

# E-COMMERCE WEBSITE USING MERN STACK

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*Abstract— The existing scenario witnesses a rising popularity of online shopping as opposed to physical store visits. Many people now prefer buying products online due to the widespread access to the internet. This has led to a significant increase in daily online transactions. Consumers find online shopping more convenient, allowing them to purchase items from their homes without physically going to a store. This allows them to make purchases at any time of the day and from any location. The website development involves utilizing modern web technologies like React for the frontend, Node.js and Express.js for backend processes, and MongoDB for database management. Key features like user authentication, inventory management, shopping cart functionality, and a smooth checkout process will be integrated. The main objective is to establish a flexible, responsive, and user-friendly platform that meets both customer and administrator requirements.*

*This project entails a MERN Stack website creation, which is an effective tool for website development. Users can buy a variety of products effortlessly with just a few clicks. This initiative not only focuses on exploration but also represents a smart economic strategy.*

**Key words:** E-Commerce, React.js, Mern Stack, MongoDB , Framework, Library, Node.js, Express', Artificial intelligence, Cloud computing, Natural language processing.

## I. INTRODUCTION

Today's rapidly changing digital age has made e-commerce an essential part of our daily routines, transforming the way we shop and do business. The rise of technologies like the MERN Stack (MongoDB, Express.js, React.js, Node.js) has significantly changed the landscape of online shopping, providing efficient platforms for businesses and consumers alike.

At the heart of any successful e-commerce site is the need for security, convenience, and reliability. This is where biometric authentication comes into play as a game-changer. By incorporating methods like fingerprint scanning, facial recognition, or iris scanning, e-commerce platforms can enhance security, ensuring that transactions are safeguarded against unauthorized access and fraud. Biometric authentication not only boosts security but also simplifies the

checkout process for users. Additionally, the integration automatic updates, similar to those found in app stores like the Google Play, guarantees that the e-commerce site stays current with the latest features, enhancements, and bug fixes. This automated process eliminates the necessity for manual updates, saving time for users and administrators while ensuring a smooth shopping experience. Moreover, accurate tracking capabilities are crucial for improving customer satisfaction and trust in e-commerce platforms. Through real-time communication between users and server locations, customers can precisely track the status and whereabouts of their orders from purchase to delivery. This transparent tracking system promotes trust, minimizes uncertainty, and facilitates swift resolution of any delivery issues, thereby strengthening customer loyalty and retention.

In conclusion, an e-commerce site built on the MERN Stack focusing on biometric authentication, auto updates, and precise tracking not only meets current security and convenience demands but also establishes a new level of efficiency and reliability in online shopping. By prioritizing these features, businesses can position themselves as reputable leaders in the e-commerce industry, ultimately fueling growth and success in the digital marketplace.

## II. LITERATURE SURVEY

The domain of online buying and selling, known as Ecommerce, is swiftly expanding alongside the rise in internet usage. Different technologies are utilized to aid in the creation of E-commerce websites, with the MERN stack being a notable choice. This study focuses on the application of the MERN stack in the development of E-commerce platforms. Comprised of MongoDB, Express, React, and Node.js, the MERN stack provides a comprehensive set of tools for constructing interactive web applications. MongoDB offers adaptable data storage, Express simplifies web app development, React allows for

engaging user interfaces, and Node.js supports server-side programming.

Despite the various benefits offered by the MERN stack, including the capacity to generate dynamic single-page applications and scalability for managing large datasets, there are some potential drawbacks. These include the learning curve for developers who are not familiar with JavaScript and challenges in handling data with NoSQL databases like MongoDB. Nevertheless, the MERN stack remains highly respected for its efficiency in developing E-commerce websites, providing interactive user interfaces and scalable data storage solutions.

## E-COMMERCE

E-commerce, also known as E-comm or EC, revolves around the online buying and selling of goods. It has been in existence since the 1960s but gained significant momentum with the emergence of devices such as laptops and mobile phones. Social media has also played a pivotal role in boosting the popularity of online shopping. Entrepreneurs, or innovators who initiate businesses, have been instrumental in propelling e-commerce, particularly in the digital sphere. The internet serves as the backbone of e-commerce, enabling individuals to access websites or applications through their computers or phones for browsing and purchasing products.

Types of E-commerce:

- **B2B (Business to Business):** Companies buy and sell to each other through online platforms.
- **B2C (Business to Consumer):** Companies directly sell products to customers on the internet.
- **C2C (Consumer to Consumer):** Individuals engage in peer-to-peer selling without involving intermediaries.
- **C2B (Consumer to Business):** People offer their products or services to companies online.
- **B2A (Business to Administration) :** Companies conduct business transactions with government agencies electronically .
  - **C2A ( Consumer to Administration ) :** Individuals interact with government entities online , seeking information or sharing data .

