

"Raita-Mitra"-Agricultural Information System

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Abstract— This project is focused on developing an agricultural informative application which is a mobile application that serves its users by providing information about the crop marketing strategy, weather details, government schemes and machine availability. The main features provided by this application include information retrieval facilities for users in the form of obtaining statistical information about fertilizer, climate conditions, news and machine availability for corresponding crops. In addition, this provides individual information about inter-crops related to main crops. The system not only provides the retrieving facilities but also the updating facilities to the authorized persons. Java is used to create the front end for the system and SQL server is used at the back end. Accessing the database is done by using SQL queries for the retrieval and update. The communication between the front end and back-end is achieved through Ms SQL Server. Admin will be given appropriate username and the password.

Index Terms— EJB, ICT, CST, Mechanization.

1 INTRODUCTION

India despite having an agricultural based economy does not have an efficient information system. Our application is used to assist with different information mainly for farmers. Our main objective is to introduce an agricultural information system for the specific crops.

Other than that developing countries have to provide information for their people who are interested in agriculture. Hence we need information system to help them in various ways. This application is associated with Kundapur region mainly concerned to help farmers.

Remote access to this system is to be provided through the internet. Our information system provides the ability to obtain summarized information in a preferred format to the external users. It also provides facility to the authorized person to insert and update the database through the internet on daily basis.

Our application provides easy access to the database for all type of data manipulation. Security is ensured with the help of username and the password for updating purposes, which will be given to authorized person. Nowadays people do not like to read books, which are very hard to find and time consuming. So this application helps user to get information online.

2 LITERATURE SURVEY

Information and Communication Technology (ICT) in term of agriculture is a promising field focusing on advancement of

vancement in ICT can be made for providing accurate and timely relevant information.

Paper [1] introduces- Krishi Ville- an android based application which will manage the updates of the different agricultural news, agricultural commodities, and weather forecast. This application has been designed taking Indian agriculture into consideration.

E-Agriculture [2] includes different activities such as conceptualizing, designing, development, evaluation and innovation to use information and communication technologies (ICTs) in the rural areas.

The accurate and reliable agricultural information is the basis of the implementation of digital agriculture [3]. Nowadays, the processing of agricultural information and data acquisition is more complex. It immediately needs to develop a portable agricultural information collection system with high degree integration and a wide range of versatility. It can gather the GPS coordinates of the farmland, the agricultural attribute data, image information, and sent to the monitoring system immediately using 3G network or GPRS network.

India is one of the world's largest producers of vegetables and fruits but its share in the global horticulture market is insignificant. So, the aim behind developing this application is to give India's huge farming community a fair and consistent price for their produce. This android based app "Virtual Fruits Market" [7] will help some of the farmers to overcome this problem. Using this app farmer can directly connect with the end users and supply the product directly to them.

Farmer, the backbone of agriculture is in pathetic condition as he is not getting precision in agricultural information resulting in less crop yield. But now, in the era of Digital India, we can form the union of farmers through networking, and make the agricultural information reach the farmers through ICT [4]. Major factor for getting high crop yield is soil test. Each farmer's soil has to be tested and based on that specific precision

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agriculture and developing rural areas of India. Thus ad-

sion information relating to each farmer's soil like type of crops to be grown, amount of fertilizer to be used, type of irrigation and latest farm equipments is sent as specific SMS to each farmer by NGO.

Information and Communication Technology (ICT) is an efficient solution for the farmers that can help them in cultivating crops which can give them a better yield and are suitable as per the present weather conditions. In this paper, they propose an android based app, *e-krishakMitra* [5] intended to address this issue. Further, it will act as a complete farmers' friend helping them in taking strategic decision by suggesting them about various issues related with the cultivation of crops such as soil's current nutrient status, irrigation needs, pest and disease identification, yield estimation etc.

The paper [6] stresses on the need of an externally hosted cloud computing platform to manage the database, android and the isolated server by the users across the country for irrigation. The system uses information and communication technology, enabling the users to consider and check-out the information gathered from different sensors. Here we make use of different sensors like humidity, temperature, moisture etc. This sensor gives signal to the micro controller.

