

MahaFarm – An Android Based Solution for Remunerative Agriculture

Aniket Bhave, Rahul Joshi, Ryan Fernandes

KJ Somaiya Institute Of Engineering & Information Technology, Mumbai, India.

Email: aniketpbhave14@gmail.com,

rahul_joshi63@yahoo.com,

ryanfernandes93@gmail.com.

Abstract - Information and Communication Technology (ICT) in agriculture is an emerging field focusing on the enhancement of agricultural and rural development in India. Using innovation is a key measure in the rural domain. The advancement of ICT can be utilized for providing accurate and timely relevant information and services to the farmers, thereby facilitating an environment for remunerative agriculture. This paper describes a mobile based application for farmers which would exhaustively help them in their farming activities. We propose an android based mobile application – ‘MahaFarm’ which would include agro-based crop information, weather updates, daily market prices and news/loan informational updates. The application has been designed taking Maharashtra into consideration.

Index Terms – Android; Mobile Application; Mobile Computing; Smart Phone; Yahoo Weather; Market Prices.

1. INTRODUCTION

Agriculture all over India is the means of livelihood of almost two third of the workforce in the country. It has always been India’s most important economic sector. Agriculture may be defined as an integrated system of techniques to control the growth and harvesting of animal and vegetables. It has a noticeable stake in India’s GDP as most activities are agro based. India is touted to be a ‘*Krishipradhan*’ country. Maharashtra is really instrumental as far as agricultural contribution is concerned.

The agricultural sector is critically important in any developing economy and so it is in India, where it contributes close to 20% of GDP. Here 60% of the population depends on agriculture, either directly or indirectly. Small-scale producers, who make up the vast majority of Indian farmers, are often unable to access information that could increase yield and lead to better prices for their crops. The rapid growth of mobile telephony and the recent introduction of mobile enabled information services provide a means to overcome existing information asymmetry and facilitate timely information disposal. It also helps to bridge the gap between the availability and delivery of agriculture inputs and infrastructure.

The increasing penetration of mobile networks and handsets in India therefore present an opportunity to make useful information more widely available. This could help agricultural markets operate more efficiently, and overcome some of the other challenges faced by this sector.

Introduction of Information and Communication Technology (ICT) in Indian agriculture enables the dissemination of requisite information at the right time. This revolution in information technology has made access to relevant information easy and cost-effective.

The mass is surprised by the rapid emergence of mobile telephony and consider this connected world to be the virtue of mobile devices. There are so many possible applications arising, but as usual, the challenge is to understand the right place and role of the technology in social, economic, educational interactions.

The main objective for such project is to develop a mobile phone based solution that helps in farm’s management, leads to agricultural yield improvement and helps in catering to the farmers’ needs.

The recent introduction of a number of mobile-enabled information services suggest that it is time to take a fresh look at their impact on agriculture in India. These services deliver a wide range of information to farmers.

Mobile or smart phones are becoming an essential device for all types of users irrespective of the age group. In India mobile technology has reached new heights surpassing insurmountable odds and has unleashed a paradigm shift in the communication medium.

Android, the open-source mobile operating system developed by Google, is quickly becoming the smart phone of choice for activists. Android's open source nature has further encouraged a large community of developers and enthusiasts to use the open source code as a foundation for community-driven projects, which add new features for advanced users or bring Android to devices which were officially released running other operating systems.

Android had a worldwide smartphone market share of 75% during the third quarter of 2012, with 500 million devices activated in total and 1.3 million activations per day.

2. BACKGROUND

There are several products available for agriculture and farming in the United States' market but there is no such product available in the Indian market.

In NSS (National Sample Survey Organization) 59th round survey, the information regarding seeds/fertilizers was the most frequently accessed information in the sample. The *mandi* (market) price was the second most important piece of information accessed by farmers.

The interviews and focus groups in different areas indicated that farmers had a wide range of information needs, which varied through the growing season. However, the broad categories of information required were common to all of them, irrespective of their location and crops.

Table 1: Farmer's Information Needs

Requirement		Typical Information Needs
General Information	- Crops - Requirements	- What are the requirements for growing a particular crop? - How cultivation activities be planned?

