Developing Online Shopping Application and Data Analysis

Sourav Saha[1]
ECE Department, JIS College of Engineering, Kalyani

Rahul Kumar Das[2]
ECE Department, JIS College of Engineering, Kalyani

Suman Modak[3]
ECE Department, JIS College of Engineering, Kalyani

Suvarghya Banik Roy[4]
ECE Department, JIS College of Engineering,Kalyani

Subhadip Bhaumik[5]
ECE Department, JIS College of Engineering,Kalyani

Dr. Indranath Sarkar[6]
Professor
ECE Department,JIS College of Engineering, Kalyani

Dr. Bikramjit Sarkar[7]
Professor
CSE Department,JIS College of Engineering, Kalyani

Abstract:- In this age of the internet, most of the things that we have used to doing physically, now are automated andinternet driven. Because of this revolution one of the basic jobslike shopping, is getting done by web applications. The people of this developed age are making their day-to-day purchases using online shopping apps. In this paper we have proposed a shopping web application and analyzed various steps of its development. It contains the entire procedure, which begins with determining the sections of our application. Like here we have login page, catalog page, checkout or payment page and admin control page, developing a responsive design for frontend and developing a backend for our application. In front-end Html, Css, Bootstrap and JavaScript are used and in backend Servlets, JSP, SQL, Hibernate and Java programming language are used, there is an extensive discussion about the technologies that we have used for frontend and backend development. Open-source data analysis and visualization of online shopping apps like Flipkart and Amazon are added. The analysis was done to check some information such as what are most selling products, the discount rates on these products and the seasonal most selling products etc. This data will be helpful in determining what are the products that should be kept instock for every season and the discount rates on them etc so that the user base can be increased. and we have mentioned features which would make our web application unique in caseof further development.

Keywords:- *Web Application, Responsive Design, Frontend and Backend Development, Data Analysis and Visualization.*

I. INTRODUCTION

Online shopping web applications have revolutionized the way people shop. Online shopping web applications have become increasingly popular over the years, with more and more consumers turning to e-commerce for their shopping needs. With the rise of e-commerce, consumers can shopfor products and services from the comfort of their own homes. This convenience has made online shopping a popular choice among consumers worldwide [1].

Data analytics is the process of examining large and complex data sets to extract valuable insights and information [2,3]. In the context of online shopping web applications, data analytics can help businesses understand consumer behavior, preferences, and trends. This information can then be used to improve the shopping experience for customers, increase sales, and drive business growth [4]. In recent years, the use of data analytics in online shopping web applications has become a game-changer in the e-commerce industry[5].

