E-Store: Inline with Online Electronics Retail

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Abstract - *The Rapid growth of e-commerce is creating a great impact on our lives. The work proposed in this paper focuses on developing a web-based application for availing electronic products by the customers from a local electronics store. Its main aim is to assist the local stores to enter into the leading competition of business and help them to grow and manage it in a better way. Currently, many web applications are available such as Amazon, Flipkart, Myntra, etc. which focus on e-commerce business. On the other hand, it's hard to find web applications that could help the local markets. Thus they tend to be way behind in the market competition.*

Our main objective is to provide a genuine authentication for customers, a reliable online payment gateway, and to build a self-reliant website rather than selling their products on high-end websites that also earns a part of profit from the sales. The proposed system is categorized into two main domains which include the user and store owner. The user in their domain can view, buy and cancel products. They can make payments, track, have their accounts to maintain their orders, and give feedbacks. The store owner on the other hand is the administrator who manages all the products on the website and can get clear statistics for their growth and development through the website. The work mainly concentrates on one brand which is the brand of the local store helping them to be a part of the leading business competition. Hence the proposed system met the requirements put forward by the stakeholder helping them to be a part of the leading competition.

*Key Words***: E-commerce, Local store, Chatbot, Search and Filter, Shopping Cart, Authentication, Payment gateway, Admin dashboard**

1. INTRODUCTION

Ecommerce is not just selling products but it's a full-blown analysis on its own. It is an analysis of user behavior, analyzing Customer Relationship Management (CRM), ensuring high sales, product content management, and customer service. It focuses on minimizing the gap between customers and sellers.

There have been several previous works done in the areas of e-commerce and analysis. Several approaches were proposed like Bayesian classification, speech recognition and email management for recognizing user transaction patterns by different researchers. Other existing solutions are maintaining good customer relationships, customer experience, transparency, and comfort of the customers, providing customer service. These are already existing solutions for an efficient e-commerce website. But the existing e-commerce websites are a hub of different collections of brands selling their products. There are not only different brands but different product categories sold online.

The idea of implementing recommendation directly when a customer is going through a product is effective in cases of giant e-commerce platforms. However, for a small business owner it is costly. So the proposed work focused more on reducing the maintenance and customer care services cost.

In the proposed work, an online website was developed for a local market that is for a local electronic retail store. This particular feature makes our web based e-commerce system different from the existing ones. The system mainly concentrates on one brand which is the brand of the local store; products from the local store are mentioned on the website.

The high priority transaction in the proposed system belongs to two categories. They are e-retail and wholesale. E-retailing or online retailing refers to the transaction of goods and services through online stores from businesses to consumers whereas wholesale is transactions made in bulk. The proposed e-commerce system is a web-based application integrated with the Machine Learning techniques focusing on e-retail.

We have included some of the components from the existing solutions like email management, customer service, transparency and comfort. Further, we have added authentication, cart features, payment, advanced filtering and searching. There is a feature called coupons which will be used by the customers during the checkout to enjoy some amount of discount from the actual price. Since this is a web application, it is a staple for brands to showcase and their business capabilities. Because of this application, the local markets can compete with other booming websites.

Most important is the reliability of the proposed system. We have made it a trustful and reliable e-commerce system for both customer and the retailer. Emails are sent from the retailer to the customers during the check-in and the customers will verify themselves by accepting the request of the retailer and verify their mails hence the retailer will know that their customers are genuine.

Thus our e-commerce website for local stores provides an online identity to create their brand and help them to be a part of this leading competition. The idea that we put forward to solve the online identity problem is to use genuine authentication for both the parties. The major problem is how to go ahead of this huge competition, thus we came up with 3 hypotheses as to how to make this project successful.

• Hypothesis – 1: It is to provide users with a smooth and easy lookup for their products by having search and filter options.

• Hypothesis – 2: Prevention of shopping cart abandonment can be done by making sure there are no bugs or an unnecessarily long and frustrating form filling process.

• Hypothesis – 3: It is to provide users a way to communicate their feedbacks to the administrator and making this feature as fast and possible.

2. LITERATURE REVIEW

[1] Dr. Shahid Amin Bhat has discussed on describing the impact of e-commerce and its analysis on the trends. The study also examined the key variables imperative for the success of E-commerce business models.

