DEVELOPING SMART AGRI-TECH APP FOR FARMERS

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Abstract

The role of smart phones is predominant over the past several years. Knowledge bases of new technological trends in agriculture can help farmers in real time to increase productivity of whole chain of agriculture processes. End to end platforms to increase the qualitative and quantitative production is essential to transform agriculture into a more profitable sector contributing to a country's GDP is of primary research interest to many research groups. In this context, a unified framework is proposed in this paper with a combination of sensors, Mobile and Android software modules that can address most of the above issues. Proposed framework automates the process of connecting, communicating and conveying different aspects of efficient and economic agriculture practices by empowering even the illiterate farmers with latest mobile systems. Trough Communication module, farmers and experts can communicate with each other. Though soil sensor module, By using sensor values farmer can decide the suitable crop for that soil. Developed framework is tested with some of the test cases and future scope of the improvements for the developed framework are given in this paper.

IINTRODUCTION

Agriculture sector is the financial backbone for many developing countries like India. The contribution of agriculture in the countries like India is 17% to its GDP. The farmers need to depend on different peoples and sources to arrival at a final plan of crop management. Most of the practices till date are non-technological in nature, where a farmer needs to depend on different people and sources to arrival at a final plan of crop management. Traditional solutions obtained from local bodies may not be suitable for all scenarios and can lead to individual farmer's loss and also nation's economy.

Agriculture sector can be considered as different chain processes, where each preceding process output affected by its previous process. These processes include the best practices of farming, amount of water, suitable pesticides, cold storages, best prices of end products etc. There is a lot of scope for latest technologies like Wireless Sensor Networks, Machine Learning, Big data in the above mentioned sub modules of agriculture.
Wireless Sensor Networks based monitoring systems are implemented in few agriculture farms, where different sensors like soil moisture, temperature, humidity etc. are logged into a database. Most of the works mentioned are trying to optimize one or two critical parameters of interest to optimize the productivity of the crops. Moreover, connecting farmers to experts, end users and other relevant sources will ease and benefit the farmers in different levels starting from planning to selling their goods.

II RELATED WORK

Many different smart agricultural techniques have been proposed in the most recent years one of them is smart agri-tech app for farmers for discussing the issues regarding farming in the fields with other farmers by using smart phones. System consisting of smart phone application and database where farmers can enter field data into the database and the analyzer analyze the data in the database and estimates the form work plansCertain measures and planning techniques like planting, harvesting, seeding are carried based on the measured sensor values from the fields. Discussion forum to provide a solution to farmers in task management and planning, environment factors, measurements and information distribution. In all above papers they implemented only one module but in this paper, an integrated framework assumes connectivity of field data to the framework with Wi-Fi network, where an android app, database system can help farmers to a more connected environment of knowledge databases for profitable agriculture.

IIIINTEGRATED FRAMEWORK ARCHITECTURE

The developed system consists of different features like authentication, discussions.

A. Authentication

Smart agri-tech app is not only for farmers but also for the users who are interested purchasing the products directly from the farmers. So. Login and authentication features are necessary. Firstly, the user can register by filling their details in registration page. These details are stored in Firebase database. The users are authenticated whenever they login and they will be directed to home page.

Figure 1: Login Form

B. Home Screen

Different features like getting suggestions from the analyst trough discussions and they can also interact themselves and find the solutions, getting soil sensor values to know which crop is suitable for soil.

Figure 2: Home Screen

C. Suggestions through Discussions

This feature is able to show the available registered users to the logged in user then it is their own choice to select the user with whom they want to proceed with the discussion and find the solutions to the problems they are facing. Here they can send messages to each other.

Figure 3: Getting Suggestions

D. Getting Sensor Values

Farmers can get data from soil temperature and moisture sensor and sent data to the database. By doing this one can decide the suitable crop for the soil. All these data can be stored in a database.

IV IMPLEMENTATION DETAILS

A. Design and Development of the application

The Smart agri-tech application was developed for farmers using android studio platform. Programming language used for the development of android app is Java. This application uses internet connectivity for the operations, application requests internet permission on android manifest.

B. Application Features

Smart agri-tech is the app for farmers. Farmers need to register themselves by filling their details. The information about the users is stored in firebase, Google provided API for database storage and syncing into our android app. It is a real time database that can communicate directly from the user. It have many features like authentication, database, storage etc.

Only authorized users are able to login using their email and password. After authentication of the user homepage is displayed. In homepage different applications like communication, getting alerts are displayed. We also collected data from sensors like soil moisture and temperature and sent the data to database. By doing this one can decide the suitable conditions for planting and harvesting the crop.

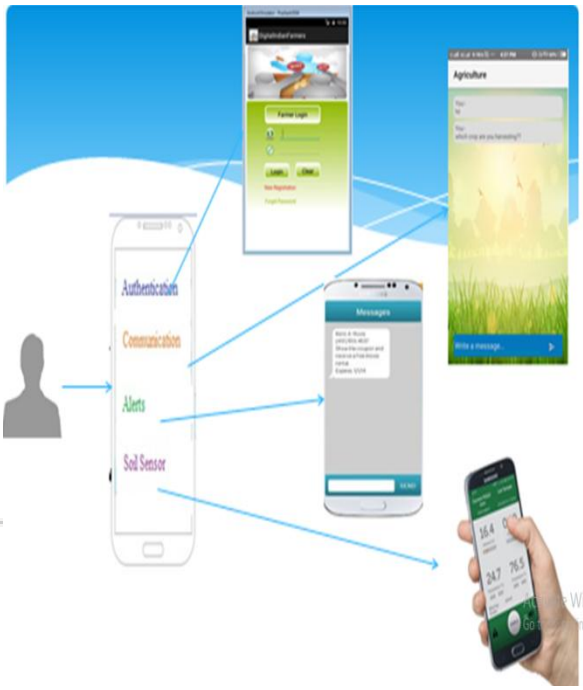

Figure 4: Block diagram showing modules of app

CONCLUSION AND FUTURE SCOPE

Here, we proposed a system through android app which helps farmers in many ways. We also have implemented communication module in which farmers can exchange each other's views. We will propose some of the useful techniques like forecasting of rainfall data based on which farmers can decide whether to plant crops at that time or not using ARIMA algorithm. We will integrate distance calculator in it which calculates the distance between the locations of two users.

In future research, we want to implement a voice c call and videocall based system for the communication between farmers.

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