



SURVEY ON DEVELOPING A SECURED E-COMMERCE APPLICATION FOR PURCHASING ELECTRIC VEHICLES

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Abstract : EV- Mart is an e-commerce application that will serve as a central purchasing point for upcoming electric scooters, next-generation electric cars, and accessories. Users will be able to purchase these vehicles from the comfort of their own homes, with a wide range of options available on a single screen. EV-Mart is a business-to-consumer (B2C) e-commerce platform that will serve as a retailer or a conduit between various electric car manufacturers and end users or customers. Consumers will have various alternatives to choose from, regardless of the company's unique products. This year's EV sales surge is expected to continue, signaling that the migration to electric cars is picking up speed. The most significant transition is taking place in the two-wheeler market, where electric two-wheelers have been driving volume increase in recent days. In November 2021, registered electric two-wheeler sales increased by more than five times, to 22,450 units, compared to roughly 4,000 units in November 2020. Electric two-wheelers increased by 17% month over month, according to data from the CEEW (Council on Energy, Environment, and Water). These figures support the necessity for e-commerce in this industry. We will build EV – Mart as a platform or a hub for electric vehicles, assisting customers in making decisions about which EV to buy depending on their needs.

IndexTerms – Electric vehicles , E-commerce ,MVC-architecture, User Experience, Web Design, RSA, Hybrid Filtering.

I. INTRODUCTION

E-commerce aids nations in improving trade efficiency and facilitating emerging countries' entry into the global economy. It enables firms and entrepreneurs to compete on a more level playing field. Many of the restrictions of conventional business were eliminated with this kind of dealing. The existence of virtual marketplaces, routes, and shops that do not take up physical space, enabling access and circulation in these markets for a brief period of time and from anywhere in the globe without leaving home. Select and order things that are advertised on virtual networks and put in virtual shop windows in unidentified regions of the globe, with payment made using electronic services. "The Indian E commerce sector has seen a big upswing as a result of COVID-19, and there is much space for future expansion," said Phil Pomford, managing director of FIS' Asia Pacific Worldpay. According to the analysis, online shopping will fuel India's e-commerce business, which is expected to increase at a rate of 21% annually over the next four years and the most common payment methods online in 2020 were digital wallets (40 percent), credit cards (15 percent), and debit cards (15 percent).

There are 6 basic types of e-commerce:

1. Business-to-Business (B2B)
2. Business-to-Consumer (B2C)
3. Consumer-to-Consumer (C2C)
4. Consumer-to-Business (C2B).
5. Business-to-Administration (B2A)
6. Consumer-to-Administration (C2A)

"E-commerce is no longer restricted to conventional websites, and physical retail has become more integrated with the digital world. Consumers want the same hassle-free and quick shopping experience whether they purchase through an app, through their social feeds, or in person. If merchants prioritize the consumer experience throughout the checkout process, they will be well positioned to succeed. "Those that position themselves with digital payment capabilities will be well-positioned to exploit the next wave of development in India's retail and E-commerce markets," the research said.

II. LITERATURE SURVEY

[1] This study presented that the creation of web applications has been eased because to MVC pattern design and integrated technologies such as JSP, Servlet, and EJB on the J2EE platform. Because it splits the logic of the program into three levels, the MVC design allows for simultaneous development. Each developer may work on these three layers of the same web application at the same time. A user may make a request to our program and receive a response via the controller layer. It mostly focused on the benefits of adopting the MVC architecture as well as its features

[2] This study presented that the employment of information technology in ecommerce is critical to its success. Information about ecommerce that is communicated over the internet and through computer networks must be safeguarded. And One of the most important aspects of e-commerce is security. Any ecommerce money transfer is a popular study topic due to its criticality, risk, and urgent importance. The e-commerce business is gradually tackling security challenges on its internal networks, but consumer security is still in its infancy. The RSA cryptosystem has been presented as a technical solution to this security concern. Despite the fact that there are several assaults, the system has shown to be quite safe.