### A. Existing System

An e-commerce website built using the MERN stack comprises MongoDB (for database storage), Express.js (for handling server-side logic), React.js (for building the user interface), and Node.js (for server-side runtime environment). This stack enables efficient development of scalable, interactive, and real-time web applications. In an existing system, these components work together to manage product

listings, user accounts, shopping cart functionality, payment processing, and order management, providing a seamless shopping experience for customers while offering robust backend management capabilities for administrators.

### B. Technical Examples for relevance

While leading e-commerce platform still faces several challenges, and there are areas where our proposed MERN Stack-based e-commerce website with biometric authentication, auto updates, and exact tracking can offer improvements and differentiators:

#### 1. Security Concerns:

Despite other leading websites robust security measures, there are always concerns about data breaches and unauthorized access. Our website can differentiate itself by implementing advanced biometric authentication methods such as iris scanning or voice recognition, which provide even higher levels of security compared to traditional methods like passwords or fingerprints.

#### 2. User Experience:

While other leading e-commerce offers a streamlined user experience, there's always room for improvement. Our website can focus on enhancing the user interface with React.js to ensure a more intuitive and responsive design. Implementing features such as personalized product recommendations, tailored notifications, and interactive elements can further enhance the overall shopping experience.

#### 3. Automated Updates:

- While other leading E-commerce websites( mobile app) receives regular updates, the process may not always be seamless for users. Our website can differentiate itself by implementing automatic updates similar to the Play Store, where new features and security patches are applied seamlessly in the background without requiring user intervention. This ensures that users always have access to the latest version of the website with improved functionality and security.

#### 4. Order Tracking Accuracy:

- Despite other leading E-commerce websites precise tracking system, there may still be instances of delayed or inaccurate updates on package location and delivery times. Our website can differentiate itself by implementing a more advanced tracking system that leverages real-time communication between users and server locations. This system can provide users with more accurate and up-to-date information on their orders, reducing uncertainty and enhancing transparency throughout the delivery process.

### III. DESCRIPTION OF THE PROBLEM STATEMENT

While other leading E-commerce offers some level of customization, our website can differentiate itself by providing a more personalized shopping experience. Leveraging React.js and MongoDB, we can implement advanced recommendation algorithms that analyze user behaviour and preferences to offer tailored product suggestions and promotions. Additionally, allowing users to customize their shopping experience with features such as saved preferences, favourite products, and personalized notifications can further enhance engagement and loyalty.

By addressing these challenges and incorporating innovative features using the MERN Stack, our e-commerce website can differentiate itself from existing platforms like other leading platforms and attract users with enhanced security, usability, and personalization.

### IV. OBJECTIVES

- Enhanced Security
- Seamless User Experience
- Automatic Updates
- Precise Tracking and Transparency
- Customization and Personalisation
- Scalability and Reliability
- Continuous Improvement and Innovation

By achieving these objectives, the developed ecommerce website aims to provide a secure, seamless, and

personalized shopping experience for users while ensuring transparency, reliability, and scalability in the platform's operations.

### V. PROPOSED WORK

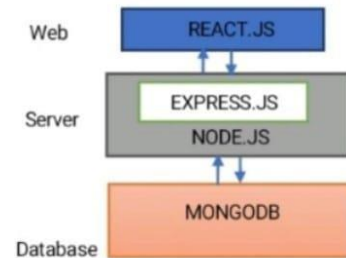


Fig 1: Three layers of the MERN stack

### VI. METHODS

#### A. MERN STACK:

The MERN stack comprises four distinct technologies that collaborate to build dynamic web applications and websites. We've adopted MERN Stack as our primary full-stack technology for our project application. The following are the components of the MERN stack:

**MONGODB:** The MERN stack employs the database referred to as MONGODB. It's a NoSQL document-oriented database featuring a flexible schema and a

JSON-based query language. MONGODB doesn't

enforce a predefined schema for storing objects, allowing flexibility, especially during early development stages. Documents, akin to rows, serve as the unit of storage, while collections, akin to tables, store multiple documents. Each document within a collection has a unique identifier for access, automatically indexed. Moreover, prominent companies like Facebook and Google leverage MONGODB in their operations.

**EXPRESS.JS:** It is a framework tightly integrated with Node.js. It's an open-source server framework entirely written in JavaScript. EXJS boasts robust features for developing both web and mobile applications. Notably, EXJS supports HTTP and middleware methods, providing substantial power to the API while maintaining simplicity.

EXJS serves as a framework atop Node.js, augmenting it with additional features without slowing down its performance. It's an integral component of well-known Node.js frameworks like Sails.js and MEAN. EXJS facilitates the development of singlepage, multipage, and hybrid web applications. As a rapid, assertive, lightweight, and adaptable web framework for Node.js, EXJS operates as a layer atop Node.js, aiding in server management and routing. Its comprehensive feature set supports the creation of both online and mobile applications. Due to its straightforward architecture and standard adjustments, EXJS serves as the foundation for various JavaScript frameworks, including feathers, Keystone JS, Kraken, and Sails.

