Design and Development of a Comprehensive App for Agricultural Products and Resource Optimization

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***Abstract*— The modern agriculture applications have the capacity to upgrade crop yields, refine food security, and provide farmers with optimal and cost-effective ways of managing their farms. However, the increase cost of new technologies and the need for specialized knowledge and training can lead to financial strain for smaller-scale farmers, while the increased use of fertilizers and pesticides can have negative environmental and health impacts. This research work examines the impacts of modern agriculture applications on farmers and implements a modern method for farmers to sell and buy their weeds/ crops/ manicures, etc, online without the help of any middleman. Further, android based app implementation and its structure has been discussed. We have conducted this search in React Native. This analysis gives an outline of the various modern technologies and techniques new in agriculture and evaluates their effects on farmers in respect of their financial, social, and environmental well-being.**

Keywords*— *Agriculture, Application, Farmer, Agriculture products, Mobile App.

I. Introduction

Agriculture has consistently played vital role as the backbone of human civilization, and its significance has only increased in recent times as the world population continues to grow. Over the years, modern agriculture applications and technologies have been developed and implemented to improve agricultural productivity and efficiency, with the aim of meeting the ever-increasing demand for food. While modern agriculture applications have yielded positive outcomes regarding the increasing crop yields and food security, their impacts on farmers' lives are complex and diverse. The introduction of modern technologies and techniques in agriculture has brought both positive and negative changes to the livelihoods of farmers, creating opportunities for growth and development, as well as new challenges. This research paper aims to examine the modern agriculture applications available for farmers, with a focus on evaluating the positive and negative effects of various technologies and techniques on farmers' financial, social, and environmental well-being. The paper will explore the challenges that farmers face in adopting modern agriculture applications and the potential solutions to address these challenges. The study is structured to provide a comprehensive review of the relevant literature on modern agriculture applications, highlighting the positive and negative effects on farmers' lives. By doing so, the study will this study will explain complex interplay between modern agriculture applications and farmers, with significant implications for the future of agriculture and food security. The study highlights the useful for comprehensive evaluation practices that promote sustainable agriculture and support the livelihoods of farmers. With the ability to obtain real-time data on weather conditions, diseases of crops, and market values, among other things, agriculture mobile applications have become known as a game-changer in the field of agriculture. For farming mobile applications to be successfully integrated into farming practices, it becomes essential to understand the influencing components and use. Localization of information, support for different languages, and simple user interfaces can help to increase user acceptance and use by educating farmers about the advantages of these apps. The intention of the paper is to give an understanding of how mobile applications could be helpful and the implementation of mobile applications in agriculture has the capable to drive innovation, raise production, and advance food security. The deployment of mobile app in React Native and its scheme has also been discussed in this work which has notable outcomes for the future of agriculture and food security. The farmers can install this app in android enabled smartphones. The paper has been organized in different sections. Section II comprises of literature review, In Section III and IV methodologies and layout of the application has been presented. Results has been discussed in Section V followed by conclusion.

II. Literature Review

Because of their ability to increase production, increase yields, and decrease waste, mobile agriculture applications are becoming more and more well-liked among farmers globally. Agriculture apps are beneficial to farmers, especially in poor nations with limited access to agricultural information and extension services, according to research Kushwaha et al. [1]. Farmers may access market prices, pest management techniques, and real-time weather forecasts using agriculture applications. According to a study conducted by Kamal et al. [2], farmers decision-making was enhanced by the usage of agriculture applications, and their incomes increased by up to 30%. Bhatt and Prasad [3] conducted a study on the adoption of mobile applications among farmers in India. The study discovered that farmers access to knowledge, crop output, and income are all positively impacted by mobile applications. The study, however, also addressed the necessity for farmer teaching and instruction on using mobile applications. Mokaya et al. [4]

analysed the impact of mobile applications on smallholder farmers in Kenya. According to the report, mobile apps help farmers obtain market data, manage their crops better, and produce more. The survey also focused the necessity of providing farmers in remote areas with accessible and trustworthy internet connectivity. Singh et al. [5] conducted a study on the impact of mobile applications on rice farming in India. According to the study, mobile applications improve farmer understanding of pest and disease management, reduce production costs, and increase rice yield. Ngugi et al. [6] conducted a study on the impact of mobile applications on maize farming in Kenya. The study discovered that farmers access to knowledge on seed kinds, how to manage soil, and dealing with pests is improved via mobile applications. The study also focused the requirement for training farmers in the usage of mobile applications. Adhikari and Shakya's [7] study in Nepal looked at how mobile apps affect smallholder farmers. The study discovered that smallholder farmers had access to crucial information on agricultural practises, market prices, and weather patterns thanks to mobile applications. Farmers were able to make better choices because to this information, which increased agricultural yields and decreased manufacturing costs. The research also found that connecting smallholder farmers with consumers through mobile applications enhanced their access to markets and increased their revenues. Farmers' profitability and productivity have been found to increase with the help of agriculture apps. A study conducted by Katoch and Katoch [8] in India found that the agricultural output and net income both increased by 14.1% and 13.8%, respectively, due to the implementation of mobile applications for the supervision of crops. According to research, farm are more frequently used. A study conducted by Birhanu et al. [9] in Ethiopia discovered that at least one kind of smartphone-based agriculture app has been implemented by 79.5% of the farmers polled.