The paper [8] proposed android operating system which is equipped with bluetooth technology where enables to communicate and process the wearable health sensors, thus reads and display the exact temperature, heart rate of the livestock. In order to gather statistical data from mobile based to PC via web services, Google Cloud Storage enable this interaction. This device is reliable and accurate in determining the livestock health status.

GeoPackage forms an intermediate to bridge agricultural geographic information and mobile devices such as smartphones and tablets. This paper [9] present a Cordova framework based GeoPackage mobile application to encourage field operations in agriculture. By implementing GeoPackage SDK on mobile application, GeoPackage files can be accessed, managed, and visualized easily in field operation. Based on Cordova framework's strong extensibility, the application can be run on various mobile platforms.

CST (Crop Statistics Tool) [10] is a standalone freeware for predicting crop yield statistics using indicators derived from crop models, weather or remote sensing data. In practice, CST guides the crop analyst through standard steps: after data screening to identify possible outliers and analysis of time trend, the crop analyst has the choice between the following two approaches to forecast yield: (1) multiple regression analysis in which a linear relationship is calibrated between historical yield data and yield indicators, while accounting for a time trend if present; (2) scenario analysis, whereby CST looks for the year's most similar (according to the indicators) to the current year to estimate a yield deviation from the time trend or the average yield.

3 PROPOSED SYSTEM

The development of this project prototype can help most of the farmers in rural areas to get information just by downloading the application in their smart phones. To make farmers aware of all kind of information related to agriculture on daily basis.

Developing a user friendly agricultural information system which fulfills the user requirements. Database updating can be done by authenticated users. Monitoring and baking up database and user details for future use. Any user can retrieve data from the application. Authenticated officers given permission to update and modify information. Farmers can easily get the updated information anytime, anywhere through this online application.

Our system consists of following modules as shown in Figure.1. Admin will upload the details. User will login to the system and views the updated information.

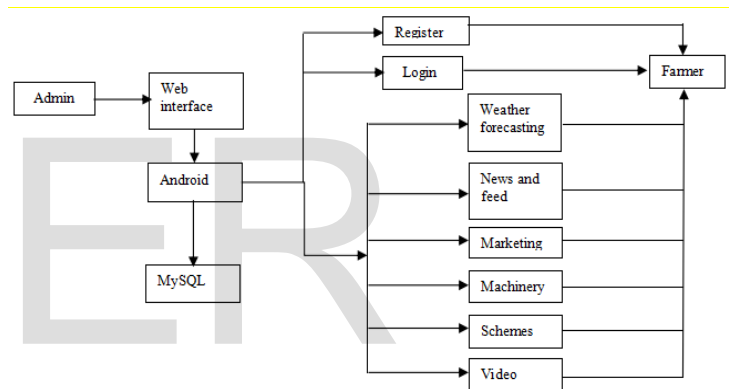


Fig.1 Modular design

Crop detail: Under this module crops are categorized into Agricultural crops and Horticultural crops. Based on these types crop information is provided to farmers. Crop information includes general crop details, climate, fertilizer, diseases.

Weather forecasting: Research center admin updates weather detail on daily basis. The system predicts weather information of a week and displays for the farmers.

News and feed: Agriculture related news is displayed in the system by the department admin. This information includes inventions, agricultural programs etc.

Marketing: In this module agricultural market details are provided by the department to the farmers. Marketing details includes price of various crops on daily basis.

Machinery: Machine availability can be checked by the farmers in various machine centers. Brief description is also provided for different machines. This information is uploaded by machine centers.

Schemes: Government facilities and subsidy information are displayed for the farmers based on various conditions.

Video: Video uploaded by the department regarding harvesting, sowing etc which can be utilized by users.

4 IMPLEMENTATION

This system is implemented using Android Studio 2.3; database connection is done using ODBC drivers, MySQL for database transactions, NetBeans 8.2 for web interface. Android Smartphone with API 16 or above, local Server (32 or 64 bit) and a laptop or desktop PC is being used for application development.