**REACT.JS:** It is an open-source client-side JavaScript library that's declarative and flexible, aimed at creating reusable UI components. It serves as a component-based front-end library primarily handling the view layer of applications. Initially developed by Facebook, it's currently maintained by a consortium of developers and companies. Each RJ web application comprises reusable components responsible for various UI elements. These components, such as navigation bars, footers, and main content sections, eliminate repetitive code, streamlining development efforts. Developers need only focus on developing the logic and importing the components into the appropriate sections of the code, making development more efficient.

**NODE.JS:** It is an open-source, cross-platform server environment. It serves as a JavaScript runtime environment for executing scalable JavaScript applications, particularly geared towards networking and server-side implementations. Renowned for its scalability, it empowers developers to construct robust web servers and clients.

NODE.JS, built on Google Chrome's V8 engine, excels in creating fast and scalable network-based applications, boosting rapid execution times. It finds extensive use in developing I/O-intensive web applications like video streaming sites and single-page applications. NJ's lightweight and efficient nature make it ideal for highly data-intensive real-time web applications

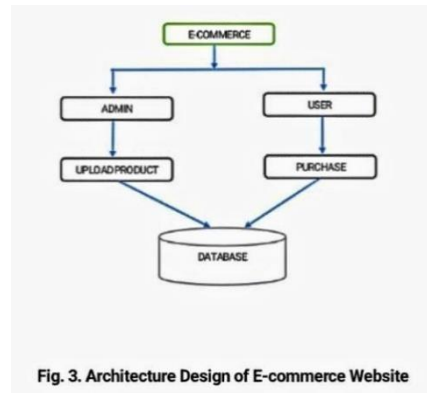
VII. RESULTS ANALYSIS OF DISCUSSION

The initial iteration of an e-commerce app, mirroring an online

store, was successfully developed utilizing the MERN stack's core technologies and incorporating multiple Node.js modules. This specific software is designed to be efficient, user-friendly, and operate seamlessly.

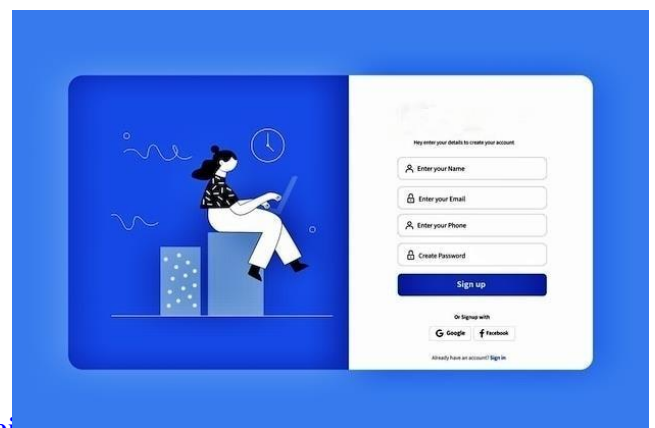
A. HOME PAGE:

spanning multiple distributed devices. Leveraging an event driven, non-blocking I/O architecture, NJ eliminates the need for waiting on API responses, making it invaluable for building high data-intensive and real-time web applications. Additionally, NJ's asynchronous nature ensures non-blocking operations, enhancing code synchronization between client and server and consequently ing up the loading time for audio and video files. It is a server -side programming and primarily developed for non-blocking, event -driven servers, such as traditional web sites and back-end API services.



#### ADVANTAGES

- Accessible anywhere at any time.
- Straightforward Returns and Swaps.
- Spares client's time.
- Diverse range of products available.
- User-friendly and scalable.
- Special offers and Promotions.
- Target the global market with a vast consumer base.
- Swift Transactions.
- Specific and focused advertising.
- No Crowded Settings.
- Simple Comparisons.



The project's landing page primarily showcases a catalogue of products stored in the database. It features a search bar and navigation options like "Login" and "Register." Login and Register Options: These options appear on the navigation bar, allowing users to either sign in using a form or navigate to the

Fig 5 : Sign-up page registration page for account creation.

