E-Commerce of Agricultural Field

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ABSTRACT
The main objective of this project is to help farmers ensure greater profitability through direct farmer to farmer, farmer to customer, & farmer to dealer communication. Our project deals with the farmer benefit of getting their products sale at the best price online. Here, the main users of this website are farmers, customers, dealers, and admin. Farmers will get a unique interface where they can perform marketing, get the correct rates of the market, get in touch with SMS or Email and gather knowledge of different schemes, and get paid online. It will provide market-wise, and commodity-wise reports to the farmer in an interactive way. The centralized market committee will control all business activities.
Keywords: *Web development, E-Commerce, MongoDB, React, Node.js, Express.js, Chakra UI, Agriculture*

I.   INTRODUCTION

As the problem statement says e-commerce in the agricultural field. For this, we will be going to make an e-commerce website that is related to agricultural products. The farmer can sell their product online and the customer can buy that product. E-commerce provides an easy way to sell products to a large customer base. Since there is a lot of competition among multiple e-commerce websites. So to make our website look good in eyes of the users first we are going to take reviews from the people and most importantly from farmers. Also, there are chances that users are not sure about the actual products they want to buy.

The e-commerce of agriculture provides a virtually global distribution marketplace. Internet is used by millions of people throughout the world and therefore, conducting business through this new system is unlimited and endless. It helps to minimize inventory costs many times by adopting just-in-time systems. It also enhances the firm's ability to forecast the demand of an industry more accurately. Under e-commerce agribusiness, the customers place orders immediately on the net, and goods are delivered in a normal way. So, With the help of the internet small and medium-size companies also get an opportunity to provide information on their products and services to all the potential customers the world over at a minimum cost. Through the internet, companies can establish a direct link to customers and critical suppliers or distributors to complete transactions or communicate trade information more easily.

II.   LITERATURE REVIEW

With the help of smart devices, the issue of those farmers having coconut farms on less than 5 acres of land was solved. This was achieved by the adoption of smart devices. With the help of these devices, a significant yield in coconut was observed. The main purpose of this was to reduce the manpower on the farm as a smart kit was directly connected and installed on the smartphones so that the farmers could use it efficiently.[1]

A hydroponic system was established on the rooftops of various buildings to provide space and a food education program. This was done to achieve and maintain a new form of agriculture in cities as a service industry. MQTT client was used to reducing the price of this system.[2]

Major pollution for agriculture was observed from the road transport or we can specifically say air pollution for the farms near the roads, In rural areas agriculture with WSN(Wireless Sensor Networks) has given a good result by decreasing the road transport and introducing alternatives for traveling into rural areas. The best way of traveling is the travel by Indian Railways.[3]

A cloud-based architecture can easily increase the business development and quality of the farms. The objective is to create a control system to monitor the controlling process in greenhouse crop production using smartphone services. Farms can be easily connected to an LFC through CFC. By combining the several advanced services of the cloud the agricultural production quality can also be increased.[4]

A production System for agriculture using IoT was implemented as GUI visualization software. The main aim was to build a reliable data collection system by launching a crop environment data system. Farmers were able to understand the current soil choice. They were able to determine which crops were good to yield in the current stage. Through better management and analysis better farmland was maintained.[5]

The system utilizes B/S infrastructure, MySQL as the database server, Apache as the web server, and PHP to implement it in win2000 and Linux. To keep in sync Groupware was used. The user can connect the system with any device to get the desired information and the limitation was not only up to the computer. The only disadvantage was the stats can be easily manipulated due to the population and lack of knowledge in the rural area.[6]

A lab-made weather monitoring system was deployed on farms to measure the various weather parameters. It was compared to a commercial Davis Vantage Pro2 installed on the same farm. The results were positive and farmers were able to integrate it into their farming. But due to its reliability on the wind pattern, to find out the source of a damaged crop it was important to study the wind factors. Apart from that, it comes with some important sensors like humidity, temperature, determining the speed of the wind, etc.[7]

