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E-commerce Price Comparison Website Using Web Scrapping

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Abstract

Price comparison sites are designed to compare the price of goods and services from a range of providers, which will help consumers in making decision to choose products that will save their money through online. Considering the customers' busy lifestyle especially those who are living in the city area, most of the consumers prefer to buy their needs through the internet because it saves their time. Besides, consumers always go for the cheaper price in purchasing products therefore by using price comparison website, customers do not have to travel from shop to shop only to survey the price offered by different shops for the same product. They can just check it from the price comparison website itself and decide where they should buy the products they need. This project, named as Price comparison website using web scrapping is the place where shoppers could find the great deals on the products. The best deals will be clearly highlighted. To obtain best deals from Price comparison websites web scrapping techniques are used to fetch detailed information. This way, paper aims to provide solution for online customers to buy products at good deal and save their valuable time, effort, and money.

Keywords: Web Scraper, E-commerce, Price Comparison

1. Introduction

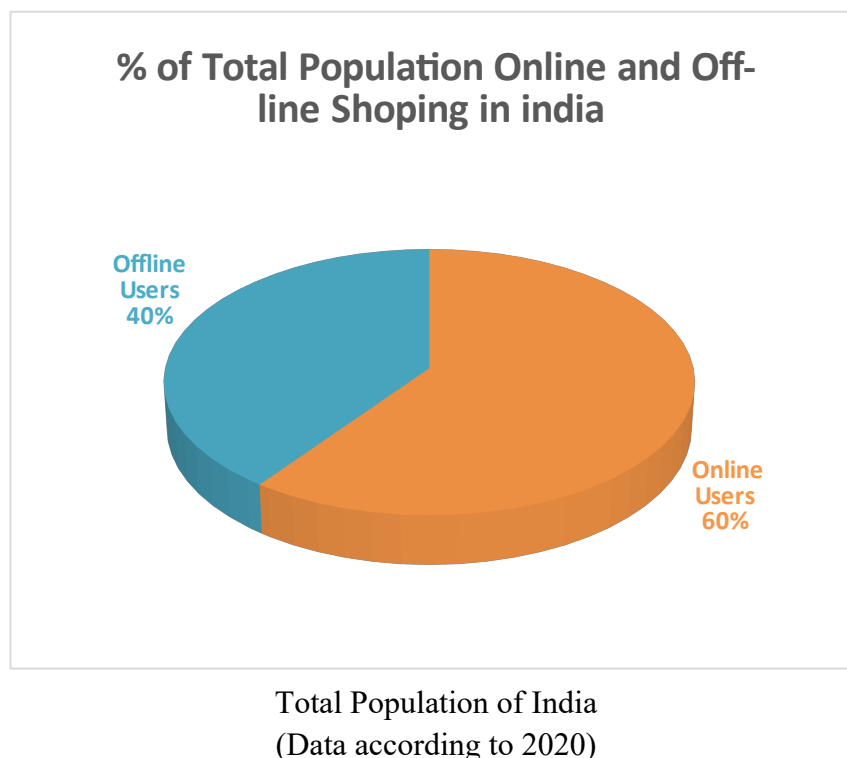
A price comparison website acts as a platform or medium between consumers and sellers. It allows the consumers to view different price lists for the product chosen by the user and helps the consumers to make an informed decision on which one to choose to save money. It also serves as a tool to help consumers increase their price awareness, so they don't feel misled by advertisements from retailers who claim they offer the lowest price, but the reality is different. Unlike other comparison sites, E-commerce price comparison website (the name of this project) will focus on providing a price list of products which we want to search online and purchase at a cheaper price ^[1].

Due to the huge increase in online users, it will be of great help to those who have busy office work and don't have much time to check the current prices of products which they want to purchase. According to Social, Digital and Mobile in India research by We Are Social, internet penetration in India is 59% and

the average number of hours Indian internet users spend using the internet each week is 19.8 hours. Meanwhile, 21% of Indian internet users access the internet via mobile devices, which means that they can access the internet anywhere with their smartphones. 77% of Indian internet users shared their thoughts about a brand via social media during this study conducted in 2019. The study shows how connected people in India are to the Internet.