Objective of this paper is to develop an enriched e-commerce website in our country that can be largely acceptable by the customers.
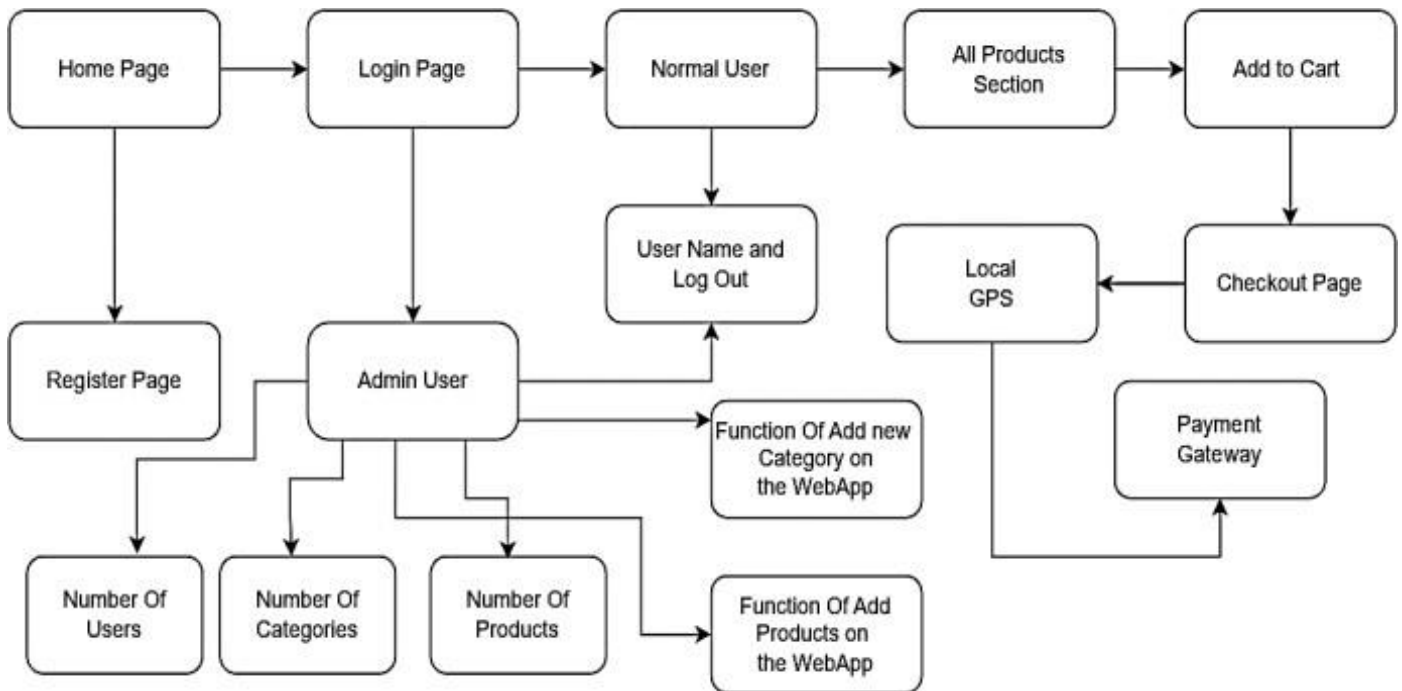
II. WEB APPLICATION DESIGN

Fig 1 Block Diagram of Proposed Web Application Design

Overall workflow of the shopping application development has been presented in the flow chart (Fig. 1). The shopping web app has a Home page where users can start browsing products. To access the website's features, users need to register or log in. Once the user enters their login credentials, they can log in as a normal user or an admin user.

On successful login, the user's username will be displayed in the top right corner of the page. Additionally, there will be an option for users to log out when they want to exit the website. As a normal user, the user can browse through the various products that are available for purchase. The products section will contain all the items that are available on the website. The user can select the product they want to buy and add it to their cart. Once the user has added all the products they want to purchase, they can proceed to the checkout page.

The checkout page will display a summary of the items that the user has added to their cart. So, on the checkout page, the user will need to enter their local address details for the delivery of the products. Once all the details have been entered, the user can proceed to the payment gateway tocomplete the transaction.

If the user logs in as an admin, they will have full controlover the website's functionalities. The admin can see the number of customers who have registered on the website, the number of products available on the website, and the number of categories under which the products are listed. Additionally, the admin can add new products and categories to the website to expand the website's offerings. Both the normal user and admin user can log out of the website at any time by clicking on the logout button.

III. DATABASE STRUCTURE DESIGN

user_id	user_address	user_email	user_name	user_password	user_phone	user_pic	user_type
1	Dehli	souravsaha8912@gmail.com	sourav saha	111	1234567890	default.jpg	admin
2	Bombay	saha231@gmail.com	sourav	123	112	default.jpg	normal

Fig 2 User Data

categoryId	categoryDescription	categoryTitle
2	T_shirts, Shirts	Clothes
3	REEBOK	Shoes
4	Speakers-> boAt, SONY Camera->DJI Pocket TV->Samsung, Oneplus	Electronics