Title		Typical Information Needs
Weather Updates	- Weather conditions	- What is today's forecast? -Upcoming 4 days' forecast -Activities are accordingly planned

Title		Typical Information Needs
Market Prices	- Market prices around the country	- Get an idea of market prices and study the market rates

Small farmers cited market prices, weather information, and general information on diseases/plant protection, pesticides and seed information as their top requirements.

Market prices are valuable not only in deciding crop selling/buying strategy, but also in deciding the cropping pattern. [1]

One of the products in United States of America is ProducePak [6]. It provides an easy to use mobile solution for farm management. The Mobile Farm PDA solution integrates fully with ProducePak Farm ERP, and makes every day business activities easier and more profitable – whilst allowing us to maintain higher quality, staff performance, cost control, and traceability levels.

There are many other such products available to cater the needs of different market. One such product for the needs of farmers in India is Kissan Kerala.

Kissan Kerala [7] an initiative by the Government of Kerala, in its attempt to redefine the services provided to the farming community has introduced a new feature to cater to the needs of the farmers to its full potential. They are slowly getting tech-savvy but currently they are restricted to SMS.

The drawback of SMS is untimely responsiveness and delay/jitter as far as transmission is concerned.

But this product is based on SMS services and all the information required by the farmers is sent to them through the SMS. Only SMS charge is applicable for all services. Also the farmers can access this service by using the free SMS packages supplied by various service providers.

This service has some barriers because the data is sent through the SMS. And there could be delays in the SMS also.

The LifeLines India initiative launched by One World International in collaboration with British Telecom (BT) and CISCO is responsible for promoting digital inclusion and supporting the realization of the United Nations (UN) Millennium development goals in India.

The project was conceptualized with a motive to deliver critical information pertaining to agriculture and animal husbandry to farmers in rural India via a digital platform, using the telephone as a primary medium for information access and use.

3. EXPERIMENTATION DETAILS AND PROPOSED FEATURES

We referred the official IEEE paper Krishi Ville[01] as comprehensive reference and enhance its applied features. It is Android based mobile application designed to meet the needs of the Indian farmers providing all the facilities to the farmers related to their agricultural activities such as crop specific data ,market prices, weather & news pertaining to farming.

- The application has easy to use Graphical User Interface (GUI).
- Crop specific data would be made available by means of a static database present within the phone itself in order to reduce data transmission costs.
- Crop prices with respect to date as well as market location.
- Agricultural News feeds relating to loan schemes, government sanctions etc.
- Information retrieval is done through:

GPRS: The connection cost in this case is reduced to a minimum since only those few bytes requested by the user will be downloaded to the mobile phone.

Wi-Fi: A feature available for smart/3G mobile phones having a Wi-Fi adapter. The application in this case directly routes the connection through Wi-Fi, hence totally eliminating the cost.

A secured connection using HTTP protocol would be there to prevent information fraud.

3.1. Proposed Features:

Weather is one of the most crucial features as per surveys. They are usually concerned about the changes in weather and other details related to the shifts in the surroundings. It helps in observing the temperature, dew factor, dryness and other minute details about the weather and forecast for next 4 days. One of the biggest challenges that a farmer faces is decisions related to marketing his grain and how those decisions will affect his bottom line. This application for agriculture enables the farmer to calculate profitability based on where the grain markets are currently trading and to see how higher or lower grain markets are presently. They would be able to get the current market prices depending upon the commodities. It should carry grain and livestock prices from major Indian agricultural market.

The application aims to use RSS feeds for News Updates. News could be regional or national. They would be of popular Newspapers.