As mentioned above, a price comparison website acts as a medium between customers and retailers to allow customers to shop online at specific retailers to shop that offer such services ^[3]. In other words, the price comparison website also has the function of promoting the retailer/store/hypermarket/supermarket to customers. Time and money pressures, especially in today's economy where the cost of living is rising and there is little time for home shopping, a price comparison site is sure to be of great help to consumers. In addition, today's users are very comfortable with the Internet having developed a greater variety of applications. of networking and now provide users with various references ^[8].

Compared to other countries, only a few price comparison sites are accessible in India. Most of them compare the price of hotel tariff, holiday package, mobile phone and others. It is important that a comparison website provides results with low prices that match what customers want, but accurate results are also important so that customers get what they really want. It also depends on how often the database is updated; Otherwise, customers will get confused when they compare it with another website. Most workers do not have time to shop for products and other things ^[16]. As a consumer, you have the right to choose which store offers the best price for specific products that interest you. To the price offered by any business, however, requires a lot of time and due to a limited time, you cannot compare prices and exit the purchase of certain products at a higher price. With a catalog that published online, sellers can save costs . Increase the price awareness among consumers. Most of the running human beings do not have time to purchase products offline because of busy schedule ^[13].



2. Literature Survey

The literature review is a critical component of any research study as it provides an overview and synthesis of existing literature on the chosen topic. It involves a systematic search and review of various sources to identify common themes, patterns, and gaps in knowledge. It also helps to support the research methodology and data collection techniques chosen for the study, providing insights into the methods used in previous research. Overall, the literature review is a comprehensive overview of the existing knowledge and research on a particular topic, informing the research question, methodology, and theoretical framework.

2.1. Overview

Previous studies and articles that are linked to price comparison websites have been collected and analysed as part of this project in order to provide greater credibility to it. As a result, the examination of the literature, which is an analytical, critical, and objective review of written materials, is covered in this chapter. The primary sources for the literature review that is being conducted for this study are comprised of three different research articles and journals that have been recently published. Each one is discussed in further detail in parts 2.2, 2.3, and 2.4.

2.2. Comparison Sites

The research centred on price comparison websites and the implications those websites have for the efficiency of markets and the level of price competition. Due to the fact that they have evolved into an aggregator of product information, price comparison websites are able to draw in all of the relevant stakeholders, including both customers and suppliers, to their own platforms. People typically begin their search for a certain good or service that they desire on the internet these days. This is a time-saving practise when compared to the activities that customers had to carry out in the days before the widespread availability of the internet. In the past, consumers had to consult books, periodicals, newspapers, encyclopaedias, and other mediums in order to obtain the knowledge they required. On the other hand, yellow pages, directories, ads, and other mediums were helpful in locating businesses and the items they offered ^[14]. In order to locate information without the assistance of the internet, everything must be done manually, which costs a significant amount of time, effort, and resources. The second category of search technology is known as comparison websites. These websites assist users find items and services according to the criteria that the consumers have specified. It makes it easier for customers to compare the various options that are available on the market while at the same time lowering the costs associated with customer searches. When compared to the price comparison site when it was initially founded and acted as an online classifieds, comparison sites of today are able to do a lot of things such as draw the items' cost, be able to travel sites, and give the sites much greater control over the users thanks to the advancements in technology. It does this by collecting and compiling the prices, items, and any other pertinent information from third-party merchants, and then presenting this information to customers in its own unique manner ^[17].

There are several business models usually used by the price comparison website and the most widely implemented is the charge will be on the sellers if they want to be listed and users can access the sites for free. The fee usually based on a cost-per-click and is paid every time a consumer is referred to the seller's website from the comparison site. Sellers also have the alternative to pay fee if a consumer buys the product. Other than that, is providing free services for both sellers and buyers and obtain revenue from the advertisers like what being practiced by Google Product Search ^[5].