To benefit farming communities by fair prices in the global market by introducing new techniques and use of the online market. A mobile application was developed which is beneficial for both farmers and buyers as both need not need to go anywhere and just trade on a mobile application. Various parameters were measured like the pricing of the products and most important the quality check of the products to satisfy customers. It was observed to be a very significant step into Indian Agriculture as it is considered to be our backbone.[8]

III.   OBJECTIVE

- The main objective of this project is to build a platform for farmers to sell their products and track the sale.
- This platform is flexible which can maneuver the customer-farmer relationship effectively.
- The farmer will get a unique interface where they can avail themselves everything right from learning to the market information.
- This website will act as a unique and secure way to perform agro-marketing.

IV.   EXPERIMENTAL SETUP

4.1 Frontend
tech stack = HTML , CSS , react.js
React is a library for building composable user interfaces. It encourages the creation of reusable UI components, which present data that changes over time. Lots of people use React as the V in MVC. React abstracts away the DOM from you, offering a simpler programming model and better performance.
Axios is a promise-based HTTP client for node.js and the browser. It is isomorphic (= it can run in the browser and node.js with the same codebase). On the server-side, it uses the native node.js HTTP module, while on the client (browser) it uses XMLHttpRequests.
HTTP is a generic and stateless protocol that can be used for other purposes as well using extensions of its request methods, error codes, and headers. HTTP is a TCP/IP based communication protocol, that is used to deliver data
HTML (the Hypertext Markup Language) and CSS (Cascading Style Sheets) are two of the core technologies for building Web pages. HTML provides the structure of the page, CSS the (visual and aural) layout, for a variety of devices.

4.2 Backend
In this particular project, we have used nodejs, express.js , and mongoose in the backend. As an asynchronous event-driven JavaScript runtime, Node.js is designed to build scalable network applications.[https://nodejs.org/en/about/]. We have used express js for routing, ***Routing*** refers to how an

application's endpoints (URIs) respond to client requests You to define routing using methods of the Express app object that correspond to HTTP methods; for example, app.get() to handle GET requests and app.post to handle POST requests. You can also use app.all() to handle all HTTP methods and app.use() to specify middleware as the callback function.[https://expressjs.com/en/guide/routing.html]. Mongoose is an Object Data Modeling (ODM) library for MongoDB and Node.js. It manages relationships between data, provides schema validation, and is used to translate between objects in code and the representation of those objects in MongoDB.

Object Mapping between Node and MongoDB managed via Mongoose
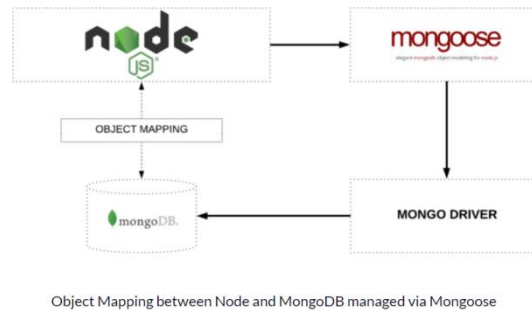
Figure 1: Object mapping between Node and MongoDB managed via mongoose

We have connected to the mongo database using **mongoose.connect**, followed by MongoDB Uri, which is saved as a constant in the config file. We have also used JWT Tokens known as JSON Web Tokens. It is an open standard used to share security information between two parties — a client and a server. Each JWT contains encoded JSON objects, including a set of claims. JWTs are signed using a cryptographic algorithm to ensure that the claims cannot be altered after the token is issued. [https://www.akana.com/blog/what-is-jwt#:~:text=Why%20Use%20JWT%3F,was%20signed%20by%20the%20issuer]