[2] Parag G Gidh emphasized how important customer experience is for an e-commerce website. He analyzed by asking various questions to different users and finally concluded that if there is transparency and comfort, the customers tend to incline to that e-commerce site.

[3] Vishal Dineshkumar Soni proposed that AI plays an important role in boosting and benefiting the economic industry by analyzing CRM (Customer Relationship Management), ensuring high sales, Product Content Management, and Customer Service.

[4]The authors highlighted the five AI-enabled tools such as Product Recommender, Virtual Agent, Email Management, Speech Recognition and Visual Perception that could enhance the experience on an e-commerce website. These tools help in analyzing customer experience with respect to awareness, effectiveness, and loyalty.

[5]The authors proposed a prediction method by Bayesian classification approach using clicking behavior features. The results alleviate the challenges of data sparseness which the traditional algorithms fail to deal with.

After reviewing various papers, we came to a conclusion that it is very important for an e-commerce website to focus on the customer relations and its requirements. It is equally important to ensure high sales and implementation of 5 AI-enabled tools for a reliant e-commerce website which was lacking for any local store.

3. SYSTEM DESIGN

3.1 Technical Aspects

The technical aspect employed for our system is discussed in the following subsections.

Operating System
We have chosen Windows operating system because it is easy to use and understand and all the required technology needed to complete the implementation of the system.

Reactjs
The frontend technology for the website as it is Single Page Application (SPA) allowing us to make the application more user friendly.

Nodejs
We have chosen to use Node for the backend of the website as it allows us to run JavaScript outside the browsers.

Database
We have decided to opt for MongoDB as our database as it provides us the flexibility to go schema-less design for our models.

Package Manager
We have decided to opt for Yarn as our package manager as it provides us the flexibility to manage our development and production phase APIs and it is free of cost.

APIs Testing
We have decided to opt for Postmanto test codes if it runs perfectly on the server without running the whole thing. Postman will give us error control of codes as we go through the development process. It will give us the agility in our working environment.

3.2 Requirements Analysis

After an effective conversation with a stakeholder, our team was able to analyze the requirements of the stakeholder, make all the electronic products to the customer available on our website and recommend what will be needed to fulfill their needs. This phase includes the requirement analysis of both the seller and customer.

3.3 Conceptual Design and research

We went through the analysis done before and created a storyboard starting from the homepage. We started with how the authentication flow would take place, how the products would be presented then we looked into the flow of the checkout process. This would present the overall structure of our system and provide the best chance for the stakeholder to discuss any changes that are required. The research was done from free research firms such as Quora, stack overflow, GitHub, etc., and by going through some papers by various authors.

3.4 Development

The coding phase began and the database designs were created. This phase was where all the discussions have been done and were converted into a reality where each page is now served dynamically and hence, they are database driven. Since the discussion phase was done extensively with the stakeholder as well as with the team it would become much easier for the programmer to produce results quickly and efficiently.

3.5 Payment Gateway

We could provide both online payment and Cash on delivery (COD). The system was integrated with payment gateway account with whichever gateway the customer would choose to use, by using a 256-bit encrypted data channel.

3.6 Content Development

We wanted our customers to find what they were looking for and writing effective content is how we could grab their attention. We had to have a great product description for our customers which attracted more number of customers to our store. Strategic content development would help us sell our products or services and shift customer perceptions.
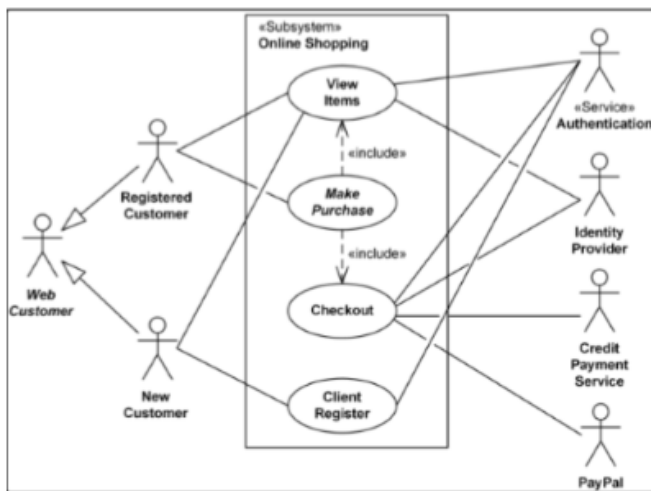

Fig -1: User Module

4. METHODOLGY

Our project was divided into modules keeping the user and the owner perspectives in mind. Thus the detailed idea about the modules is provided in the following subsections.