The less chosen business model is the sellers are listed for free meanwhile membership fee is charged towards the consumers such as AngeList.com. Whatever model is being used; the most important thing is the agreement from both sides on the chosen model. That based on the business models explanation, the most suitable business model for any price comparison website is the one that providing free services for both users and retailers and the revenues will be obtained from the advertisers who wants to advertise with PCW ^[7].

The free services will attract more people to use PCW because it is free and when more people use PCW, the online traffic will be increased as well. The high traffic will attract advertisers to advertise with PCW. By choosing the intermediate fees carefully to out-compete the search market, a price comparison site will be able to stay in business for a long run. Based on studies made by Yavas, the intermediary such as comparison site will be able to obtain profit by attracting high valuation sellers and low valuation buyers. Comparison sites have the potential in providing abundant of data that might be useful for further analysis for example, analyze how exactly consumers search for products and provide indications about the best way to improve the current system ^[12].

2.3. The Use of Price Comparison Sites

The research entitled 'The Use of Price Comparison Sites in the India's General Insurance Market' a strategist for Consumer Intelligence has reported the current performance, media coverage, usage and marketing activity of price comparison sites in the India's General Insurance sector. The results shows that there is increased on the advertising spend and competition and it gives adverse effect on the financial performance towards the price comparison sites. Meanwhile the number of consumers using price comparison sites for quotes has remains high and its average number of sites used are increasing over time. Based on the research, 8 out of 10 people are likely to get quotes from the price comparison sites in the future which show good sign of price comparison sites to stay in business in future. To compete with other brands through the internet, big brands usually are facing big advertising spends. Based on Nielsen advertising data, back in 2010 it requires Rs. 35 crore has increased to Rs. 85 crore in 2011. The amount of spend needed to compete with the big player with the big name has make it tough for other competitors unless they have a good marketing budget. Some of the comparison sites have launched various campaigns to promote their sites and get more traffic for example 'Compare the Market' that creates a personality designed to appeal to consumers and improve their impression towards the brand at the same time increase its web traffic and boost conversion rates ^[11].

2.4. Consumers Plan More Web Research Before Buying

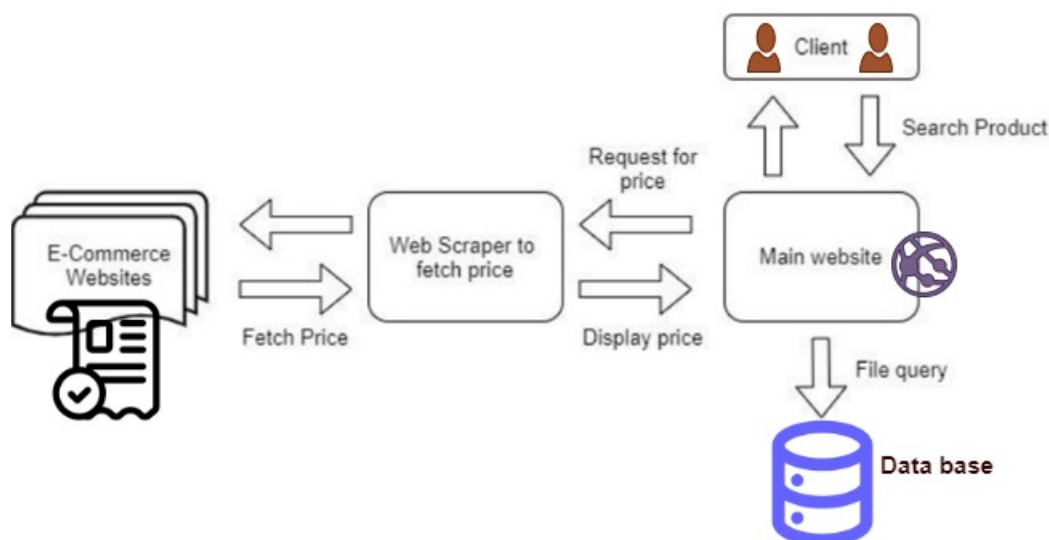
It is based on the findings of a survey made by Deloitte LLP, concludes that a fifth of online consumers plan to conduct more web research this year (2013) as compared to year 2011 before buying. Deloitte LLP, a consulting, auditing, and financial services firm, has conducted the online survey on 5-12 July 2013 towards 1,314 parents of children in kindergarten through the 12th grade. Around 20% of the survey respondents plan to shop online this year but the web is playing the important role in giving influence for the purchases either it is done online or offline (going to the shop to purchase). The result shows that a third of the parents who responded plan to visit e-commerce sites, retail blogs and other web locations to learn before buying the items. Not only that, but the survey also resulted that 60% of the respondents owned smart phones and use it as shopping tools for seeking price information with 65%, getting coupons and discounts with 55%, and finding store locations with 48% were among the most popular mobile shopping activities. From this result, it shows that there is big number of people