Fig 3 Data Category

pId	pDesc	pDiscount	pName	pPhoto	pPrice	pQuantity	category_categoryId
4	Type Round Neck Sleeve Half Sleeve Fit Loose Fabric Pure Cotton P/M-Drop Shoulder-Nirvana Neck Type-Round Neck	3	NIRVANA Round Neck White T-Shirt	clothes (1).png	546	3	2
5	Pack of 1 Closure Button Fit Regular Fabric Denim Sleeve Full Sleeve Pattern Washed Reversible No	70	Men Regular Fit Washed Casual Shirt	Colthes(2).jpg	1699	5	2
8	WISHFUL by W Color- Grey Length- Ankle Length Fabric- Nylon Sleeve Length- 3/4 Sleeve	11	Women Gown Grey Dress	Colthes(3).jpg	11999	3	2
9	Color- White Outer- material Mesh Closure-Lace-Ups	44	REEBOK Stride Runner Running Shoes For Men (White)	pic(4).jpg	1799	2	3
10	Color- Black Outer- material Mesh Closure-Lace-Ups	41	REEBOK Stride Runner Running Shoes For Men (Black)	pic5.jpg	1799	2	3
11	Brand Color- Black Shooting Modes- Still, Video Ports -Type-C Wireless Connectivity-Yes	16	dji Osmo Pocket2 with Expansion Kit Sports and Action Camera (Black, 64 MP)	pic10.jpg	38990	2	4

Fig 4 Product Details

Fig. 2,3,4 shows the entities, attributes, and relationships between the different components of the web application.

➢ *Entities*:

• *User:*

The user entity stores information about the users of the web application, including their name, email, password, and address.

• *Product*:

The product entity stores information about the products available for purchase on the website, including their name, description, price, and image.

• *Category:*

The category entity stores information about the different categories of products, such as electronics, clothing, and home goods.

• *Relationships*:

• *Product and Category:*

One Category, Many Products: This relationship means that each Category can have many Products associated with it, but each Product can belong to only one Category. For example, the "Electronics" category can have many products associated with it, such as smartphones, laptops, and headphones, but each product can belong to only one category, such as "Electronics".

• *Many Products, One Category:*

This relationship means that each Product is associated with only one Category, but each Category can have many

Products associated with it. For example, a smartphone product can be associated with only one category, such as "Electronics", but the "Electronics" category can have many products associated with it, such as smartphones, laptops, and headphones.

In the above image, this relationship is represented by a one-to-many relationship between the Category entity (represented as the parent entity) and the Product entity (represented as the child entity). The Category entity has a primary key attribute called "Category ID", which uniquely identifies each category, and the Product entity has a foreign key attribute called "Category ID" that refers to the Category entity's "Category ID" attribute. This indicates that each Product is associated with only one Category. The relationship is also indicated by the crow's foot notation on the Category side, which shows that each Category can have many Products associated with it.

➢ *Here are some technical terms that are commonly used in the design and development of an online shopping web application:*

• *E-R Diagram:*

An Entity-Relationship diagram is a visual representation of the data schema used in the web application. It shows the different entities, attributes, and relationships between them.

• *User Authentication:*

This refers to the process of verifying the identity of the user trying to access the web application. The user is required to enter their login credentials, such as their email and password, to gain access to the system.

- *User Authorization:*
This refers to the process of determining the access rights of the user once they have been authenticated. The system checks the user's access level and determines what actions they are allowed to perform.

- *Database:*
The database stores all the information related to the web application, such as user data, product data, and category data.

- Backend:
The backend of the web application is responsible for processing user requests and returning responses. It interacts with the database and other external systems to retrieve and process data.

- *Frontend:*
The frontend of the web application is responsible for displaying the user interface to the user. It interacts with the backend to retrieve and display data.

- *Shopping Cart:*
A shopping cart is a temporary storage area where the user can store items that they wish to purchase.

- *Checkout:*
The checkout process is the final step in the shopping process. The user enters their payment and shipping information and confirms their purchase.

- *Payment Gateway:*
Online payments that are managed by a payment gateway service. It securely processes the user's payment information and authorizes the transaction.

- *Session Management*:
Session management is the process of managing the user's session in the web application. It ensures that the user remains logged in and that their session remains active until they log out or their session expires.

Including GPS for local shops in the online shopping web application can provide several benefits for users. By integrating GPS location data, users can easily find local shops that carry the products they are looking for, which can save them time and money on shipping costs. Here are some technical terms related to integrating GPS data in an online shopping web app:

- *Geolocation*:
Geolocation is the process of identifying the geographic location of a user or device using GPS or other location-based services.

- *API*:
An API (Application Programming Interface) is a set of protocols and tools for building software applications. In the context of an online shopping web app, an API can be used to retrieve and display GPS data from external location-based services, such as Google Maps.