[3] This study presented that E-commerce sites may be very customizable for the user and buyer with the use of recommender systems. They enable businesses to gain a deeper understanding of their customers, deliver customized shopping experiences, and so boost consumer happiness and loyalty. They're put in place by customizing existing data mining techniques to meet current requirements. Association rules, collaborative filtering, content-based filtering, and hybrid filtering are some of the most prevalent techniques. Collaborative filtering enables the active user to get suggestions based on things that other users with similar interests have bought and rated positively, as well as a model that leverages the current user's prior ratings and transaction history to provide a new set of relevant products.

[4] This study says that a secure communication tunnel approach in an electronic payment system may safeguard transaction data such as account numbers, amounts, and other details. For internet transaction, participants such as payment gateway servers, bank servers, and merchant servers, and electronic payment system must be secure. The system's security architecture is built utilizing a variety of security procedures and approaches to reduce fraud involving credit card or debit card payment information and customer information. The system challenges a user's or process's identification, and suitable measures must be done to confirm the claimed identity. It illustrate the use of SSL certificates and digital signature.

[5] This paper presented that electronic commerce has become widely used in order to remain competitive in today's corporate world. The importance of e-commerce design in the development of systems is rarely emphasized. UX design was suggested as a useful approach for achieving success in system design. In addition, it is suggested that social media be used as a route for attracting additional clients and it discuss about eBay's e-commerce success methods, including trust, stickiness, interface features, and an entertaining experience. The three traits will be used as a guideline to develop some stickiness methods that will result in a pleasant user experience. Rather than promotional material, a content marketing approach will develop more customized content for certain customers and it takes time for a content marketing strategy to be effective.

[6] This paper proposed self-built cross-border e-commerce website solution based on the user experience paradigm. The article delves into how the user experience model is applied to the website's analysis and design. and it illustrates the website of Top China Furniture Trading Company (TCF) which serves as an example of the website's research and design process. The company has its own websites on Aliexpress.com and DHgate.com, but running an offshore warehousing business through such platforms is inefficient and time-consuming. It talks about the trading process and the information structure of the sites and navigation design.

III. METHODOLOGY

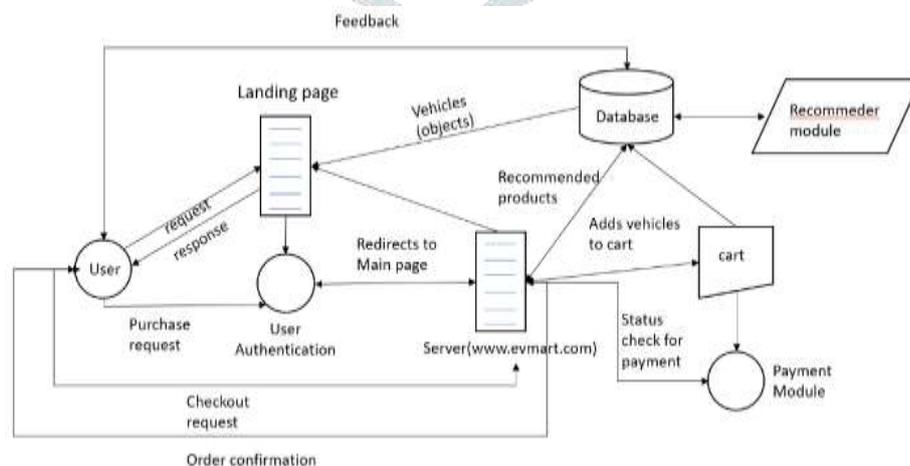


Fig 1: Methodology and rough sketch of components of the workflow model

Workflow: User is first directed to a landing page when he access the site and he is provided the overview about the site and the type of business it deals like types of cars and scooters and when the user is interested he is directed to a process of registration. After the registration process he is redirected to the main page of the application and he has to login through the login credentials and after

successful login he can explore all the items in the site and if he is interested in some vehicle and wants to purchase after viewing all the specifications and features he can purchase it with a typical purchase session used in the modern e-commerce and all the payment information is secured and once the order is successful an order confirmation is sent on to the users order page and all the updates about the order is posted on that page and after successful trade the user can give feedback and ratings on items that they purchase and this data is used to recommend the items to the other users.