4.1 Authentication and Authorization

The deployment of the ecommerce websites is facing issues like security threats and online attacks. These cause users to be concerned about the privacy and make them to stop using online methods. Thus, we made sure to authenticate users and merchants, verify their identities, and therefore overcome e-commerce security threats. The

application should keep track of the authenticated users. Each request is treated as an unrelated transaction to any previous request.

There are multiple workarounds to keep track of logged users such as sessions, cookies, and tokens. Once we solve the authentication needs, another important feature is authorization. It dictates what the users can see and do inside the app. Authorization assigns roles to the users. For instance, a seller should be able to edit his/her own products but not anyone else's. However, administrators should be able to edit/delete any product that they find inappropriate. Modern applications allow logins not only through usernames and passwords, but also through social networks. Thus in the proposed system, we allow the users to login through their email id and set their passwords or through their Google accounts.

4.2 Admin Dashboard

One utmost important feature is to have a hassle free admin dashboard. This is mainly because the client, who is the shop owner in our scenario, might not be well versed with the technologies used to make changes every time in the backend to showcase it on the website. Thus, we created an admin dashboard exclusive for the shop owner so that it's easier for them to make any necessary changes related to the products and focus on market growth than on learning the technologies.

4.3 Search Filter for Products

The options available might quickly become overwhelming, leading the customer down a virtual rabbit hole. The likelihood of a buyer converting and making a purchase decreases as they search. We wanted to reduce the amount of time they spent looking. The solution was a search and filter module. Customers may choose to see fewer options, which lowered the number of options displayed. This reduces the amount of time a customer spends on the phone. In our e-commerce system, search and filter focuses on product attributes.

We sort and organize by which product features attract a consumer, from price to color. The choices that the customers make inform their algorithms about preferences for certain items or services. We reinforces that these filters improve the user experience by reducing the time it takes for a consumer to go from search to checkout and adding their search information.

One essential way for consumers to filter is through reviews. Users can select five-star products and sort by what other customers have bought and enjoyed the best. One of the most natural kinds of marketing is word of mouth. Customers will buy a product with higher ratings as a result of this positive feedback loop. Above all, a search and filter informs the e-store what customer wants. Similar products can be listed by the algorithms in the aim of receiving more

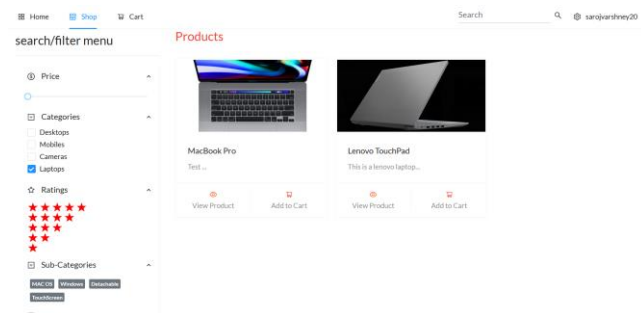orders. As a result, conversions rise and customers feel confident about their purchases.

Fig -2: Search and Filter module

4.4 Cart Functionality

Shopping cart module is one that targets on product purchases. It receives payments and coordinates information transfer to merchants and other stakeholders. It bridges the gap between shopping and purchasing; having the best shopping cart software was critical for our website. We opted to include a goto basket function, which allows users to purchase things directly from the website, as well as a wishlist, which allows customers to save products for future purchasing.

4.5 Payment

While setting up a fully functional e-commerce website, we had to make sure that the online store enables online payments for our customers. Selecting the right type of payment method was essential and a critical task for e-commerce. There are different types of payment methods available and had to figure out which payment method will suit the nature of our business and at the same time appeal to our customers. For achieving profitability and success it was considered as a critical step.

We had to confirm that the estore allows our customers to make online payments. For e-commerce, choosing the correct payment mechanism was vital and critical. There are a variety of payment methods accessible, and we needed to find out which one would best suit our business while also appealing to our target audience. It was regarded as a crucial step in establishing profitability.

