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Clothes Price Comparison Using Machine Learning

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Abstract - *Current e-commerce platforms include a range of features to enable the purchase of any cloths from their websites. But comparing any garments pricing, deals, and quality across numerous apps takes time, and the customer has to spend their time reading reviews and visiting other websites to compare costs. Most of the clients prefer to purchase their necessities online since it saves them time, particularly those who currently live in metropolitan areas with hectic lifestyles. Furthermore, while buying things, people always look for the lowest possible price. Therefore, a strong artificial intelligence system is developed that can analyze large, varied datasets that include product attributes and pricing data from different online shops. The algorithm for the model is created with the use of machine learning techniques to identify trends and correlations that affect price, considering factors such as material quality, fashion trends, and brand popularity. Natural language processing is used by the AI system to analyze product evaluations and descriptions, which helps it to better grasp customer preferences. The goal is to develop a dynamic and flexible tool that predicts and adjusts to market changes aside from offering precise and up-to-date pricing comparisons for clothes. This system reveals the effectiveness of using AI in order to enhance the efficiency and accuracy of apparel price comparison through rigorous review, hence empowering customers to make better-informed selections. In this manner, paper aims to provide online shoppers a method to purchase goods at a reasonable price while also saving them money, time, and effort.*

Key Words: **Price Comparison, Artificial Intelligence, Web Scraping, Machine Learning, E-commerce.**

1.INTRODUCTION

The fashion industry is huge and fiercely competitive, with several brands and outlets offering a diverse range of apparel alternatives. Because of this, costs for comparable apparel goods could range greatly amongst online retailers. Customers find it difficult to find the greatest offers and ensure that they are getting the greatest value for their money. as a result. Due to time and financial constraints, especially in the current fashion trends where variety of clothing styles and their prices have increased and users have limited time to look at properties.

The price comparison of clothes website resolves this issue by compiling data from several online merchants and displaying it to customers in an understandable and structured way. Consumers may go through several categories or do a targeted search to locate the apparel item they're looking for. Users are then able to rapidly compare and get the best deal due to the website's presentation of alternatives and pricing from many stores. To improve and streamline the procedure of comparing clothing prices, this system applies machine learning techniques. This is motivated by the enormous amount and complexity of data that online merchants produce, which includes information on everything from product features and specifications to pricing policies and user reviews. The size of this data makes manual comparison techniques impossible, therefore it's critical to take use of machine learning's ability to identify patterns, correlations, and trends in huge datasets.

In India, there are not as many price comparison websites available as in other nations. The majority of them compare just local brands' prices. While it is crucial for a comparison website to deliver results with affordable pricing that corresponds with consumers' preferences, precise results are equally important in ensuring users receive their desired products. Additionally, it relies on how frequently the information is updated; if not, users who compare it to another website might get confused. Most of the people do not have time to go shopping for clothes. It is users freedom to select the vendor that gives the greatest deal on the garments you are interested in. However, comparing costs and pulling From the purchase of some items at a higher price requires a significant amount of time in relation to those price supplied by any vendor. A catalog that is published online allows retailers to cut expenses. Due to their hectic schedules, the majority of people who manage their businesses do not have the time to make offline purchases. The fig. 1 demonstrates the percentage of the total population that do online or offline shopping in India.

Machine learning plays an essential role in transforming clothing price comparison systems. The systems use sophisticated algorithms to sort through large information and identify pricing patterns, historical data, and market swings. The algorithms make accurate pricing predictions and price comparisons by using characteristics like fabric quality, user feedback, and brand reputation. This technology improves the user experience by providing

tailored, at the moment recommendations and assisting with well-informed purchase decisions. The ability of machine learning to comprehend consumer preferences is always improving, which helps the garments price comparison system provide more insightful results and assist customers in locating the best offers.

Fig -1: % of the total population that do online or offline shopping in India, 2024

2.LITERATURE SURVEY

The literature review is an essential component of every research project since it provides an overview and synthesis of current literature on the selected topic. It involves an organized search and examination of several sources to find recurring themes, trends, and knowledge gaps. Additionally, it supports the research methodology and data gathering strategies selected for the study by offering insights about the approaches taken in earlier studies.

As specified by the authors in [1], this article focuses on the existing system which has detected anomalies, and a computerized system is being suggested to replace it. The system will function as a wish-list product price comparison website, letting users check prices across different e-commerce sites and alerting them when an item's price changes. This function, enables consumers to contrast costs from several online retailers in one location, is very beneficial for those who purchase online frequently.

As mentioned by the writers of [2], This work focuses on website that lets individuals make well-informed decisions based on their best interests by comparing prices on different e-commerce shopping websites. This makes it easier for working people to compare costs and select the best combination of low-cost and good deals on products they are interested in buying. It also saves buyers time and effort by bringing together strategies, the best offers, and deals from all major online retailers. Users can access useful information to make the best decision, and the website also gives vendors a platform to sell new products, announce ongoing promotions, and offer competitive prices. All things considered, the website makes online shopping easier and more convenient for working people.