V.   PROPOSED SYSTEM

5.1 System Architecture

System analysis is the process of defining the architecture, components, and data of a system to satisfy specified requirements. Design is a method of studying a system by examining its component parts and their interactions. Before implementation began the system was analyzed and designed.
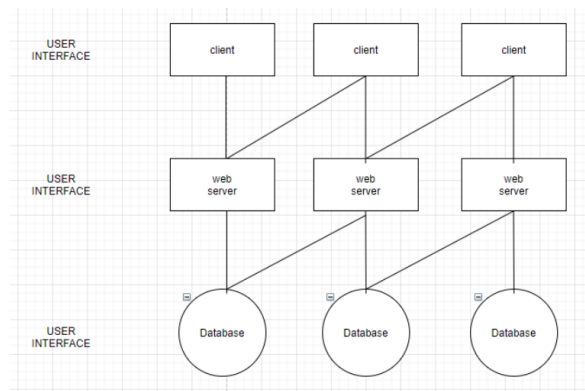

Figure 2: System Architecture diagram

5.2 Activity diagram

UML models are basically three types of diagrams, namely, structure diagrams, interaction diagrams, and behavior diagrams. An activity diagram is a behavioral diagram i.e., it depicts the behavior of a system. An activity diagram portrays the control flow from a start point to a finish point showing the various decision paths that exist while the activity is being executed. We can depict both sequential processing and concurrent processing of activities using an activity diagram. They are used in business and process modeling where their primary use is to depict the dynamic aspects of a system
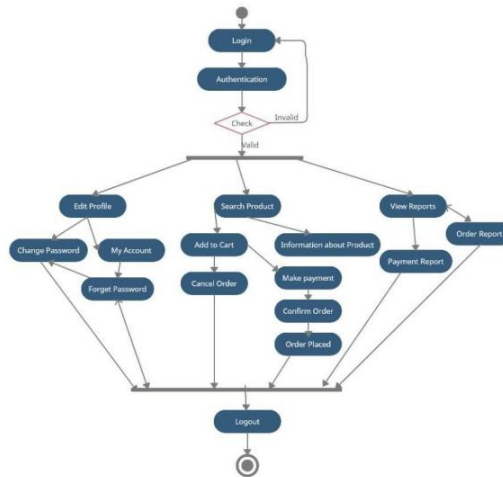
Figure 3: Activity diagram

5.3 Interaction design and Sequence Design

From the term Interaction, it is clear that the diagram is used to describe some types of interactions among the different elements in the model. This interaction is a part of the dynamic behavior of the system. This interactive be

havior is represented by two diagrams known as the Sequence diagram and the Collaboration diagram. The basic purpose of both diagrams is similar. The sequence diagram emphasizes the time sequence of messages and the collaboration diagram emphasizes the structural organization of the objects that send and receive messages.
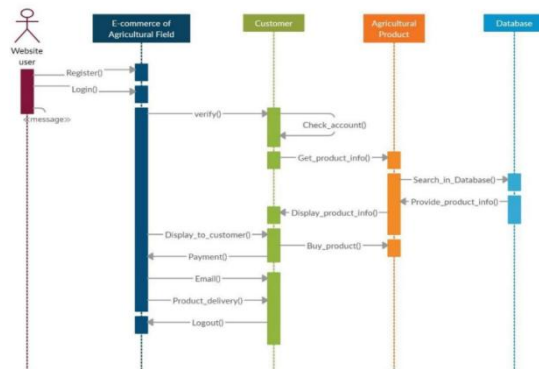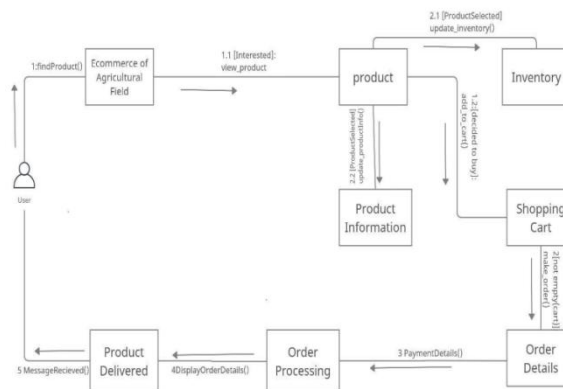