who are using smart phone to check on the price information of a certain product. Therefore, based on this article, it can be concluded that most of the customers, as well as potential customers of a product will make some research online before making a purchase ^[10].

3. System Architecture

Figure 1 provides a description of the system architecture as well as its operational process in detail. The backend of the system is comprised of scraping techniques in order to extract product information from various e-commerce websites. The front-end system provides a graphical user interface (GUI) in the form of a website where clients interact with the system. After that, the information that was collected from e-commerce products is presented on the website. The client makes a request for the product they want on the primary website, which then causes a query to be fired in the local database. Information about products is presented on the homepage of the website. The client may view the prices of the desired goods in one location, even though it may be sold on multiple e-commerce platforms. Another feature that is available on the website is a price alert, which allows users to register for notifications from the website anytime a product's price drops to an extremely low level or receives a significant discount ^[8].

Figure 1: System Architecture



4. Methodology

4.1. Project Planning – Stage 1

This is the degree wherein the hassle associated with the assignment is recognized and the importance of the have a look at is determined. The goal and additionally scope of have a look at are mentioned and the feasibility of the assignment paintings is ensured to be advanced in the time body given. The technique to the hassle announcement is studied and the kinds of machine to be broaden and gear used for growing the machine also are recognized through literature reviews ^[9].

4.1.1. Algorithm (Possible)

- S1: The most important details are to define the project scope,
- S2: Identify project requirements,
- S3: Break down the project, estimate effort and resources,
- S4: Create a project schedule, allocate resources,

S5: Risk assess and mitigate,
S6: Communicate and collaborate, monitor and control,
S7: Review and adapt, and make necessary adjustments to the project plan.

4.1.2. Possible Code for “Project Planning”

```
// Define project tasks and their dependencies
tasks = [
  { id: 1, name: "Requirement gathering", dependencies: [] },
  { id: 2, name: "System design", dependencies: [1] },
  { id: 3, name: "Database setup", dependencies: [1] },
  { id: 4, name: "Front-end development", dependencies: [2] },
  { id: 5, name: "Back-end development", dependencies: [2, 3] },
  { id: 6, name: "Integration testing", dependencies: [4, 5] },
  { id: 7, name: "User acceptance testing", dependencies: [6] },
  { id: 8, name: "Deployment", dependencies: [7] }
]

// Function to get the project schedule
function getProjectSchedule(tasks):
  schedule = []

// Function to recursively traverse tasks and their dependencies
function traverseTask(task):
  if task is not already added to schedule:
    for each dependency in task.dependencies:
      traverseTask(find task with id = dependency)
    add task to schedule

// Traverse each task to build the schedule
for each task in tasks:
  traverseTask(task)
return schedule

// Call the function to get the project schedule
projectSchedule = getProjectSchedule(tasks)

// Print the project schedule
for each task in projectSchedule:
  print task.name
```

4.2. Data Gathering and Analysis – Stage 2

In this Series of research has been achieved to advantage similarly information at the strength and power consumption. Also, readings turned into achieved to get higher know-how on what assessment web page is all about, the way it enables humans to clear up hassle earlier than shopping for domestic groceries product, and instance of present assessment web sites to test at the competitors. The statistics concerning preceding research are gained from studies papers written with the aid of using pupils and were defined in info with inside the literature evaluate phase earlier. Meanwhile the statistics concerning customers had been acquired through survey and interview that made online in addition to assembly the respondents (save proprietors in Perak’s area) face to face ^[6].

