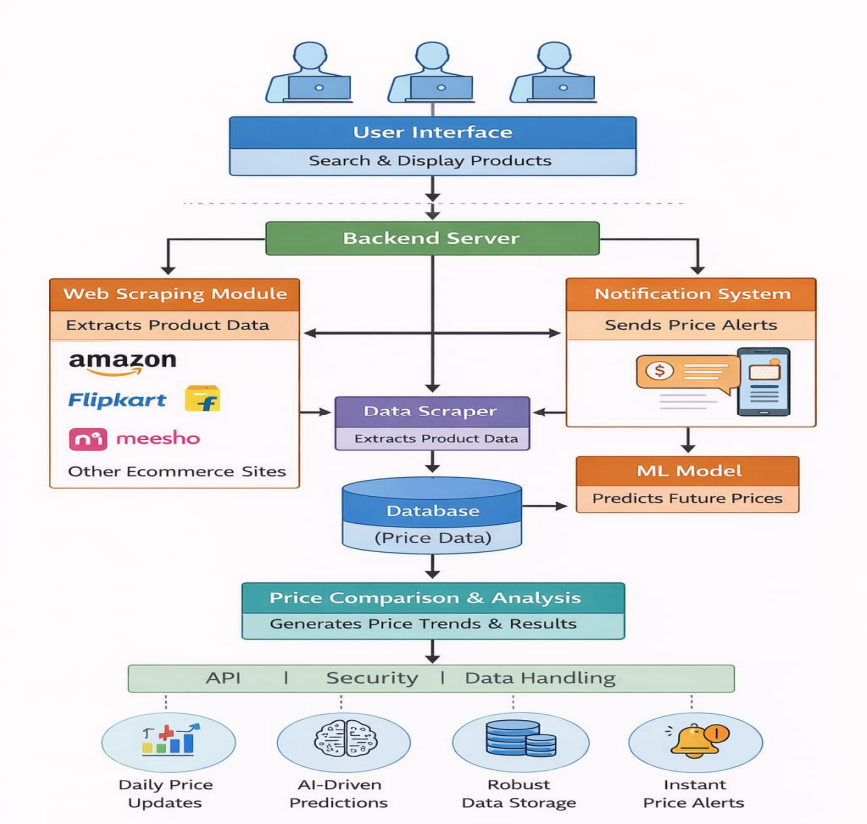


Fig 2: System Architecture

IV. METHODOLOGY

The methodology of the AI-based price comparison and price tracking platform involves a systematic process of data collection, processing, analysis, and presentation to provide accurate and real-time price comparisons. Initially, product data is collected from multiple e-commerce websites using web scraping techniquesandAPIs, includingdetailssuchasproductname, price,specifications, andavailability.Thisraw data is then cleaned and organized to remove duplicates, inconsistencies, and irrelevant information. After preprocessing, artificial intelligence techniques such as machine learning and natural language processing (NLP) are applied to identify and match similar products across different platforms, even when product descriptions vary. Thesystemthencomparesthepricesofthesematchedproductsanddisplaystheresultsinauser-friendly interface.Additionally,theplatformcontinuouslymonitorspricechangesovertimeandstoreshistoricaldata to enableprice tracking and trend analysis. Based on this data,the system can generate alerts for pricedrops and provide recommendations to users for making better purchasing decisions.

V. SYSTEM MODULES

The Price Comparison and Price-Tracking Platform with AI Prediction is developed by dividing the system into different modules. Each module performs a specific task and works together to ensure the smooth functioning of the system.

A. Android App (Customer role primarily)

Module 1: User Interface Module is responsible for the interaction between the user and the system. It provides a simple and user-friendly interface where users can search for products and view price comparisons. The interface displays product details, prices from different websites, and predicted price trends. This module is developed using HTML, CSS, and JavaScript.

Module 2: The user management module handles user registration, login, and authentication. It stores user details securely in the database and allows users to manage their profiles. This module ensures that only authorized users can access certain features of the system.

