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Developing An E-Commerce Web Application with ReactJS and Firebase

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Abstract: ***With the rise of e-commerce platforms, shopping is now possible anytime, anywhere. Web application development is a great solution for the shopping needs of people who want to avoid the hassle of physical stores. The web application will provide users with a user-friendly interface that will allow them to easily purchase a wide range of products. This app will include various features like product search, filtering, sorting, shopping cart management, payment gateway integration. In contemporary times, most people use technology to live their lives and meet their daily needs. In this generation, most of us use e-commerce sites to buy clothes, groceries, and electronics. Additionally, this app will provide users with personalized recommendations based on their purchase history, search history, and preferences. The application is designed to provide users with stable and fast engagement. All in all, it will provide a convenient and a safe platform for users to purchase products online. With its powerful features and modern technology, the app will help users save time and effort while providing a hassle-free shopping experience.Loading time and minimalist design. The ambition of this article is to discuss the development of an app that provides users with a seamless shopping experience while ensuring security and comfort.***
Keywords: REACT, NODE JS, STRIPE, JAVASCRIPT, FIREBASE , HTML, CSS

I. INTRODUCTION

E-commerce web applications have developed from traditional brick-and-mortar stores to online platforms, making it simple for people to buy products from the comfort of their homes. With the increase in the use of smartphones, web application development is a great solution for those who want to shop at any moment in any place. It allows users to browse a wide range of products, compare prices and make purchases directly from their mobile devices.

The internet has become an integral part of our daily lives, particularly during the current pandemic crisis, with an estimated 5.25 billion active internet users worldwide. With the convenience of online shopping, e-commerce has seen significant growth, particularly in the mobile sector, which generated 56.8% of all internet traffic in 2020. However, slow loading times have caused users to switch to native applications for their daily internet activities, leading to a decline in web browsing time.

In response to this trend, this thesis focuses on developing a functional and responsive e-commerce web application prototype for small businesses. The use of JavaScript, particularly the ReactJS library, is emphasized as a powerful tool to create dynamic and user-friendly websites that respond to user requests. Additionally, the Firebase cloud service is utilized to handle data management and authentication.

The primary aim of this thesis is to provide an e-commerce web application that includes basic features such as product viewing and purchasing, order handling, and an admin panel for managing products and orders. By combining ReactJS and Firebase, this web application is expected to provide an efficient and user-friendly experience to potential customers[5].

II. LITERATURE SURVEY

1) "Design and Development of E-Commerce Web Application" E-commerce web application, Cooperative Store Management System is a platform for customers to shop online without physically visiting the store. It is designed to reduce sellers' workload and minimize manual errors by automatically recording entries. Customers can significantly reduce the costs and wasted time of using the system. In addition, customers benefit from better services and can make their purchases at their convenience since they are available at home. This not only helps attract new customers, but also retains old ones, which ultimately contributes to the long-term growth of the business.
2) "E-Commerce Web Application " HTML5, CSS and JavaScript and some of their libraries as frontend and Firebase as backend. JavaScript library to manage dynamic database content and Firebase to build the whole e-commerce site.

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Many web developers use it to create dynamic web pages, this technique allows the web page to be updated asynchronously by exchanging small amounts of data with the server in the background, so that different parts of the web page can be updated to make it work properly, without reloading all the pages in any way, it also helps developers to make web pages interactive and dynamic.

3) "Developing an E-commerce application prototype with React JS and Firebase" In this article, we aim to explain the process of developing an e-commerce application using React JS and Firebase Services. Along with a brief description of e-commerce, this article examines the fundamentals of React JS and Firebase. At the heart of the process is creating a conceptual framework for Firebase that leverages its tools and services. The result of the project based on this thesis is a prototype of an e-commerce online store.

4) "Building an E-commerce Application Utilizing Firebase Cloud service" The thesis project resulted in the creation of an e-commerce application prototype. The purpose of the application is to allow individuals to buy and sell things related to their own needs. E-commerce websites exist as utilities that help businesses process orders, receive payments, and manage logistics. Overall, all key aspects of a working prototype application were successfully implemented, except for some that were excluded for various reasons.

5) "Internship on Web-Based-Commerce Application Development at Bangla Soft Computer using React JS" Web application development is an important topic for e-commerce websites. People can browse, select products, and order from the company, which will ship within days. We plan to change and make some changes to this site.

6) "E-Commerce Web Shop" After implementing the topic and systematically covering the basics of Spring Boot, React JS, MySQL and a few other technologies and techniques for building enterprise Java applications on the web, it is useful to provide an overview of Spring Framework as well than understanding the basics. framework principles and working mechanisms.