4.2.1. Algorithm (Possible)

S1: The most important details are to define the objectives and scope of the data gathering and analysis process,

S2: Identify the sources of data, design a data collection plan, extract the relevant data,

S3: Analyze the data, interpret the results, present the findings,

S4: Validate the results, iterate and refine the process,

S5: Document the entire process, and continuously monitor and update the process.

4.2.2. Possible Code For “Data Gathering and Analysis”

```
function dataGatheringAndAnalysis():
    defineObjectivesAndScope()
    identifyDataTypes()
    determineDataSources()
    designDataCollectionPlan()
    implementDataCollectionPlan()
    cleanAndPreprocessData()
    analyzeData()
    interpretResults()
    presentFindings()
    validateResults()
    iterateAndRefine()
    documentProcess()
    monitorAndUpdate()

function defineObjectivesAndScope():
    // Define the objectives and scope of the data gathering and analysis
    process

function identifyDataTypes():
    // Identify the types of data needed for analysis

function determineDataSources():
    // Determine the sources of data

function designDataCollectionPlan():
    // Design a plan for collecting the required data

function implementDataCollectionPlan():
    // Implement the plan to gather data from the identified sources

function cleanAndPreprocessData():
    // Clean and preprocess the collected data

function analyzeData():
    // Analyze the data using appropriate techniques

function interpretResults():
    // Interpret the results of the analysis

function presentFindings():
```



```
// Present the findings in a clear and concise manner

function validateResults():
    // Validate the analysis results

function iterateAndRefine():
    // Iterate and refine the analysis process based on feedback and insights

function documentProcess():
    // Document the data gathering and analysis process

function monitorAndUpdate():
    // Continuously monitor and update the process

// Call the main function to execute the data gathering and analysis process
dataGatheringAndAnalysis()
```

4.3. Research on any Existing Similar Systems – Stage 3

Next is the have a look at achieved to test if any comparable machine exists. The major goal of doing studies on comparable present machine is to recognize the way it works, what idea is being carried out with inside the machine, what's being computed with the aid of using the machine and the way the machine enables fixing the hassle ^[18].

4.3.1. Algorithm (Possible)

S1: The most important details are to define the research objectives,
S2: Identify relevant search keywords, conduct a literature search,
S3: Analyze the architecture, features,
S4: Functionalities, and implementation details of existing similar systems,
S5: Compare them, evaluate suitability,
S6: Identify gaps, summarize the research findings,
S7: And document the research process and findings.

4.3.2. Possible Code For “Data Gathering and Analysis”

```
function researchExistingSimilarSystems():
    defineResearchObjectives()
    identifySearchKeywords()
    conductLiteratureReview()
    analyzeExisting Systems()
    compareFeaturesAndFunctionalities()
    evaluateStrengthsAndWeaknesses()
    identifyGapAreas()
    generateResearchFindings()
    documentResearchProcess()

function defineResearchObjectives():
    // Define the objectives of the research on existing similar systems

function identifySearchKeywords():
```

```
// Identify the relevant keywords and terms for conducting the literature review

function conductLiteratureReview():
    // Search and review relevant research papers, articles, and publications

function analyzeExistingSystems():
    // Analyze the existing similar systems identified from the literature review

function compareFeaturesAndFunctionalities():
    // Compare the features and functionalities of the existing systems

function evaluateStrengthsAndWeaknesses():
    // Evaluate the strengths and weaknesses of the existing systems

function identifyGapAreas():
    // Identify the areas where the existing systems lack or need improvement

function generateResearchFindings():
    // Generate research findings based on the analysis and evaluation

function documentResearchProcess():
    // Document the research process, including the literature review and analysis

// Call the main function to execute the research on existing similar systems process
researchExistingSimilarSystems()
```

