

PROTOTYPE ANDROID BASED REAL TIME CROP INFORMATION COLLECTION SYSTEM

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Abstract - Smartphones have always helped human beings since it has been invented, from simple communications to guiding directions for a destination. Mobile applications have made everything easy of which e-commerce is a classic example. Data collection over the internet through mobile applications can be a solution to all the manual work, which consumes a lot of time. Going to the fields and collecting data is a very cumbersome procedure. It not only consumes time and money but also storing the data is a big concern. Also, the problems faced by users in remote areas are not addressed effectively. Prototype android based real time crop information collection system has been developed and applications are associated to collect crop information system from the field. It is a system where the user or farmer can enter the data related to crop type, and farming practices. The geolocation of the farm will also be recorded with the help of a GPS. Since the data is to be fed by the user or farmer, the authentication of data to be higher. The data then will be sent to the server through online. The server at organization will store the data in the database to eliminate the storage issue. A report of data collected could be generated which can be viewed in the application. The system also has a feedback part in which the users or farmers will be provided with some suggestions for better farm practices.

Agriculture has a significance to the International Trade, to the market surplus and even beneficial for Foreign Exchange Resources. As agriculture is a vital part of the country and with the development of the generation, Information Technology is reaching out to too many areas. Merging both the fields can give us tremendous results leading to simplifying methods. Many projects have been made globally such as the CSIR-CIMAP made a free android application 'Mentha Mitra'. 'Mentha Mitra' is an android app based advisory digital tool for menthol mint farmers as yielding this cash crop is becoming less profitable. Reasons include lack of scientific knowledge of farmers, infections by diseases, high water requirement, pest attacks and mainly introduction of synthetic menthol in the market. The application provides farmers with information on improved high yielding varieties, insects, and pests along with the scientific e-advise to increase productivity.

Decision Making Based on IoT Data Collection for Precision Agriculture aims that IoT can be used to collect local data on precision agriculture in which the farmer could get real-time data for monitoring his field and can use the information to gain higher yields and earn profits.

Other than sensors a project has used drones in combination with agricultural equipment such as an agricultural boom sprayer that evaluates the crops being farmed and ensures delivery and dispensing of liquid from the sprayer including monitoring and verifying whether the liquid is being dispensed correctly or not in the desired pattern.

The portable multifunctional farmland information collection focuses on collecting parameters such as chlorophyll content of crop leaves, air humidity, air temperature and light intensity using STM32 which is a 32-bit comprehensive range of microcontrollers based on ARM Cortex-M3 and an android application which is a low cost, timely, accurate, and easy to use.

The project named Real-Time Implementation and Analysis of Crop-Field System based on Microcontroller with GPRS (M-GPRS) and SMS, which monitors the field conditions by using sensor stations distributed across the

Key Words: Crop, Agriculture, Android Application, Java, Data Collection, Data Analysis.

1. INTRODUCTION

Agriculture is the challenging area for research, improvement, and growth. For decades, it is been associated with the production of essential food crops. It plays a crucial role in the life of a country's economy. Agriculture acts as a backbone of the economy of any country especially for a country like India. Many people in India are dependent on agriculture for their bread. It gives employment opportunities for a large number of the citizens. Approximately 70% of people depend on farming for a living. Agriculture also contributes to the national income, that is it plays an important role in any developing country.

field. The values are based on a maximum and minimum like threshold values from field stations are then wirelessly transmitted to a base station by using GPRS technology, which adds a new feature to the GSM node.

A Crop Cultivation Information System on Mobile Devices application has also been made where a farmer can provide inputs related to crops being cultivated in his farm and location information to get recommendations to improve yield. It is made using the Service Oriented Architecture (SOA) that processes spatial data. A Crop Monitoring System Based on Wireless Sensor Network has also been designed using sensors which is a large-scale application of IoT in the area of agriculture.

The Karnataka government made an application for the farmers of their state. According to this, crops cultivated by farmers or landholders in about 2 crore areas in the state could be surveyed using an android app which is GPS enabled and the data updating could be done by visiting that specific plot, also uploading photos.

2. OBJECTIVES

We aim to make the process of data collection easy and efficient for the organization that could help them save time and money. It has been observed that going to the farms that are in remote areas is a hectic job, it consumes a lot of time as well as resources. The main objective of the study is to develop prototype android based real time crop information collection system to collect the real time georeferenced crop and farm practices information from the field.