Module 3: Web Scraping module is used to collect product information from various e-commerce websites such as Amazon, Flipkart, and Meesho. It extracts data such as product name, price, ratings, and availability using web scraping techniques. Libraries such as BeautifulSoup and Requests are used for data extraction.

Module 4: The database module is responsible for storing all collected data including product details, price history, and user information. The system uses databases such as MySQL or SQLite to manage and retrieve data efficiently.

Module 5: Machine Learning Module analyzes historical price data and predicts future price trends using machine learning algorithms such as Linear Regression and Time Series Forecasting. It helps users decide the best time to purchase a product.

Module 6: The price comparison module compares the prices of the same product from multiple

Module 7: websites and displays the results to the user. It helps users easily identify the lowest price available online.

is done to maintain the stability and reliability of the system as well as effective interaction with users.

VI. RESULTS AND DISCUSSION

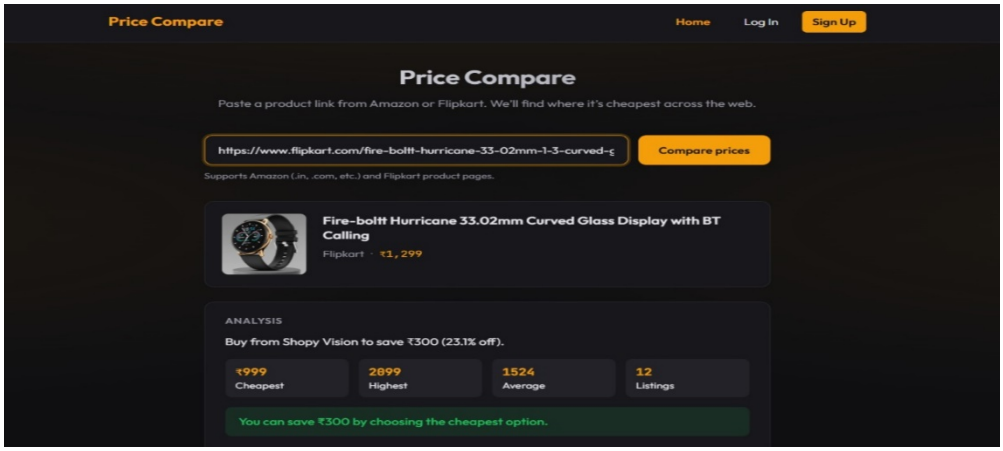
TheimplementationoftheAI-basedpricecomparisonandpricetrackingplatformproducesefficientand reliable results that significantly improve the online shopping experience. The system successfully collects product data from multiple e-commerce websites and processes it to provide accurate and real-time price comparisons. When a user searches for a product, the platform displays a list of similar products along with their prices, specifications, ratings, and availability from different sources in a well-organized format.

The results demonstrate that the platform reduces the time and effort required for manual comparison. Userscaninstantlyviewmultipleoptionsinoneplaceinsteadofvisitingdifferentwebsitesseparately.The system also ensures high accuracy in product matching by using AI and natural language processing techniques.