III. METHODOLOGIES

A. *Concept and Design:* The concept and design of the mobile farming application are developed. The properties and functionalities of the app are defined rooted on the target audience and their needs. The design of the user interface (UI) and user experience (UX) are also defined.

B. *Front-end Development:* The design are developed into a functional mobile app using front-end technologies such as React Native.

C. *Back-end Development:* The server side of the application is developed using a suitable database management system. The back-end development could include features like data management, user authentication, and API integration.

D. *Testing:* The mobile farming application is thoroughly tested to ensure that it meets the desired functionality, security, and usability standards. This could involve unit testing, functional testing, and user acceptance testing.

E. *Deployment:* The application is deployed to the app store and made available for download to the target audience.

F. *Maintenance and Updates:* The application is monitored and maintained to ensure that it remains functional and secure. Regular updates are also released to provide new properties, debugging, and other improvements.

The framework and architecture have been depicted in Fig.1

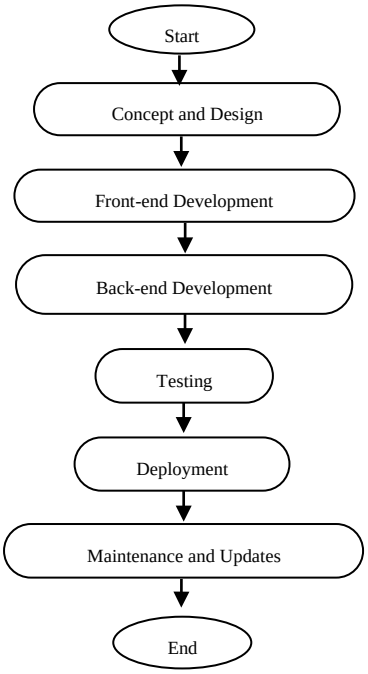

Fig. 1. Framework of the application

IV. LAYOUT OF THE APPLICATION

The layout of the application has been described in Fig. 2

A. *Splash Screen:* Displays the app logo and brand name for a few seconds when the app is launched.

B. *Login/Signup:* Allow users to create an account or log in with their existing credentials.

C. *Home Screen:* Displays options including:

1) *Dashboard:* Displays a menu with various options.
2) *Tab:* Displays a tab at bottom including various options.
3) *Notification:* Displays the notifications pushed.

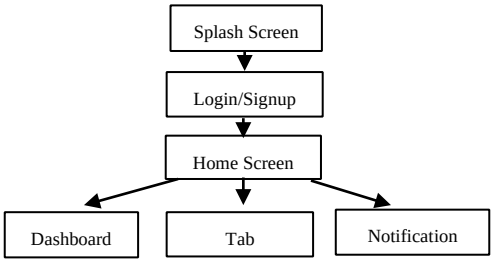

Fig. 2. Layout of the application

D. Dashboard: Various options on the dashboard(shown in Fig. 3) includes:

1).Shop: To change the default, adjust the template as follows.

a) View Crops Screen: Displays a list of crops with images, descriptions, and prices.

b) Crop Detail Screen: Shows additional information about the selected crop, including images, descriptions, and reviews.

c) Buy Crops Screen: Displays the user's cart, including crops, quantities, and prices. Allows users to update the quantity, remove crops, and proceed to checkout.

d) Checkout Screen: Enables users to review their order, enter payment and shipping information, and confirm the purchase.

2). Weather Forecast: This element shows the name of the area covered by the weather forecast being displayed. And displays the present weather details, such as temperature, humidity, and wind speed, sunrise, sunset and also provides a summary of the climate conditions for the next few days, including high and low temperatures.

3). Farming Practices: Supply farmers with information of different crops, including good time for planting and harvesting, growth requirements, and potential pests and diseases.

4). Agri News: Offer a news and information section with articles and resources related to agriculture, such as government policies and subsidies, new technologies, and industry trends.