3. SYSTEM DEVELOPMENT

3.1 System Architecture

Most of the Applications are used for reducing hectic manual work. As Crop Information Collection System is one of them. The purpose of developing this application is, to collect data from farmers to analyze the yield in a particular area. The application developed is named "CICS" which is "Crop Information Collection System" which is basically designed for android phones only. The flow of the application is given in fig. 1, one can use an android phone to access the application. This application supports version API 15: android 4.0.3 (IceCreamSandwich). Installing the application is the first step then after, access the application and provide authentication, then coming to the next module Data and GPS, data will be provided by the users in a particular given form format along with the map access for providing location information of the farm. The next step will be, storing the data into an inner database that is an offline database. The application then generates a pdf for the user and store it in the mobile, then all the data filled and fetched from the database will be stored in a cloud server that is the outer database. Hence, the application works like this.

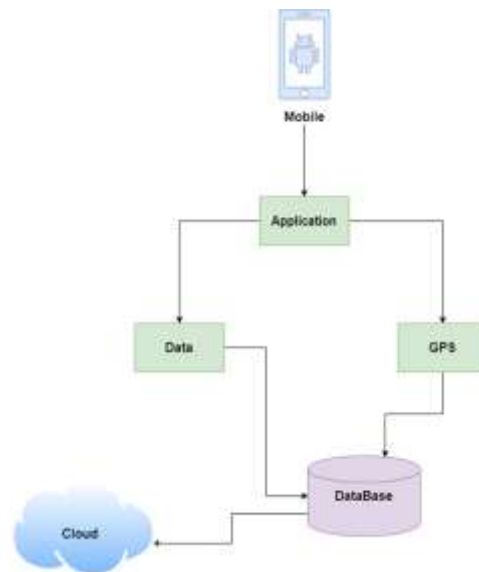


Fig -1: System Architecture for the application.

3.2 Hardware Requirements

Hardware requirements include a laptop/ desktop to develop the application. Smartphones are used for accessing the application.

3.3 Software Requirements

We are making an application using the android studio platform. The version we are using is the ANDROID STUDIO 3.2.2 version which is Microsoft compatible. Android Studio is the official Integrated Development Environment (IDE) for Android app development, based on IntelliJ IDEA.

4. MODULES

The various modules of our application are as follows.

4.1 Location Details

It is the first page after the splash screen. In this page the user has to give his/her location details such as the name of the state and district. All the spinners are connected to the database and it will fetch values in spinner from the database. Then by selecting State and District value from given spinner, it will store data in another database for the record. Here, district value is populated from State value. Also, these location details will help the organization for analyzing the yield growth in a particular area and will give location authentication.



Fig -2: Front page of crop information system

4.2 Map Access

Map access is based on the previous module that is location detail. Once location details are filled and the user submits it, then it will jump on the next page which is map access, the map will locate the farm area. This part of the application is very important as it will authenticate the location of the farm.



Fig -3: Collection of location details through crop information system

4.3 Crop Selection and Form

This is the main form that consists of crops for selection. Crop types are available for a selection of a particular crop. Once the user selects any crop it will generate a form that is available with some important parameters. Users must fill the form and response is captured. These parameters help organizations and farmers to know about the yield. The same crop with different information varies from area to area.



Fig -4: Selection crop type for collection information through crop information system

4.4 Camera/ Gallery

Once the crop selection form is complete it will proceed for the next action, which is capturing an image of the crop and field. This task can be accomplished by both, the camera and gallery. One can upload the image from the gallery or can directly capture it via camera. This is done so that one can identify the condition of the crop immediately and can do analysis.

4.5 PDF Generation

The generation of pdf is for the users. It will help them for analysis purposes. If the user wants to see the data of last year then they can open pdf of last year and relate the parameter's value, and also can analyze the growth of yield. The organization will also help by giving good suggestions to farmer for better yield.

5. CONCLUSIONS

Application helps the organization in collecting data efficiently. The organization will be able to analyze the data collected and provide the farmer or user with suggestions for better yield.

6. FUTURE SCOPE

The focus of future efforts in this area lies in the collection of data efficiently so that manual work will be lessened and data storage and management will be easier. As well as farmers will be guided wherever needed. We also hope that this application will be available in many other languages as the country is diverse.

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