A. Product search Performance

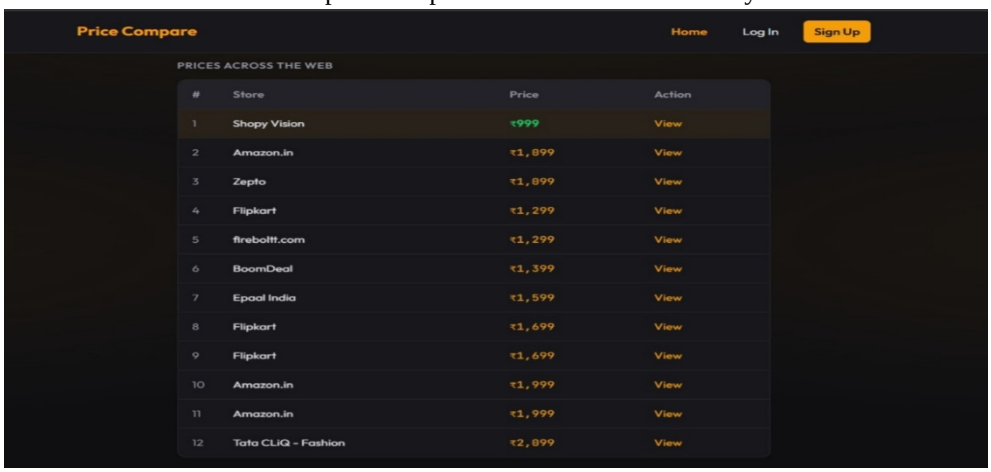
The Product Search Performance of the AI-Based Price Comparison and Price Tracking System is a critical factor that determines how quickly and accurately users receive relevant product results. The system is designed to handle user queries efficiently and retrieve product data from multiple e-commerce platforms such as Amazon and Flipkart with minimal delay.

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B. Price Comparison

The Price Comparison Module is one of the core components of the AI-Based Price Comparison and Price Tracking System, designed to help users identify the best available price for a product across multiple e-commerce platforms. This module collects product pricing data from various websites such as Amazon and Flipkart and presents it in a unified and easy-to-understand format.



C. System Performance and Reliability.

The System Performance and Reliability of the AI-Based Price Comparison and Price Tracking System are critical factors that ensure smooth operation and user satisfaction. The system is designed to deliver fast and accurate results when users search for products and compare prices from multiple e-commerce platforms such as Amazon and Flipkart.

To achieve high performance, the system uses optimized algorithms, efficient database queries, and caching mechanisms to reduce response time. Parallel processing is implemented to fetch data from multiple sources simultaneously, ensuring quick retrieval of product information. The system is also scalable, allowing it to handle multiple users and large volumes of data without performance degradation.

Reliability is maintained through proper error handling, data validation, and backup mechanisms. The system ensures that even if one data source fails, it can continue functioning using available sources. Regular updates and monitoring help maintain data accuracy and system stability. Additionally, secure authentication and data protection measures are implemented to ensure safe user interactions.

VII. CONCLUSION

The AI-Based Price Comparison and Price Tracking System was developed to simplify the process of comparing product prices across multiple e-commerce platforms. The system successfully collects product information from different online stores such as Amazon and Flipkart and presents the comparison results in a clear and organized manner. This helps users quickly identify the best available price without spending time searching on multiple websites.

The implementation of Artificial Intelligence techniques improves the accuracy of product matching and enables efficient data processing. The price tracking feature also allows users to monitor price changes and make better purchasing decisions. Overall, the system reduces manual effort, saves time, and enhances the online shopping experience.

In conclusion, the project demonstrates how automation and AI technologies can be effectively used to build a smart price comparison platform. With further improvements and integration of advanced machine learning techniques, the system can become more powerful and widely useful for online consumers in the future.

VIII. FUTURE DIRECTION

The AI-Based Price Comparison and Price Tracking System can evolve significantly with advancements in technology and user requirements. In the future, the system can expand its integration with more e-commerce platforms such as Amazon and Flipkart to provide a broader and more comprehensive comparison of products.