7) "Enhancing E-Commerce with Modern Web Technologies". The purpose of this article is to study new developments in the field of web development and use them to create e-commerce web applications. The application implemented in this article adopts a headless architecture, which separates the backend and frontend logic. This optimizes the front-end of the app and builds progressive web apps.

8) "Designing and Developing a Website with React Js" The main objective of this thesis is to design and develop a user-friendly and responsive website for a restaurant. The motivation of this article is also to learn and implement progressive web applications. The main objective of this thesis is to learn and implement ReactJS to develop a website for the restaurant "Ravintola Sargam". The desire to learn and implement Progressive Web Apps on a website adds extra motivation.

III. PROBLEM STATEMENT

Today, most consumers prefer to shop online through mobile apps. However, many shopping apps have poor user interfaces, a lack of personalized recommendations, and insufficient payment security. As a result, consumers may find it difficult to browse vast catalogs of products, make informed purchasing decisions, and transact seamlessly.

Current web applications for shopping apps lack modern web technologies and user experience as the apps are built using traditional web development frameworks that do not provide responsive design and efficient data management. As a result, users may not be able to access the app on multiple devices, experience slow page load times, and experience issues searching for products. Some apps also lack essential features like real-time product availability updates, user-specific recommendations, and smooth navigation. To solve these problems, it is necessary to have a shopping application that offers a user-friendly interface, safe and convenient payment options and efficient post-purchase services. Therefore, the app should be designed to enhance the overall shopping experience and provide users with a hassle-free environment.

IV. PROPOSED WORK

The project is a full-stack e-commerce application using React, JavaScript, Node Js, Stripe, and Firebase. It consists of five primary pages - the authentication page, homepage, cart, orders, and logout. React with Node.js and DOM, Google's Firebase, HTML & CSS, JavaScript, and Visual Studio Code were used to create this web application. The first task, once we get the development environment ready, will be to set up the React Router.

Once we have everything in place, we can start off with creating the website header, which will basically serve as the navigation bar, as in most modern websites.

Next up is the home page building. In this project, we'll be keeping it simple by showing all our sample products on the homepage.

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Then we'll be setting up the React Context API. The Context API is a component structure provided by the React framework, which enables us to share specific states across all levels of the application. In our project, we'll need to manage two states: basket (to manage the shopping cart) and user (for managing the details of the currently logged in user).
For setting up the payments functionality, we'll be using APIs provided by Stripe.
Handling our database and authentication needs to be supported and we'll be using Firebase for the same. Basically the database will be used to store the login information for the users, but the resource can be used for storing product information as well.
Once we have Firebase setup, we can work on the Login page of our application.
Successful implementation of the above requirements will lead to completion of the core implementation of our e-commerce solution.
The following diagram shows the proposed workflow of the project:

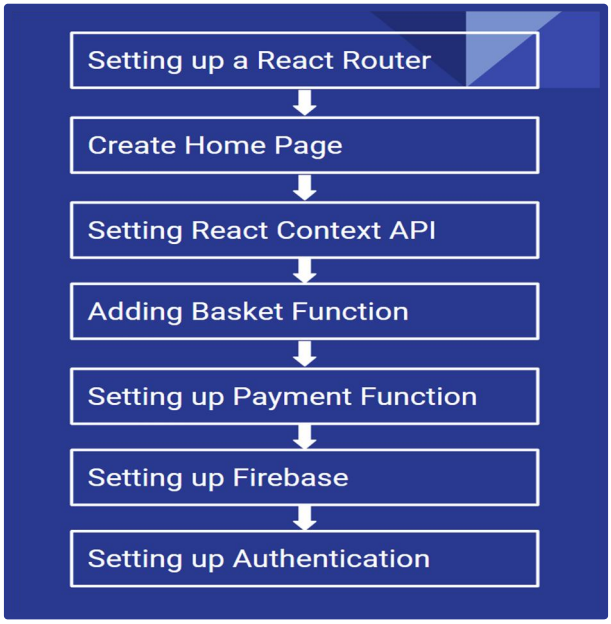


Fig.1: proposed workflow of the project.

V. FUTURE SCOPE

In the future, the use of native apps is expected to continue to grow, especially in the e-commerce market. As a result, web developers will continue to seek out ways to provide experiences that are comparable to native apps. JavaScript will likely remain one of the most powerful programming languages for web development. React's unique feature of generating a memory-based data structure cache is expected to further enhance the efficiency of webpages.
More businesses will likely turn to React and Firebase to create responsive and scalable e-commerce web applications. Firebase's cloud service will continue to be useful in managing data and authentication, while React will handle the front-end work.
Future research may focus on improving the design and architecture of e-commerce web applications, as well as enhancing the testing procedures used to ensure their functionality. Additionally, there may be further exploration of the advantages of using numerous services on Cloud Firebase to improve the performance of e-commerce websites. Overall, the use of React and Firebase is expected to continue to grow as businesses seek to create high-performance, user-friendly e-commerce web applications.

