MERN Stack Ecommerce Web Application

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Abstract: *Over the last decade, web development has gone through significant changes in every aspect. The rapid development of web technologies in general as well as front-end library and framework have taken web development to a new level which facilitate developer job considerably. One of the most widely used and modern full-stacks is the MERN stack, which plays a leading role in web development nowadays. The four components included in MERN stack are MongoDB database, Express as back-end web framework, React.js serves as front-end library and Node.js as JavaScript environment. The purpose of this thesis was to study the usability and functionality of each technology in the MERN stack and as a consequence, to develop a fully functional E-commerce web application by utilizing MERN as well as some other additional modules. The thesis presented the development process of the application, with all the essential parts noted and explained. The outcome of this project is an e-commerce web application with all the necessary and fundamental features of an online bookstore. The product aimed to be an essential part in the business strategy of the author's parent's startup. The application is a beta version and focused mainly in development process, therefore deployment process is not carried out in this thesis but will be concerned further in the future..*

Keywords: MERN Stack, E-commerce, React, JavaScript, Node, Ex-press, MongoDB, Web Development.

I. INTRODUCTION

MERN stack, E-commerce, React, JavaScript, Node, Ex- press, MongoDB, web development Nowadays, technology is growing incredibly fast. The rapid innovation of hardware devices makes software technologies to advance as well, automatically take place of old technologies. Because of the significant expanding in the number of electronic devices that use Internet and real-time feature, performance is key.

By tradition, web development has been carried out by technologies such as JAVA servlets, ASP.NET or PHP. While those technologies are quite widespread and have good features with many years of development and are supported by a large community, they still have some limitations concerning about today's need which is performance. The MERN stack (MongoDB, Express, React and Node) with their simplicity and uniformity, has been recently developed to become a better solution for this performance issue.

II. METHODOLOGY

The five phases of the project are as follows:

2.1 Scoping and Planning

This phase focuses on the planning of the project's overall direction, including the definition of the project's scope, objectives, and timelines. The deliverable from this phase is this Design Plan.

2.2 Conceptual Design and Research

In this phase, the conceptual design of the methodology is developed and research on existing methodologies is conducted. Research is performed from independent research firms, such as the Gartner Group, Forrester Research, and CIO.com. These research firms sometimes publish the methodologies that consulting firms use. Consulting firms' websites are another source for researching E-commerce strategy methodologies.

2.3 Development of Methodology

The actual methodology is developed in this phase. Detailed descriptions of each task in the methodology are documented, including the objectives, inputs, approach, relevant models, applicable tools and techniques, outputs, and any references. The methodology is to be documented in an appropriate format, be it a Word document or HTML pages.

2.4 Implementation of Methodology

The methodology will be implemented with a client. This phase includes the marketing of E-commerce strategy development services and the closing of the sale, followed by the actual implementation.

2.5 Revision of Methodology

Final touches and revisions to the methodology are made in this phase. The majority of these revisions come from experiences on the client project. Sample reports and any additional references are added to the methodology.

III. RESULTS AND DISCUSSION

This project has several parts to it, but the most essential are three listed in Table 1.

Table 1: The overview of the three major parts of the shop

| Administrators	Customers	User
Login access	Login access	Cannot login
Can add products	Can add to cart	Can add to cart
Can edit products	Can edit product in carts	Can edit product in carts
Can view products	Can checkout	Cannot checkout
Can delete customer	None	None

3.1 Administrators Detailed Attribute

- **Admin Register:** The administrator needs to register before they can have access to the core data of the shop.
- **Admin Login:** The admin logs in and can view, add products, manage customers.
- **Admin Edit:** The Admin can make changes to the shop such as delete customers, add a customer or, upload new products.
- **Manage Customer:** The administrator has the authority to delete or add a customer.

3.2 Customer Detailed Attribute

- **Signup:** This refers to registering as a customer. The registered member has a lot of privileges associated with the shop when one becomes a customer.
- **Login:** After the user has registered, the user becomes a customer, and he or she can log in with their personal information.
- **View:** The customer can see all the products in the catalog and able to look at the products and some features on the homepage.
- **Edit:** The customer can make changes to their data displayed on the customer page.
- **Update Cart:** This refers to putting or removing products from a shopping cart.

Figure 5 is the use case diagram of the shop. One can see the essential attributes associ- ated with both Administrator and Customers/Users
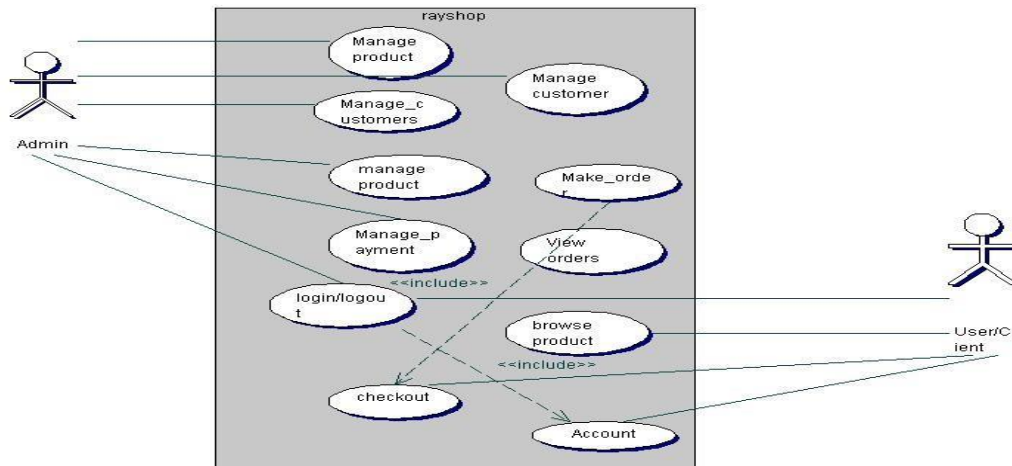
IV. CONCLUSION

The main goal is to build an e-commerce web application with all three i.e., Front end, back end, and database. This web application is a fully pledged working web application right from the login authentication, admin authorization, add items to cart, using payment gateway. It can be used by any product on either a small scale or a larger scale. The web application is easy for them to access and without any effort categories can be created and products can be added by them. It will be very attractive for the customer to see the products by sitting at home or office. It will be very helpful for the small-scale industries without selling to wholesales, large retails mediators they can directly sell to the customer by saving money for both.

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BIOGRAPHY

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