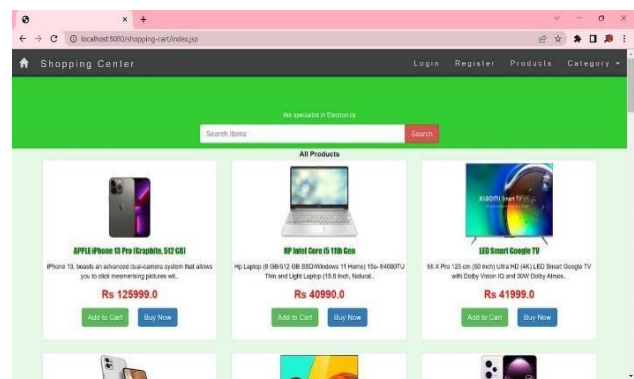


Fig 4 : Home page

B. SIGNUP PAGE :

A signup page is typically used to register new users for a service. It usually collects essential information of an user such as name, email address, and password, to create an account. It also validates and checks to that the entered information is accurate and secure. Additionally, it may provide options for users to agree to terms of service, privacy policies.

C . CART PAGE :

The cart page serves as a virtual shopping cart where users can review and manage the items they intend to purchase before proceeding to checkout.

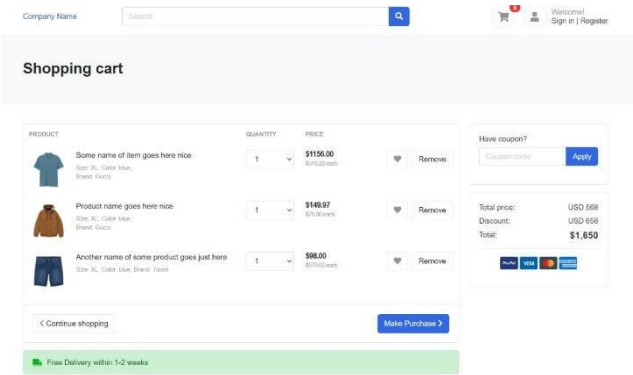
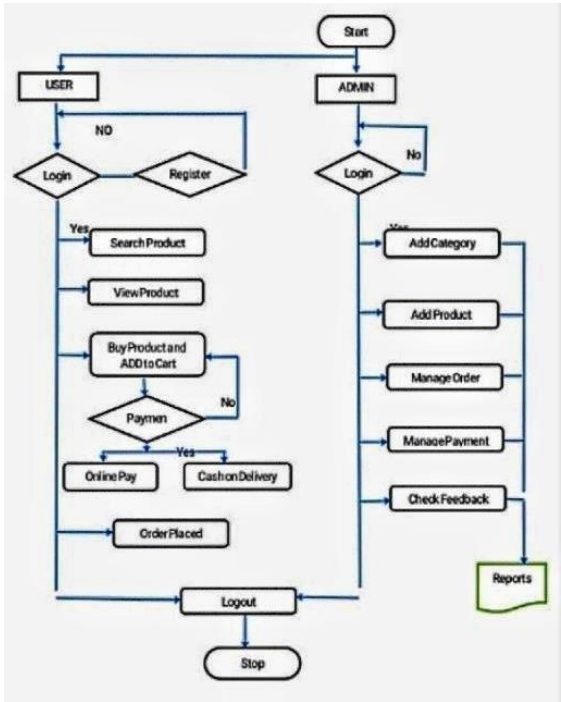


Fig 6 : Cart page

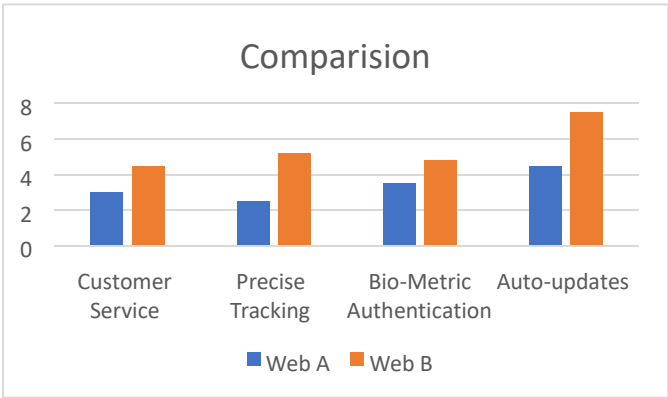


FLOWCHART



CONCLUSION

Finally, the paper concludes that E-commerce offers unparalleled convenience for both consumers and businesses in today's competitive landscape. Unlike traditional brick-and-mortar stores, online stores are accessible 24/7, accommodating the diverse schedules of modern consumers. With the MERN stack technology, this project facilitates seamless buying and selling experiences, allowing users to browse, purchase, and sell products effortlessly. Key features include advanced search and sorting functionalities based on price and popularity, as well as the capability to store and manage user profiles, order histories, and preferences. For sellers, the platform offers intuitive tools for product management and category creation, streamlining the process of adding new products and expanding their offerings. This userfriendly interface empowers consumers to explore a wide range of products from the comfort of their homes or offices, enhancing their shopping experience significantly.



aspire to achieve. Thank you to everyone who contributed to this project, and we sincerely hope that this work will be beneficial to the community.

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