VI. CONCLUSION

In comparison to most of the e-commerce applications, we can conclude that our web application is faster as it has a high response time, more secure because Stripe provides high security. The application also provides an enhanced user interface and user experience. Validation after placing an order via email ensures integrity and a secure environment.
Deploying and testing were conducted on different platforms. The outcome was positive because the webstore satisfies all the listed requirements.
There are a lot of useful features in this web app, yet it is still basic as well as appealing enough for an online business. At a modest cost, it gives customers a way to grow their company.

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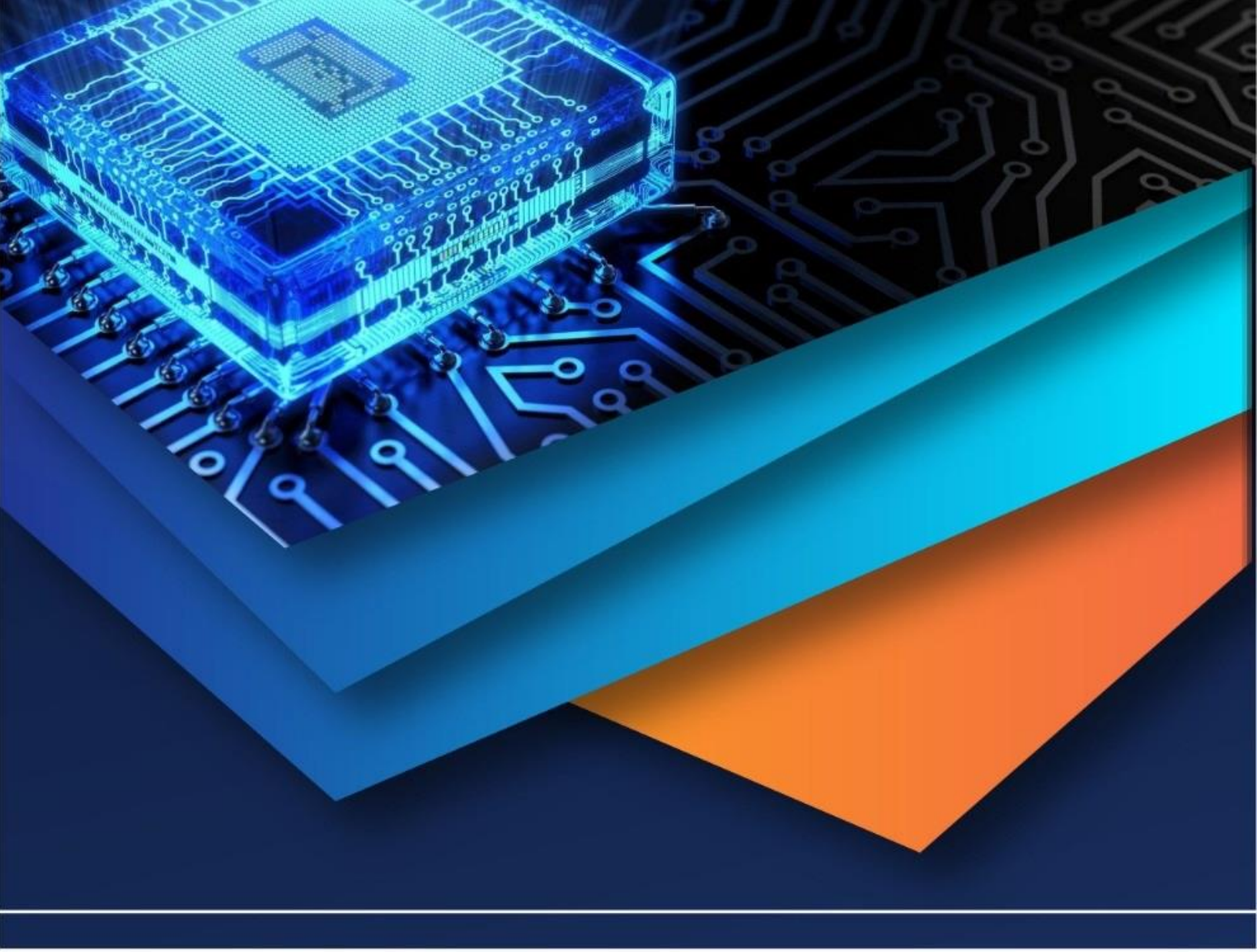
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