Various payment alternatives are now available thanks to technological advancements. With new systems such as UPI, wallets, and other digital payment options, the payment landscape is migrating further towards digital. Without a sure, selecting a payment option that is appropriate for our business is critical, but we also had to examine other factors. One of which was customer interaction. By enabling different payment methods, our online store enhanced the opportunities of conversion. Here is the list of some payment methods for our e-commerce business.

— **Credit/Debit card payments:** Payments via cards is widely used and popular methods in global level. As a global payment solution, by enabling payment acceptance via cards merchants could reach out to an international market. The customer just had to enter the card number, expiry date, and CVV, which has been introduced as a precautionary measure. The CVV helps detect fraud by comparing customer details and the CVV number.

— **Cash:** Let's face it, in India cash is the king. For e-commerce, it comes in the form of the cash-on-delivery option. It does come with several risks, such as no guarantee of an actual sale during delivery, and theft.
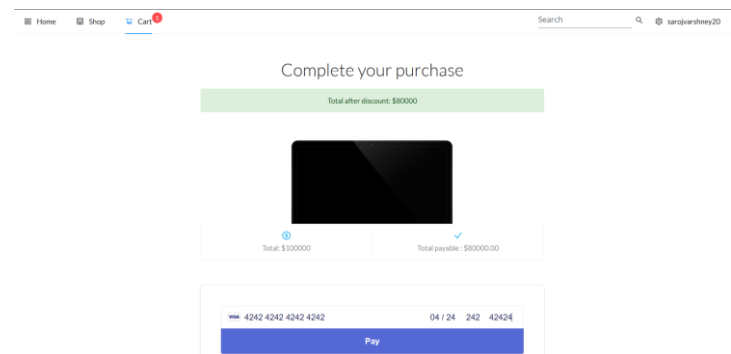

Fig -3: Card Payment module

4.5 Giving Coupons

Discounts, offers, and promotions are presented to potential clients via digital coupons. Coupons, like their physical counterparts, are designed to entice a customer to make a purchase in an online marketplace. Digital coupons exist to assist ecommerce enterprises in generating cash. With online measurements, they can track their growth and return on investment. It also aids in the rise of conversions and the reduction of cart abandonment. Coupons are only used once thanks to technology, which reduces denials and redemption.

4.6 Integrating Chatbot

This chatbot will be ready to process a user's query about a product's feature. A user will interact with the store owner indirectly using the chatbot. It will answer all the possible queries that it's being trained for. This is our approach towards the AI technologies mainly the ML domain. The existing giant e-commerce platforms have 24/7 customer care services with an actual human being on call which is costly for a local store owner like our client-the store owner. So the chatbot will reduce his business expenditures and will increase the website's productivity. This differentiates our proposed system from the rest of the well-known ecommerce platforms.
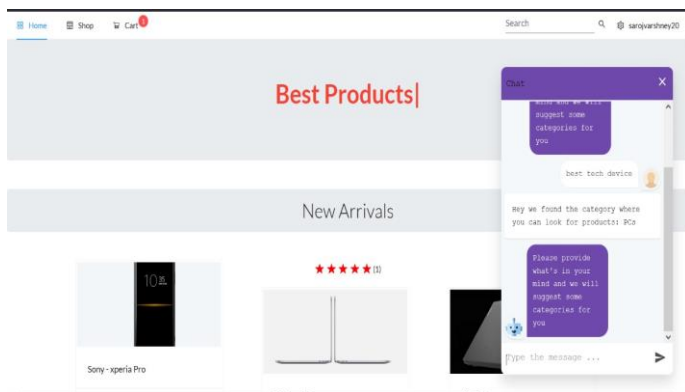
Fig -4: Chat bot module

5. EXPERIMENTAL RESULTS AND ANALYSIS

The testing strategy adopted validates the correctness of the functionalities incorporated as specified during requirements collection. User interface attributes, cosmetic presentation and content was tested for accuracy and general usability. The goal was to make sure the User Interface was easy to use and that the user had consistent and appropriate access to and navigation across the application's features. The purpose of the functional testing was to confirm that each aspect of the component met the business's functional requirements as mentioned in Sections 3 and 4.

We then continued with the unit testing where the very first level of testing applied, in which we focused in checking the correctness of all the implemented code both from the GUI point of view as well as the physical storage point of view. In this layer of testing we had basically two of our developers working on the data end and the other two on the representational end of the software. Each pair after successful implementation of a particular module would test its correctness with a self-assessed bound condition input. That is we have considered maximum and minimum limit of users/accesses/data length etc., then the system is compared with the expected outcome with the least approximation possible.