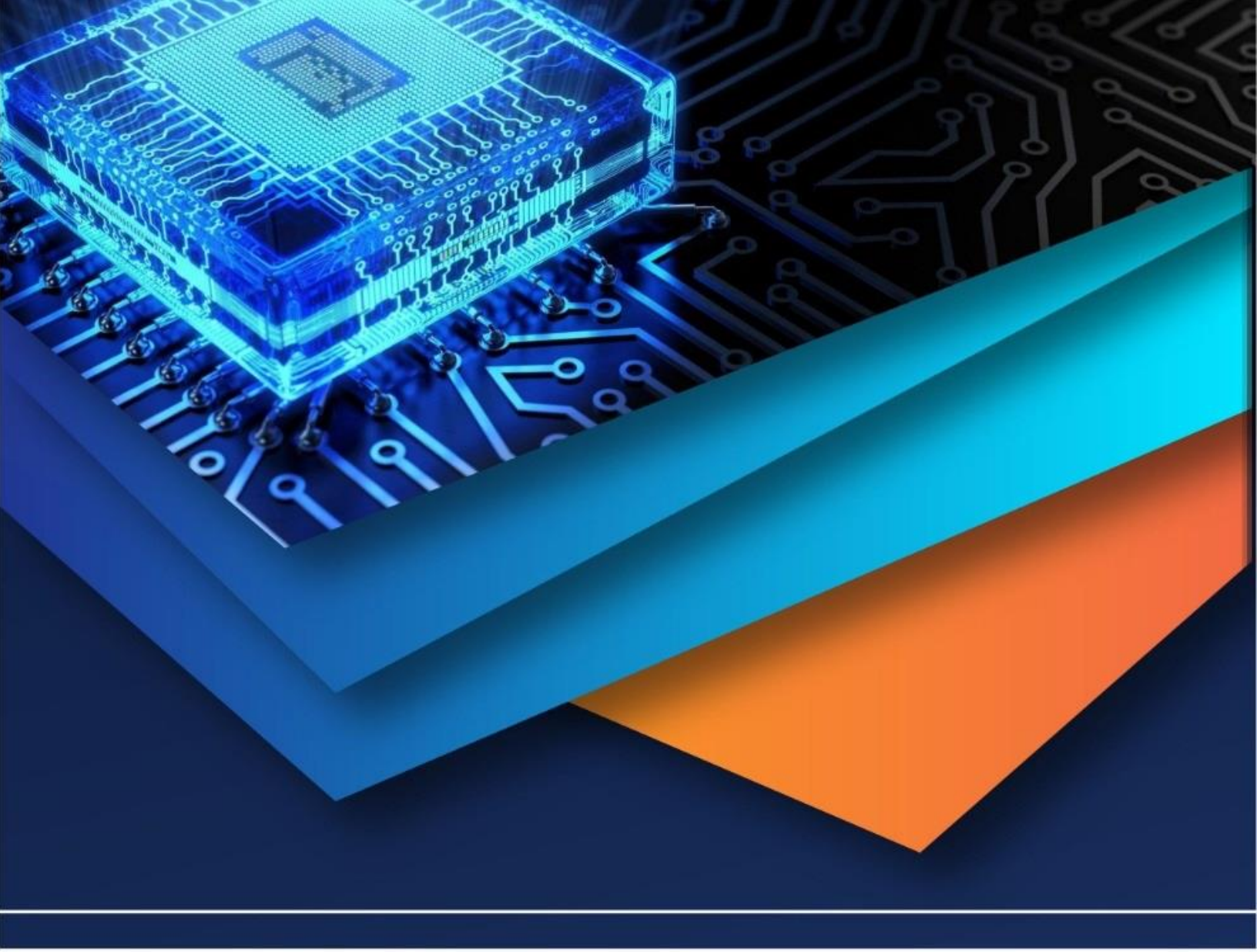
Further development can focus on implementing advanced Artificial Intelligence and deep learning models to improve the accuracy of price prediction and product matching. The system can also incorporate real-time analytics to provide instant insights and dynamic pricing trends. Another important direction is the development of a mobile application, enabling users to access features and receive notifications anytime and anywhere.

Additionally, the system can introduce personalized recommendation engines based on user behavior, preferences, and purchase history to enhance user experience. Integration with voice assistants and chatbot systems can make the platform more interactive and user-friendly. Expanding the system to support global markets and multiple currencies will also increase its usability. These future directions will make the system more intelligent, scalable, and efficient in meeting the growing demands of online shoppers.

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