Corresponding to the author in [3], according to the research, price comparison websites are important for price rivalry and the marketplace efficiency. These websites draw in all parties involved, such as suppliers and customers, by functioning as an aggregate of product information. These days, search technologies come in two flavors those that assist users in finding the goods and services they want, lower search expenses, and provide easy comparison shopping across options. Comparison websites are more strong than most online ads because they hold the ability to crawl webpages, compute product pricing, and provide customers more control. They reduce the time, effort, and resources needed to discover information manually by gathering and aggregating data from third parties and presenting it in an approachable manner. The study emphasizes the effectiveness and ease of price comparison websites, which are now necessary for price competition and market efficiency.

As claimed by the authors [4], the project offers the ability for customers to set rate cause alerts. This means that a buyer can set a specific rate for a particular item, Also, the framework will send out an email notification as soon as the vendor provides the rate that meets the parameter the buyer sets. The alert will be triggered by the product's current rate. The majority of websites that provide tools and guidance for inventory change businesses use this kind of notice. The customer will be notified and an alarm will sound when the rate of a certain inventory reaches a certain price that has been established.

3.METHODOLOGY

A detailed explanation of the system design and operational procedure is given in Figure 1. The system's backend is made up of scraping methods and machine learning technique for obtaining product details from different e-commerce websites. Customers can engage with the system through a graphical user interface (GUI) that the front-end system offers using an online platform. Following that, the website displays the data obtained from e-commerce items. On the main page, the customer requests the desired product, which prompts a query to be sent to the local database. Product information is displayed on the website's home page. The customer may see the costs of the desired items may be found at one location, even if they are sold on many e-commerce platforms.

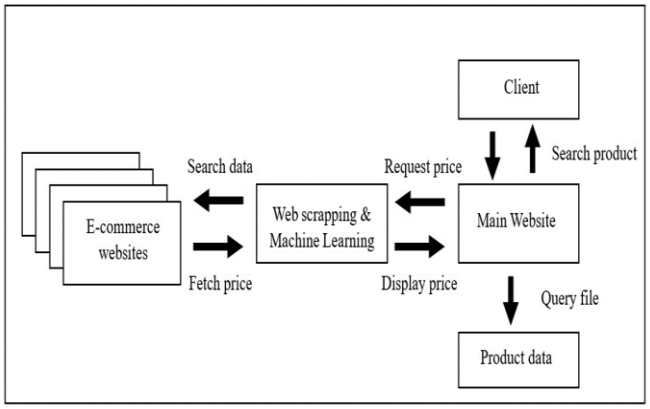

Fig -2: System Architecture

The methodology to demonstrate how the price comparison website is created using Machine learning in the following ways:

3.1 Data Gathering

Data Gathering is necessary in order to provide accurate estimations. and insights. The system gathers a broad spectrum of information on different clothing items, brands, styles, and shops. Price points, discounts, reviews from customers, and product details are present in the data. E-commerce websites can have their information effectively scraped from them using web scraping technologies. Furthermore, real-time changes may be made easier via API linkages with shops. A key component is feature engineering, which improves the model's performance using inputs including user preferences, seasonal trends, and brand reputation. To comprehend user behaviour and feelings about certain items, sentiment analysis and the process of collaborative filtering techniques is also deployed.

3.2 Data Preprocessing

Data preprocessing is critical for successful model training and accurate price estimation. This include managing missing values, encoding category characteristics, and cleaning and structuring the raw data. Text data are tokenized and embedded, while numerical properties is made consistent by normalization or scaling. A more robust model is also enhanced by the identification and elimination of outliers. For the purpose of allow the machine learning model to learn patterns from the training data and assess its performance on unseen data for trustworthy clothing price comparisons, the preprocessed data is then divided into training and testing sets.

3.3 Feature Engineering

To improve model accuracy, feature engineering is essential. A thorough analysis is produced by incorporating important variables like fabric quality, seasonal trends, brand reputation, and consumer feedback. To enhance the forecasting power of the model, numerical information such as popularity ratings, discounts, and past price trends are extracted. Sentiment analysis of customer evaluations is also used to measure how people personally view clothing products. By taking a comprehensive approach to feature engineering, the system is able to provide more accurate and sophisticated pricing comparisons, which enhances user experience and decision-making in the ever-changing world of fashion retail. Furthermore, adding elements like as customer evaluations and ratings may provide valuable insights on consumer perceptions of clothing quality. and value. The machine learning model will better understand the elements influencing clothing prices by carefully choosing and designing these characteristics, It provides consumers with with more accurate and trustworthy pricing comparisons.