Architectural Pattern using Django: Django is a high-level experienced Python web framework that enables rapid development of secure and maintainable websites. Built by developers, with thriving and active community, great documentation. Django follows MVC pattern very closely but it uses slightly different terminology. Django is essentially an MTV (Model-Template-View) framework (a MVC inside an MTV) . There by we are achieving architectural design for our application using Django

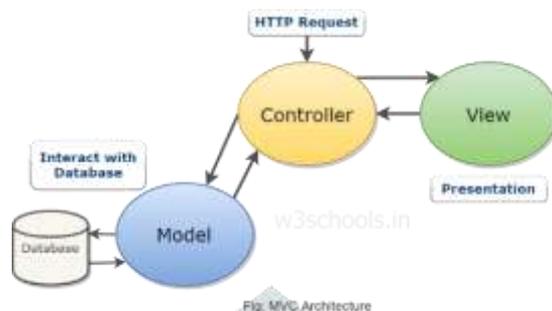


Fig 2: MVC Architecture

Securing the Payment information (using RSA): We must conceal our sensitive information from other users while transmitting credit card data during e-commerce purchases. Encryption methods are used to encrypt our data for this reason. Encryption is the process of converting plain text data into a non-readable form known as cipher-text by using algorithmic algorithms. To decrypt the data and restore it to its original plain text format, you'll need a key (or algorithm). When real cardholder data is in the open – that is, when it is in plain text format that can be read by a human or a machine – it is particularly susceptible to theft. Cyber criminals are well aware of this and are looking for methods to get a copy of the data. For example, when card data is broadcast in plain text from a card reader to the point of sale (POS) server or the merchant's central server, it is feasible for a criminal to steal it. Encryption of either the data itself or the data's transmission channel via the network, or both, may greatly minimize the data's susceptibility, lowering a merchant's risk. In the payment process, there are several techniques to encryption. A merchant must assess its particular environment to choose which technique or approaches would best suit its requirements, but the suggested solution is based on the RSA cryptosystem in this study. The payload inside the tunnel is encrypted via data-level encryption. That is, critical data components including the card number, track data, card security code (CVV, CVV2, etc.) and expiry date are all encrypted. The merchant might be protected from both internal and external fraud depending on where the data pieces are encrypted throughout the transaction. The card data that a merchant wishes to protect is encrypted at the point of capture – for example, at the customer-facing PIN input device in a multi-lane shop or at the data entry web page of an e-commerce site – and remains encrypted until it is received by the processor. End-to-end encryption is what this is referred to as, even if the transaction is intercepted at any point along the line, the encrypted card data is unintelligible by anybody except the processor who has the decryption key

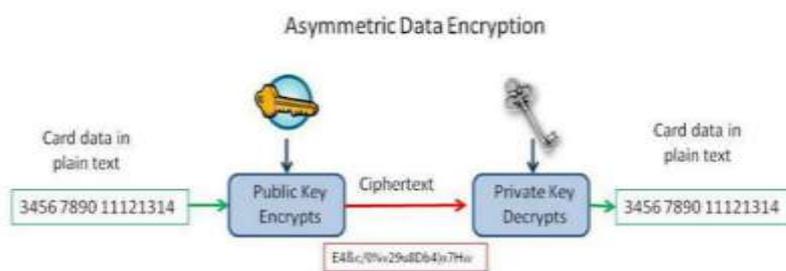


Fig 3: Asymmetric Encryption and Decryption

Hybrid Filtering: With the help of artificial intelligence and the use of machine algorithms like content-based filtering and collaborative filtering we achieve the implementation of recommender systems. Hybrid techniques have been developed to overcome difficulties seen in both content-based and collaborative filtering systems. Implementing both systems individually and aggregating the results, combining content-based filtering features into collaborative filtering systems, and developing new algorithms that integrate the approaches of both systems is optimal. The suggestions may be created independently and then linearly concatenated. Based on the relevance of the produced suggestions to the user, the algorithm allocates a weight to each one. The user is then provided with the suggestions that have been added. The other way is to present the user with the findings that are more consistent with the user's previous evaluations based on the amount of confidence each system created. Many recommender systems employ a collaborative-based method to construct content-based user profiles. The profiles are then utilized to discover person similarity rather than item similarity, allowing the system to overcome some of the sparsity-related restrictions.