4.1 Android

The basic steps for developing applications are shown in Fig.2.

a) Setup: During this phase one can install and set up development environment. Also creates Android Virtual Devices (AVDs) and connect hardware devices, on which one can install this applications.

b) Development: During this phase one has to set up and develop android project, which contains all of the source code, resource files for this application.

c) Debugging and Testing: During this phase one can build android project into a debug gable. Apk package that user can install and run on the emulator.

d) Publishing: During this phase configure and build

e) android application for release and distribute this application to users.

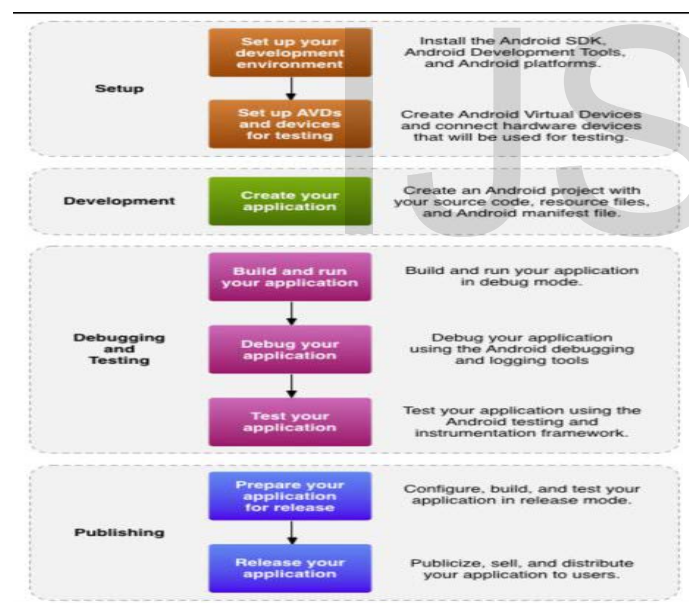


Fig.2. Steps for Application Development

4.2 Android Studio 2.3

Android Studio is the official Integrated Development Environment (IDE) for android platform development. It contains a base workspace and an extensible plug-in system for customizing the environment. Written mostly in java, Android Studio can be used to develop application in Java. The Android Studio Software Development Kit (SDK), which include the Java development. Users can extend its abilities by installing plug-ins written for Android Studio platforms such as development toolkits for other programming languages and can write and can contribute their own plug-in modules.

Software Development Kit (SDK) is a plug-in for the Android Studio IDE that is designed to give us a powerful, integrated environment in which to build Android applications. SDK extends the capabilities of Android Studio to let us quickly set up new Android projects, create an application UI, add packages based on the Android Framework.

The AVD Manager provides a graphical user interface in which user can create and manage Android Virtual Devices (AVDs), which are required by the Android Emulator.

4.3 Database

MySQL 5.0 is a relational database management system (RDBMS), and ships with no GUI tools to administer MySQL database or manage data contained within the databases.

SQLyog MySQL GUI is a commercially available (closed-source) MySQL manager and admin tool, combining features from MySQL Administrator, phpMyAdmin and other GUI tools.

4.4 NetBeans 8.2

NetBeans IDE is an open-source integrated development environment. NetBeans IDE supports development of all Java application types (Java SE [including JavaFX], Java ME, web, EJB (Enterprise JavaBeans) and mobile applications) out of the box.

PHP is a server side scripting language that is embedded in HTML. It is used to manage dynamic content, databases, session tracking, even build entire e-commerce sites. It is integrated with a number of popular databases, including MySQL, PostgreSQL, Oracle, Sybase, Informix, and Microsoft SQL Server.

The hardware used should be with minimum interfaces like that of processor used should be above 2 Ghz, ram of 4GB, hard disk of 10 Gb. Input device used are standard Keyboard and Mouse. Output device used is android smart phone.

The software used should be with minimum interfaces like operating system used should be Windows 7 or 8 or 10 and java is used for the programming.