4.4. Drafting the Main Components of the System – Stage 4

After the studies on comparable present systems, the subsequent step wanted is to become aware of what is going to be the primary thing that made up the machine to be advanced. For the traffic of this internet site to apply its services, they should sign in with their fundamental records including name, email, etc. The registered customers might be subscribed mechanically to this internet site's newsletter. The customers will be capable of pick out product and associated records might be displayed. Other than that, customers can also additionally upload preferred merchandise into their profile so the present-day fee for the favorite gadgets might be dispatch individually to the consumer apart from each day mail concerning the merchandising for the day. Therefore, consumer might be capable of get without delay the records that they're involved in. The major additives of this machine are database to save merchandise and customers' records that users are capable of to seek the product that they're involved in [4].

4.4.1. Algorithm (Possible)

S1: Review and analyze system requirements,
S2: Identify key functionalities,
S3: Determine major components,
S4: Define interfaces and interactions,
S5: Define purpose, responsibilities,

S6: Input data, output data, internal processing,
S7: Dependencies, interfaces,
S8: APIs, and documentation,
S9: Verify and validate components against system requirements and design guidelines,
S10: Refine and iterate drafting process, and document drafted components.

4.4.2. Possible Code Drafting of the Main Components of the System:

```
class AuthenticationModule:
    def authenticate_user(self, username, password):
        # Authentication logic
        pass

class DataProcessingModule:
    def process_data(self, data):
        # Data processing logic
        pass

class UserInterfaceModule:
    def display_menu(self):
        # User interface logic
        pass

# Create an instance of each component
auth_module = AuthenticationModule()
data_module = DataProcessingModule()
ui_module = UserInterfaceModule()

# Interact with the components
username = input("Enter username: ")
password = input("Enter password: ")

if auth_module.authenticate_user(username, password):
    data = input("Enter data to process: ")
    processed_data = data_module.process_data(data)
    ui_module.display_menu()
else:
    print("Authentication failed.")
```

4.5. Develop System Architecture – Stage 5

The subsequent section to broaden the structure on how the machine will works. This will supply the clean photograph and know-how on how the machine will function and to keep away from growing a machine that doesn't fix the hassle it meant to clear up ^[15].

4.5.1. Algorithm (Possible)

S1: Analyze the requirements specification,
S2: Identify design constraints,
S3: Determine structural components,
S4: Define relationships and dependencies,
S5: Select appropriate architectural styles,

S6: Define interfaces, specify behavior,
S7: Document system architecture,
S8: Review and validate with stakeholders,
S9: Make necessary refinements, and finalize the system architecture.

4.5.2. Possible Code for “Drafting the Main Components of the System”

```
class Component:
    def __init__(self, name):
        self.name = name
        self.subcomponents = []

    def add_subcomponent(self, subcomponent):
        self.subcomponents.append(subcomponent)

    def remove_subcomponent(self, subcomponent):
        self.subcomponents.remove(subcomponent)

    def display(self, level=0):
        indent = "\t" * level
        print(f"{indent}{self.name}")
        for subcomponent in self.subcomponents:
            subcomponent.display(level + 1)

# Define system components and their relationships
root_component = Component("System")
subcomponent1 = Component("Subcomponent 1")
subcomponent2 = Component("Subcomponent 2")
subsubcomponent1 = Component("Subsubcomponent 1")
subsubcomponent2 = Component("Subsubcomponent 2")

root_component.add_subcomponent(subcomponent1)
root_component.add_subcomponent(subcomponent2)
subcomponent1.add_subcomponent(subsubcomponent1)
subcomponent2.add_subcomponent(subsubcomponent2)

# Display the system architecture
root_component.display()
```

5. Web Scrapper

Web Scraping is used to extract HTML statistics from URLs and use it for non-public purpose. As that is fee evaluation internet site, statistics is scrapped from more than one e-trade websites. In this project, Scrapping is achieved with the use of PHP libraries that is used for parsing html pages. Using these, product facts from one-of-a-kind e-trade web sites are scrapped and saved in database ^[2].