This testing method adopted by us was done by each pair with a mindset of breaking the code as put forward by the developing pair. It was found that the password details which were initially stored as integer type might be secured away from the public access but would not be restricted from the developing/maintenance team which would be ethically and conceptually incorrect.

After the unit testing we did the integration, which dealt with the working of the components and their dependencies on each other. To provide customers with a greater sense of security we then introduced the md5 type of encryption technique to hide all passwords from direct representation. Another instance was that the database end incorporated various features including deleting of a customer when he/she no longer shops for a period of six months .But soon

this was pointed out by the other pair that by doing so we lose hold of the customer details existing in the past.

When entire software product was ready and we had the confidence that it is working correctly and will satisfy all requirements which are required to prove itself in the real world, our software product was exposed to Acceptance testing. Our software product received a very positive response from these stakeholders who performed the acceptance testing of our product. They conducted a careful go through of our product to see whether it satisfies all the criteria mentioned by them during the requirement collection phase and it passed all the acceptance use cases.

Operational acceptance testing of the product was carried out by them which also had a good feedback because our application is easy to maintain, it is reliable and also we have provided an efficient technical support. Our team efficiently clarified all their doubts and explained all the features that are product incorporates.

After the entire validation was completed, we even listed to their suggestions regarding the functionalities provided by the product and we promise the stakeholders in the future with additional requirements that they desire.

Table -1: Unit Testing

| Test Number	Feature	Input	Expected output	Actual output	Remarks
1	Password testing	Correct password	Login Else no Login	Login for correct password or no login	Test case passed
2	Accuracy of chat-bot	Query	Given outputs required to be relevant	Relevant output given	Test case passed
3	Payment gateway testing	Card no and cvv	Amount is debited and payment is successful or else payment failed if cvv is not unique	Payment successful if cvv unique or else payment failed	Test case passed
4	Filters application	Apply filter	Products shown based on the filters applied	Output products based on filters applied	Test case passed
5	Cart Functionality (Wish-list)	Wish-list products	Can find the products in wish-list	Products wish-listed are found	Test case passed
6	Download of invoice	By users after payment	Invoice downloaded successfully	Successful download of invoice in pdf form	Test case passed
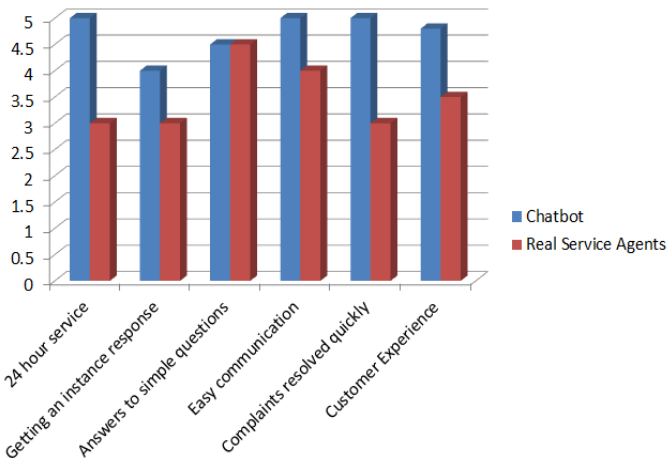
Chart -1: Comparison between Chatbots and Real Service Agents

6. CONCLUSIONS

With the policies by the Indian government vocal for local, it was an initiative taken by us to help the local businesses to enter into the leading market competition. So the proposed system is an online e-commerce system developed for a local electronic retail store which urges to expand its business. The application developed provides a platform to improve the brand of the local store and enter into the leading competition with other e-commerce websites. Though other booming websites does have their own benefits, we have tried to uplift the client's business by providing all kinds of basic functionalities for their ecommerce website which is reliable and easy to use. We did add some exciting features like chat bot, category wise filter, etc which would help the users in their search experiences.

Thus making sure that hurdles like high competition, selling fees, order management, complex data feed, availability of customer representatives is not an issue as faced by the users from many other websites thus making the working of the local stores as semi automated leading the owner to be sole administrator. In the future, we can work on adding recommendation system and expanding the areas of sales over electronic products leading to apply the same to many other local businesses.

ACKNOWLEDGEMENT

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BIOGRAPHIES

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