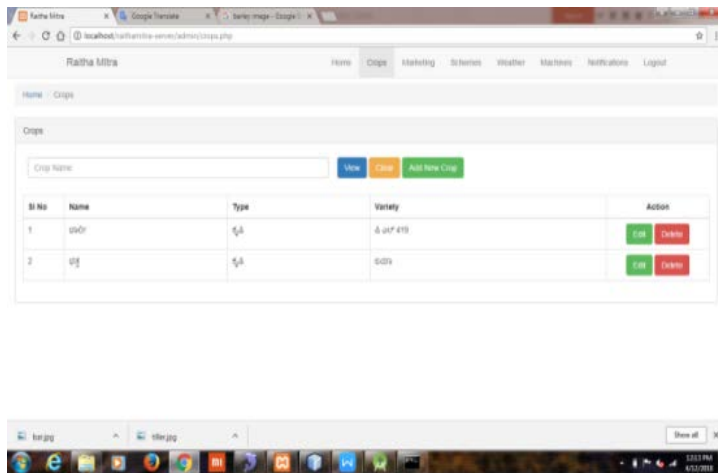


Fig.3. On adding crops by admin at back-end

Function:

1. Marketing Management:
 - a. addCropPrice()
 - b. UpdateCropPrice()
 - c. addStoreDetails()
 - d. updateStoreDetails()
2. Scheme Management:
 - a. addGvtScheme()
 - b. updateGvtScheme()
 - c. deleteGvtScheme()
3. Machine Management
 - a. addMechine()
 - b. addMachineRent()
 - c. checkAvailability()
4. Weather Management
 - a. Addweatherinfo()
 - b. UpdateWeather()
5. Crop Management
 - a. aadCropDetails()
 - b. updateCrop()
 - c. cropInfo()

This application has been implemented in Kannada language so that it can be convenient to the farmers. We made use of Google translator for translating the contents. After translating the contents to Kannada, it can either be declared as constant in strings.xml file of resource folder or can be directly copied to the required activity.xml file in Android Studio. Thus data stored in database will be in Kannada language and hence data displayed to the users will be in Kannada language .

5 RESULTS

Agriculture information system is developed as a user friendly application which helps to fulfill the user requirements. Database update is done by authenticated users. This application helps by providing the reference information for the cultivators and decision making support mainly for farmers. Monitoring and back up of database and user details for future use is done here. User can retrieve data from the application. Farmer can easily get the updated information anytime, anywhere through this online application.



Fig.4.Login Activity

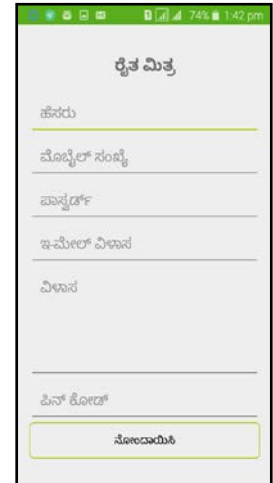


Fig.5. Register Activity



Fig.6.Home Page Activity



Fig.7.Crops List Fragment

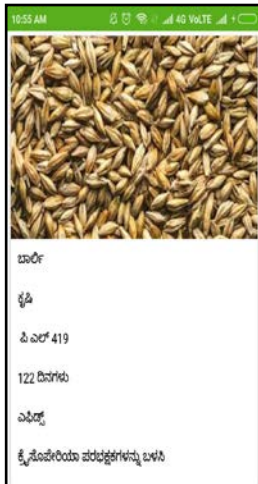


Fig.8.Crop Details Fragment



Fig.9.Marketing Fragment



Fig.10.Machinery Fragment

Schemes	Various government facilities and subsidy details are displayed.
Video	Videos are uploaded regarding harvesting, sowing etc.

6 CONCLUSION

Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions. Authors are strongly encouraged not to call out multiple figures or tables in the conclusion—these should be referenced in the body of the paper.

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TABLE 1 OUTCOME OF THE SYSTEM

Category	Information
Crop detail	Provides information regarding crops. Crop detail includes general information, fertilizer, soil condition, climate, diseases.
Weather fore-cast	Displays weather details such as temperature and condition. For example 32°C, sunny.
News and feed	Displays news regarding agricultural aspects such as inventions, programs etc
Marketing	Crop prices on daily basis are displayed. For ex Barli Rs 1978/quintal.
Mechanization	Machine availability details are displayed. Details include machine current count, machine description and machine center details.