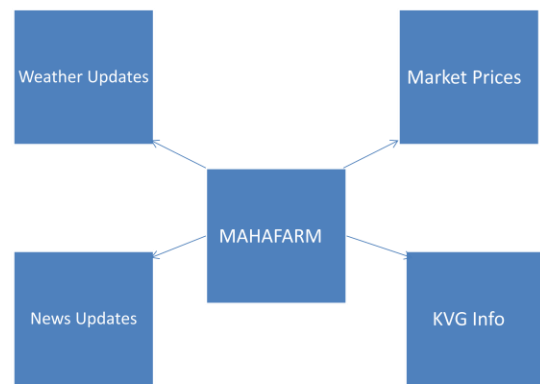


Figure 1: Basic blocks of Mahafarm

It would help them to maintain a list of suppliers and sellers of the different commodities and items sold in the market. The application could help in guiding the people to manage and organize their tasks and particularly help them in remembering those tasks during usual hectic routines.

The application would also provide the farmers with the information about the various loan schemes offered by different major banks in India. E.g. National Bank for Agriculture and Rural Development (NABARD), State Bank of India and also regional/local banks.

A Hyper Text Transfer Protocol (HTTP) Connection would be made to the Server to send the request and to parse the received data.

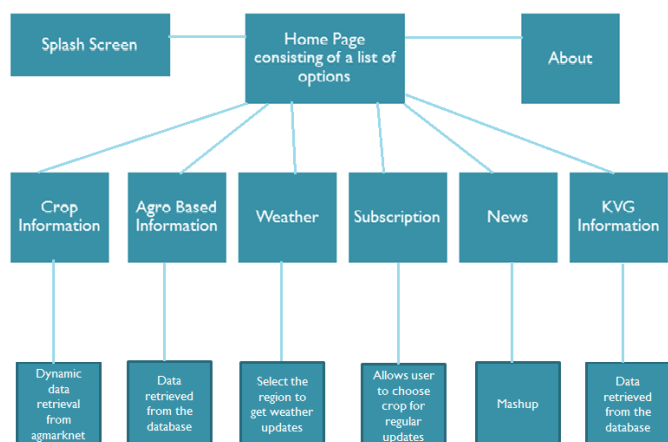


Figure 2: Layout of Mahafarm

Information on availability of market prices from recognized and authentic source is a primary information requirement for the farmers. Through this service, the farmers can explore the prices of various agricultural products across the country.

The user would connect the handset to the internet through GPRS or Wi-Fi and then a HTTP Connection would be made to the Database/Web Server which would be getting the data from Agricultural Market Exchanges through Web Services.

The data which the client gets regarding agricultural news is through Web Services in the form of Extensible Markup Language (XML).

XML provides a language which can be used between different platforms and programming languages and still it can express complex messages and functions and the data in XML form with security.

This weather service is a novel concept which helps the farmers in exploring the intricate details of the weather of a particular location. The farmer can avail the details like rainfall, max temperature, min temperature, total cloud coverage, max relative humidity, and minimum relative humidity of any district on the given day. The farmers can also have the privilege of knowing the weather predictions for four

days in advance which would help them in taking timely decisions.

The weather data is also in the form of XML from Yahoo Weather Application Programming Interface (API) Web Services. [3]. The XML data has to be parsed before showing it to the user on the mobile screen.

```
<rss version="2.0"
xmlns:yweather="http://xml.weather.yahoo.com/ns/rss/1.0"
xmlns:geo="http://www.w3.org/2003/01/geo/wgs84_pos#">
<title>Yahoo! Weather - <Region>, IN</title>
<language>en-us</language>
<lastBuildDate>Sun, 23 Feb 2014 2:31 pm
IST</lastBuildDate>
<ttl>60</ttl>
<yweather:location city="Region" region="MH"
country="India"/>
<yweather:units temperature="C" distance="km"
pressure="mb" speed="km/h"/>
<yweather:wind chill="31" direction="320" speed="9.66" />
<yweather:atmosphere humidity="44" pressure="1011.8"/>
<yweather:astronomy sunrise="6:58 am" sunset="6:40 pm"/>
<b>Current Conditions: Sunny, 31 C<br />
<br /><b>Forecast:</b><br />
Sun - Clear. High: 30 Low: 21<br />
Mon - Sunny. High: 32 Low: 21<br />
Tue - Sunny. High: 32 Low: 21<br />
Wed - Sunny. High: 32 Low: 20<br />
Thu - Sunny. High: 32 Low: 19<br />
<br />
```

A snippet of the weather data in form of XML from Yahoo Web Services

The loan schemes for different nationalized and agricultural banks have been hard coded in the application. As they change from time to time, the updated versions will have the latest schemes.