- *Database Integration:*
To integrate GPS data in the web application, the location data of local shops can be stored in the database along with other shop information such as shop name, address, phone number, and product availability.

- *User Interface:*
The user interface of the web application can be designed to allow users to search for local shops based on their location. This can be done by adding a search bar or map to the website where users can enter their location or use their device's GPS to find nearby shops.

- *Navigation:*
Once the user has found a local shop that they want to visit, the web application can provide navigation directions to guide the user to the shop.

- *Mobile App Integration:*
To enhance the user experience, a mobile app can be developed that utilizes the GPS capabilities of the user's device. This can provide more accurate location data and a better user experience for users who are on the go.

Integrating GPS for local shops in the online shopping web application can greatly enhance the user experience and make it easier for users to find the products they are looking for.

IV. SCOPE OF FUTURE EXPANSION

In the future, as online commerce continues to grow, this website will offer users the option to register as either a buyer or a seller. The registration page will likely include a brief explanation of the differences between the two options so that users can make an informed decision about which role they want to play.

Those who choose to register as buyers will typically be able to browse through listings of products or services and make purchases directly from sellers. They may also have the option to save items to a wishlist, leave reviews or ratings for sellers, or track the status of their orders.

On the other hand, those who register as sellers will be able to create listings of their own products or services and set prices or terms of sale. They may also be able to manage their inventory, process orders, and communicate with buyers directly through the website. Some platforms may offer additional tools or resources for sellers, such as analytics or marketing assistance, to help them optimize their sales.

➢ *Equal Opportunity for Offline Vendors:*
Due to the widespread popularity and accessibility of e- commerce websites and applications, offline shop vendors are currently having trouble managing their operations effectively and financially. Due to the fact that the majority of client traffic is now directed towards online shopping applications, it is extremely difficult for them to compete with e-commerce websites.

Customers who shop online may encounter a variety of issues, like obtaining the incorrect item, defective goods, late delivery, challenges with replacements or refund processing, etc. For these reasons, some people prefer to purchase their necessities from offline markets, but they are unable to do so because they lack knowledge of the stores or locations where they can do so. They ultimately decide to purchase it from online shops.

In this e-commerce website, there will be an option from where the user can select their shopping preference (Online/offline). This interface allows users to select their preferred shopping method by selecting either "Online" or "Offline" option. Once the user selects their preferred shopping method, they can click the "Next" button to proceed with their shopping experience. This interface can be used in a variety of contexts, such as e-commerce websites or mobile apps, physical retail stores, or hybrid shopping experiences.

If the user selects online, the process will be the same as other websites, but if selected offline, a new window will open where the user has to type the product name in the search box. Then, as a result, it will show the nearby shops from where the user can get it. It will also display the product price and the rating of the product in different shops. Now, the user can compare the price and the rating and choose the particular shop from where he/she wants to buy it. The interface could also display additional information about each shop, such as its name, address, phone number, hours of operation, and customer ratings or reviews. Users could click on a marker to see this information in a pop-up window or sidebar.

In addition to displaying nearby shops, the interface could also provide other features, such as the ability to get directions to a shop, save favorite shops for future reference, or share shop locations with friends.

After selecting the shop, it will now show the distance between the user and the selected shop. By using GPS tracker, the user can get the route in order to reach the shop. Overall, the interface should be user-friendly, visually appealing, and provide the information that users need to find nearby shops quickly and easily.

V. CONCLUSION

In conclusion, creating an e-commerce website is a crucial first step for any company seeking to grow its clientele and boost sales online. When building an e-commerce website, several elements must be carefully taken into account, including the platform selection, the site's design and layout, the security precautions taken, and the features and functionality necessary to deliver the best user experience.

Businesses that don't create an e-commerce website run the danger of falling behind their rivals and missing out on important chances to engage with customers and make money given the rising popularity of online shopping. For this reason, offline store owners who want to boost the likelihood that their products will sell should put them online. One can access both online and offline shopping with the use of this type of website, and offline vendors will have an equal opportunity to grow their business.

Businesses can open up new growth prospects, reach a larger market, and offer a smooth purchasing experience that promotes consumer loyalty and pleasure by investing in the creation of e-commerce websites. So, if you want to grow your company, think about creating an e-commerce website right now.

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