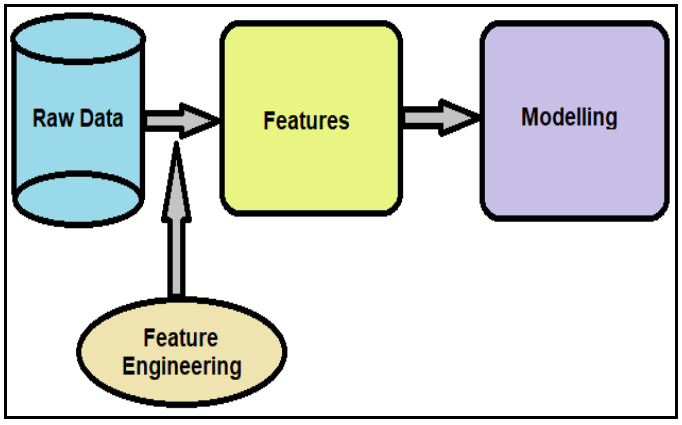

Fig -3: Feature Engineering

3.4 Training the Model

The initial stage in creating a machine learning-based garments price comparison system is gathering a variety of clothing products and their associated prices into a dataset. It is possible to acquire characteristics like size, style, brand, and material. After that, this dataset is divided into testing and training sets. In order to identify patterns and correlations between attributes and prices, a machine learning algorithm is trained on the training set using neural networks. On the testing set, the model's performance is assessed, and modifications are made to increase accuracy. The system is kept up to date with changing market dynamics and fashion trends through routine upgrades and retraining.

3.5 Neural Network

In the domain of clothes price comparison systems employing machine learning, neural networks serve an integral part in translating raw data into useful understandings. A neural network, inspired by the human brain's structure, consists of interconnected nodes organized into layers. When applied to pricing, the network learns

intricate patterns within a dataset, considering factors like brand, material, style, and size. During training, the network fine-tunes its internal parameters to accurately predict prices, capturing the nuanced relationships between various features. Due of its capacity for prediction, effective price comparison among diverse clothing items. Regularization techniques prevent the neural network from memorizing the training data, ensuring adaptability to new trends. The incorporation of neural networks in clothes price comparison systems improves both accuracy and provides users with a dynamic tool for navigating the complexities of fluctuating fashion markets.

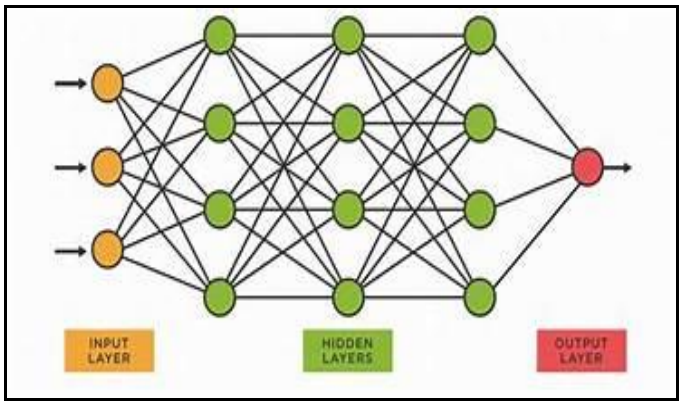

Fig -4: Neural Network

3.6 Web Scraping

Web scraping is a basic method that allows machine learning based clothing price comparison systems to collect enormous quantities of data in real time from various web sources. Web scraping in this sense refers to the automatic extraction of product details, costs, and availability from different e-commerce websites. Through website navigation and HTML text parsing, this procedure yields a rich dataset that includes data about the brand, specs, and user reviews. Machine learning algorithms use the extracted data as a training set, which helps them identify and forecast pricing patterns in the fashion industry. By continuously updating data, web scraping makes the system more agile and guarantees that consumers have availability of the most current price dynamics. However, while using web scraping in clothing, moral concerns and respect for the terms of service of the website are essential.

4.RESULT

By employing machine learning, the clothing price comparison system produces impressive outcomes by accurately projecting and comparing costs for a wide variety of fashion goods. The models of machine learning that have been put into practice, including neural networks and feature engineering, show a great degree of precision in recognizing complex patterns in the dataset. Because the system dynamically refreshes with real-time data through web scraping, reflecting the most recent pricing trends and market variations, users benefit from making educated purchase selections. The design of the model can consider various features, including brand, material, style, and size, guarantees a thorough study and offers insightful information on comparative pricing. All things considered, the findings demonstrate how well the system works to provide customers with current, appropriate data, enabling a smooth and knowledgeable shopping experience in the ever-changing world of fashion. Fig. 5 to Fig.9 shows the overall implementation of the proposed system.