Similarly the contact addresses of Krishi Vigyan Kendra [8] around India are also hard coded just to provide the information to the farmers about them so that they can get their contact details any time.

These are the proposed features for the application and so these are the difference between this product and the Kissan Kerala.

In Kissan Kerala, the information was provided by the SMS services and in Mahafarm, all the services are provided by the handset itself. The user does not have to message anything time and again to get the news. He just needs to click on the feature he wants to use and the information would be provided to him through the application itself. That's the most advantageous feature of the application.

4. SYSTEM TESTING

The application was tested on major android phones running different API versions. Some of the screen shots for the application are -

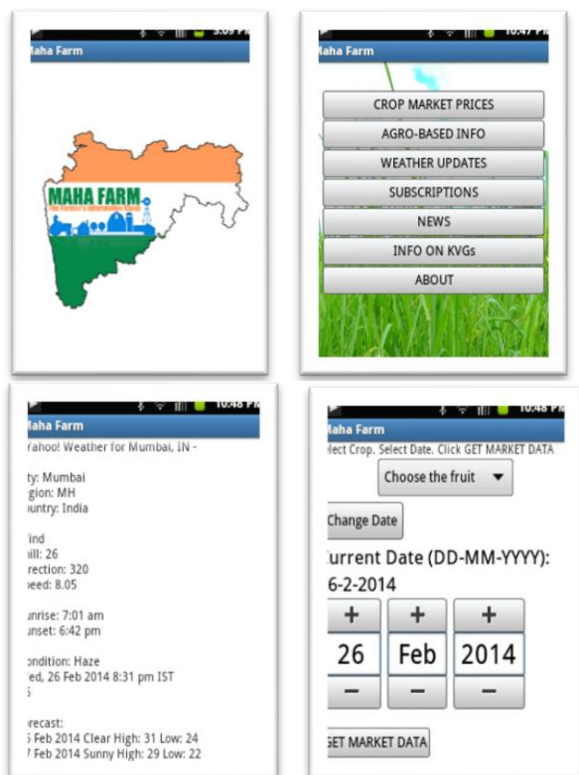


Figure 4 (Clockwise from top) Splash Screen, Home Menu, Weather forecast, Market Prices interface (As on Gingerbread)

The speed with which the user will get data from net would be dependent on the network bandwidth of the service provider the client is using. But now, in India we have 3G mobiles also. And the most common way of interfacing with a web-based component is by using web services in XML format.

The application is supported by all versions of Android. Gingerbread and Jellybean differ in interface however but the functionality is independent of the version.

5. CONCLUSION

- One Stop Solution to all agricultural information needs
- Location specific information delivery
- Highly authentic and reliable database on agriculture
- Accurate information from reliable sources

The most common benefit of mobile found in the research was derived from the use of mobile phones as a basic

communication device. As for many of the farmers interviewed, it was the only convenient mode of communication they had access to.

But there are some constraints with this application. In order for the farmers to realize the full potential of access to new information, they must be able to use it effectively.

Moreover, the current version of the application is in English, but to make it accessible to large rural domestic market, the next versions of this application would be in the local languages. So it would help the farmers to use it effectively and would be beneficial to most of them.

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REFERENCES

- [1] http://agmarkweb.dacnet.nic.in/sa_reports_menu.aspx
- [2] <http://129.3.20.41/eps/get/papers/0503/0503002.pdf>
- [3] <http://www.developer.yahoo.com/weather/>
- [4] <http://developer.android.com/android/database/package-summary.html>
- [5] <http://www.mobileactive.org/uploads/ImpactofIndianAgriculture.pdf>
- [6] <http://www.producepak.com/goods>
- [7] <http://www.kissankerala.net/kissan/kissancontents/geninfo.jsp>
- [8] <http://www.icar.org.in/krishi-vigyan-kendra.htm>
- [9] <http://www.krishisewa.com/cms>
- [10] <http://bsnltnj.ucoz.com/cell/agri.html>