5).Calendar: Supply farmers with resources for managing their farm, including scheduling and tracking tasks.

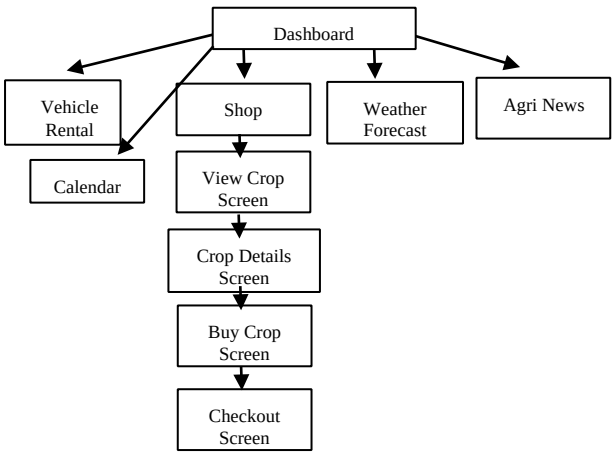

Fig. 3. Contents on Dashboard

E. Tab: Various options on the tabs(described in Fig. 4) are as given below:

1). Profile Screen: Displays the user's account details, order history, and other options.

a). Edit Profile Screen: Displays and enable to edit the user's account details.

b). Favourites: Shows a list and information of the items marked as favourite.

c).Contact and Support: Provides users with the ability to reach out to customer support for inquiries or concerns.

*d). Checkout Screen:*Enables users to review their order, enter payment, shipping information, and confirm the purchase.

6). Sell Screen: ask for various details from the seller, some are as follows.

a). Image upload: Allow the user to upload an image of the item they are selling.

b). Category and Quantity selection: Allow the user to select a category and quantity for the item they are selling.

c). Description input and Location selection: Allow the user to provide a description of the item and select the location where the item is available for pickup.

d). Payment options: Allow the user to select the payment options they accept for the item.

e).Preview screen: Show the user a preview screen that displays all the information they entered.

1) Chat Screen

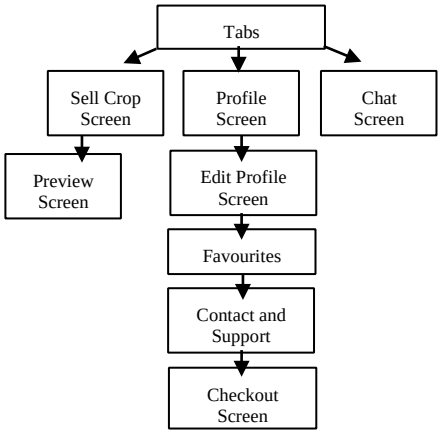

Fig. 4. Contents on Tab

V. RESULT

The objective of this study is to build a mobile application for farmers that provides a variety of advantages for their land and crops. The designed application is a visually appealing app that enables farmers to obtain real-time weather information and buy and sell their products and crops. Anyone can download this app on both android devices.

The primary benefits of the suggested application are:

- To support farmers in crop management crops effectively, it provides real-time information on weather patterns.
- The applications give farmers knowledge about crop diseases, so they can identify and prevent ailments before they spread.
- The app opens quickly and completes the job without any delays. This is instantly accessible.

Fig. 5. Login Screen


Fig. 6. Signup Screen


Fig. 7. Home Screen


Fig. 8. Article Screen


Fig. 9. Weather Forecast

Fig. 10. Agri News


Fig. 11. Shop Screen


Fig. 12. Product Detail

Different snapshots of the application have been shown above includes Login Screen (Fig. 5), Signup Screen (Fig. 6), Home Screen (Fig. 7),Article Screen (Fig. 8), Weather Forecast (Fig. 9),Agri News (Fig. 10), Shop Screen (Fig. 11),Product Detail (Fig. 12).

VI. Conclusion

The proposed application offers customers a practical and understandable interface for buying and selling products. Farmer may quickly enter details about the thing they want to sell or buy using the app, including several payment methods and a location. They can also upload a picture of the thing they want to sell. In this research, the strong framework for creating a mobile application for selling goods has been proposed. Its well-structured design and basic error handling make it simple to adapt and add new features as needed. Additional style enhancements to improve the user experience, server-side integration, and payment processing are all potential future developments. Further, this developed component is a potential solution for people trying to buy and sell goods through an application for mobile devices, and with further testing and development, the app might turn out to be a useful resource for users interested in buying and selling goods in an efficient and quick way. That may help farmers for their crop and yield production in a better way.

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