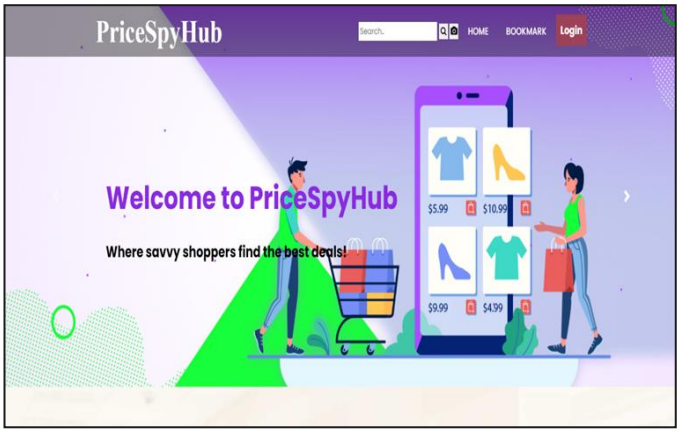

Fig -5: Home page of Price comparison website

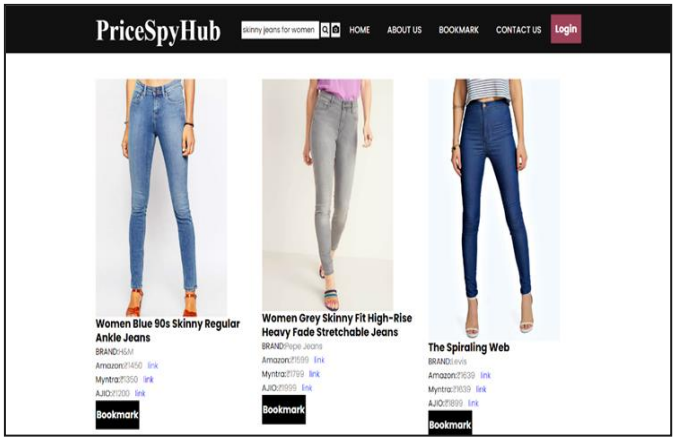

Fig -6: Price comparison

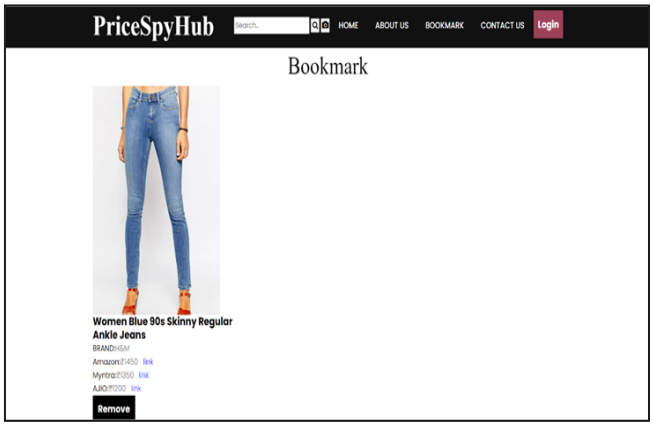

Fig -7: Bookmark page of price comparison website

Fig -8: Login page of price comparison website

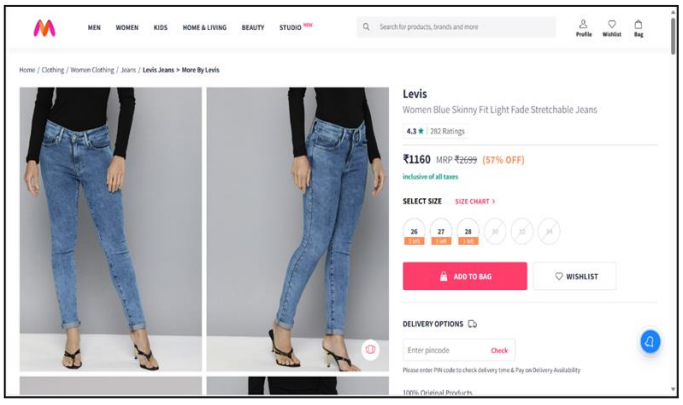

Fig -9: Redirected platform for the user to buy the product

3. CONCLUSIONS

In conclusion, the world of online buying has seen a dramatic change with the rise of clothes price comparison websites. These networks provide users with exceptional flexibility and transparency by enabling them to quickly compare prices from a wide range of commercial spaces without having to visit each website separately. These websites provide consumers the power to make informed choices by compiling product details and pricing, allowing them to locate the greatest offers and stretch their budgets.

Price comparison websites encourage a healthy level of competition among businesses by offering attractive promotions and competitive prices to draw in customers. Customers and companies together gain from this, fostering a vibrant market. Additionally, by encouraging price transparency, these platforms enable customers to spot price differences and make wise decisions. Consequently, openness, businesses are encouraged to continue using reasonable prices, which builds loyalty and confidence. These platforms are expected to grow more and more significant in influencing consumer behavior and e-commerce as technology develops.

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