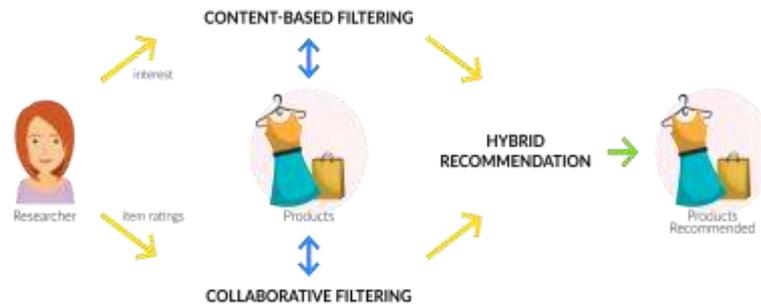


Fig 4: Hybrid Filtering

User Experience / User Interface(ReactJS and Bootstrap) : ReactJS is a tool for creating both UI components and whole UIs - everything that has to do with bringing visual elements together, attaching data to those parts, and expressing the logic that governs them. React.js may be used to construct JavaScript user interfaces for a variety of platforms. ReactDOM is for web apps, React Native is for mobile app development (with the bulk of code shared across Android and iOS), and Electron is for cross-platform hybrid desktop applications. React.js is primarily a frontend framework, but it may also be used to build backend (server-rendered) desktop programs. Modern JavaScript frameworks may be used in two ways: client-side rendering, in which the browser downloads the code and produces the UI, or serverside rendering, in which the UI is produced on the backend. The difference between JavaScript solutions (like as React.js) and earlier technologies is that JS handles a lot more functionality and page manipulation, almost as if it weren't server-rendered at all. The versatility of React.js is what sets it apart from other popular JavaScript frameworks. You may use React.js alone to show a basic page or view, or you can mix it with additional technologies to create a framework that will serve as the basis for a more comprehensive application.

Bootstrap is a free and open-source CSS framework focused towards responsive, mobile-first front-end web development. It provides CSS- and (optionally) JavaScript-based design templates for typography, forms, buttons, navigation, and other interface components. Bootstrap is an HTML, CSS & JS Library that focuses on facilitating the building of informative web pages (as opposed to web applications) (as opposed to web apps). The major goal of adding it to a web project is to apply Bootstrap's selections of color, size, font and layout to that project. As such, the major consideration is whether the developers in control find such selections to their satisfaction. Once integrated to a project, Bootstrap offers basic style definitions for all HTML components. The outcome is a unified look for prose, tables and form elements across web browsers. In addition, developers may take use of CSS classes introduced in Bootstrap to further personalize the look of their contents, For example, Bootstrap has supplied for light- and dark-colored tables, page headlines, more prominent pull quotes, and text with a highlight. Bootstrap also comes with various JavaScript components in the form of jQuery plugins. They give extra user interface components such as dialog boxes, tooltips, and carousels. Each Bootstrap component comprises of an HTML structure, CSS declarations, and in certain instances supporting JavaScript code. They also enhance the functionality of several existing interface components, offering for example an auto-complete capability for input fields

IV. RESULTS AND DISCUSSION

This survey helps in developing a modern Ecommerce website which include all the best practices and technologies referred in section III The Domain of Electric vehicle trading seems a very good option as a product base for the developing ecommerce application which is based on the upsurge in it's sales because of rising technological innovations in reducing in fuel usage and pollution control. The application which will be developed will promote the sales of EV'S and it will create multiple business opportunities for manufacturing companies and startups through which they can widen their market overseas and it will create a eco-friendly environment and educates people about the latest eco-friendly products and encourage their uses. Through this customers can do cross border ecommerce hassle free and will be equipped with real time order tracking updates and a secure payment system where easy payments can be carried out.

V. ACKNOWLEDGEMENT

We would like to express our special thanks and gratitude to **Mr. HARSHAVARDHAN J R** for his valuable suggestion and useful advice during the planning and development of this project. We would also like to thank all the professors, staff and management of KSIT for their continuous support and encouragement

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