Figure 4: Interaction Diagram

Figure 5: Sequence Diagram

5.4 Component Diagram

Component diagrams are used to model the physical aspects of a system. Physical aspects are the elements such as executables, libraries, files, documents, etc. which reside in a node. Component diagrams are used to visualize the organization and relationships among components in a system. These diagrams are also used to make executable systems. It does not describe the functionality of the system but it describes the components used to make those functionalities.
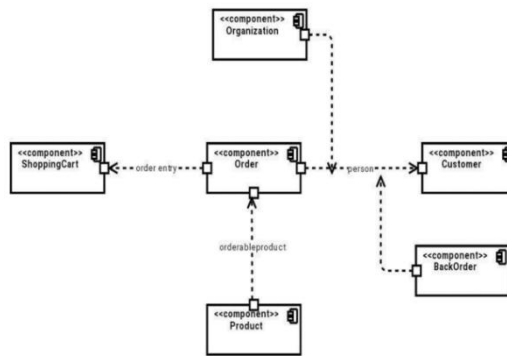

Figure 6: Component Diagram

5.5 Deployment Diagram

Deployment diagrams are used to visualize the topology of the physical components of a system, where the software components are deployed. Deployment diagrams are used to describe the static deployment view of a system. Deployment diagrams consist of nodes and their relationships. Deployment diagrams show how they are deployed in hardware. However, these two diagrams are special diagrams used to focus on software and hardware components.
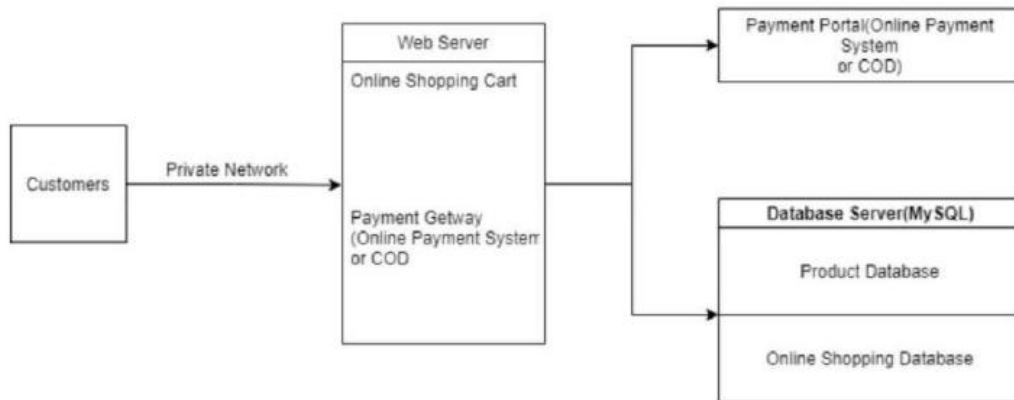.

Figure 7: Deployment Diagram

VI.   CONCLUSION

The "E-Farming: An E-Commerce Site for Agricultural Product" is successfully designed and developed to fulfill the requirements, as identified in the requirements analysis phase, such as the system is very much user-friendly, form-level validation and field-level validation are performing very good. The old manual system was suffering from a series of drawbacks. The present project has been developed to meet the aspirations indicated in the modern age. Through the developed project, anyone can visualize the effectiveness and efficiency in the real life. It is very helpful for the computerization or automation of a personal information management system. This program helps reduce the manual method and stress which is done by a person and that is a time-consuming and lengthy process. With this application users, information is stored very efficiently in a secured database. The trend of information improvement in the generation has improved the quality and services of human operation just as the case of this application for job services has reduced the mobility rate of humans and improved their standard of database storage.

Future Scope

The future plan of this project is to improve design; implementation and documentation in such a way that anyone can use this project for better performance. I will develop the site more dynamically. In the future, I will add a few modules for better improvement of the project such as a real-time chatbot option for users and farmers, so that users can directly inquire about their problems at any time through the chatbot. Video conversation option for user and farmer and admin and barcode generation for a membership card and using online buy and sell the product. Online account verification and notification for a user for a specific job category they searching for jobs. In the future, I will also add a mobile version app for this website.

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