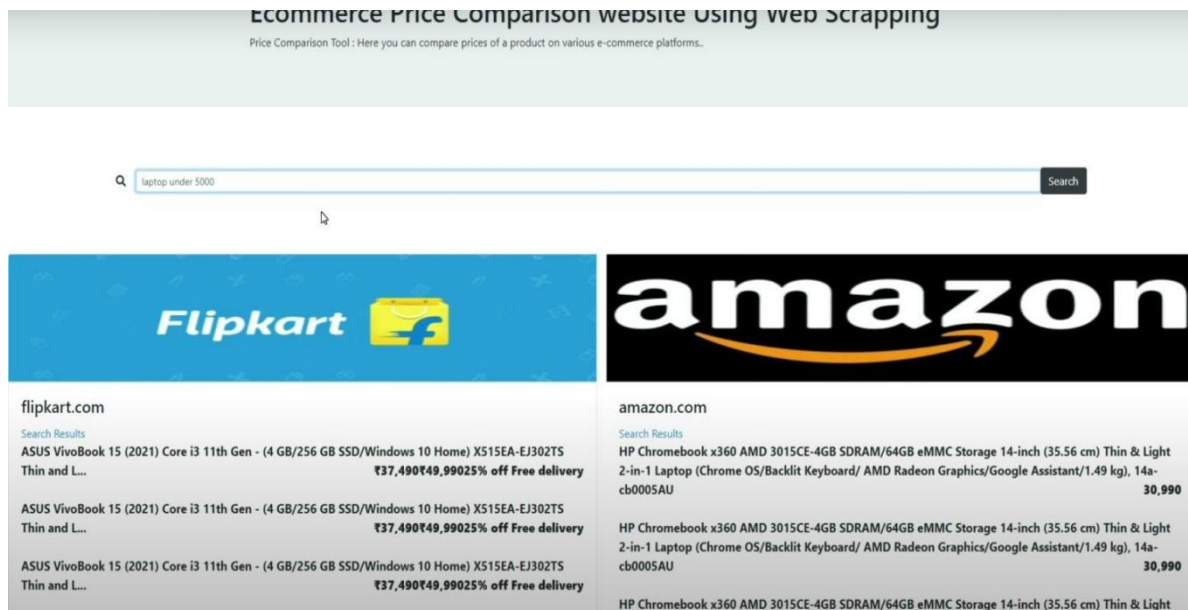
6. Expected Outcome

Comparison of product prices from different e-commerce websites and result is displayed on single web interface. This website aims at providing the best possible deal to the users for the required product by comparing the product price and displaying the minimum price from various e-commerce websites such as Amazon, Flipkart, Snapdeal and Croma, which are leading and some of the best websites to shop.

To achieve this result web mining is done to fetch the required product details and concept of web scraper is used to extract information of these products available on different e-commerce websites. System will allow users to redirect to original website of that specific product selected by the user as a best deal. Thus, website serves as a time-saving tool for frequent online buyers as they can compare the prices at one-stop instead of searching for the same product on various websites.

Here in Figure 1, we can see that in search bar, we have search for laptops under 30 thousand and it had shown us results from 2 major e-commerce market shareholders.

Figure 2: E-commerce Price Comparison Website Using Web Scrapping



7. Conclusions

Users can access helpful information on the website, which will assist them in making decisions that are in their best interests. It is now possible for working people to check on the price of things before making purchases, as a result of the existence of a website that compares prices. Users of this website will be able to compare costs on a variety of e-commerce shopping websites in order to choose which website offers the best combination of low cost and a good deal on the product they are interested in purchasing. The purchasers are going to unquestionably appreciate the time and effort that this saves them. In the end, this will help buyers shop online by bringing together tactics, the greatest offers and deals from all of the biggest online retailers, and by providing customers with an easier way to shop online.

Users will be able to acquire valuable information from the website, which will assist them in arriving at the best choice. The need for working people to check on the price of things before purchasing them is alleviated by the existence of this website that compares prices. It offers a platform for vendors to promote new products, announce ongoing promotions or deals, and enable customers to purchase products at prices that are more competitive with the market.

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