

E-Agro Android Application (Integrated Farming Management Systems for sustainable development of farmers)

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Abstract— this software application is basically for sustainable development of farmers. Many times farmer is confused to take decision regarding selection of fertilizer, pesticide and time to do particular farming actions. So to avoid this problem this application is very useful. Fertilizer schedule of each type of crop will get registered. Based on sowing date of crop, farmer will get reminders about application of fertilizer as per schedule. Additional advice will be given based on Soil type, climatic condition etc. This system combines modern Internet and mobile communication systems with GPS for efficient and smooth farming. This review paper presents the introduction, theories and analysis of DBMS in agriculture. This paper is developed on brief study of some common problems faced by the farmers across the nation. This project aims at bringing the spark of 21st century to that 70% population who are land worshippers.

Keywords— Android, Smart phone, Agriculture, SQLite, Weather Forecasting, Management, Sustainable Development, GPS.

INTRODUCTION

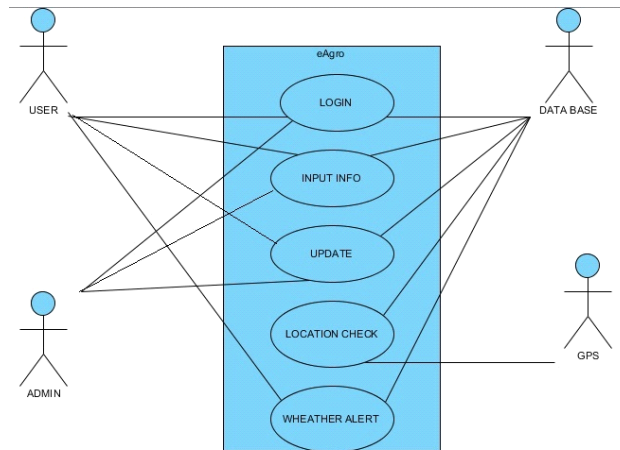
Indian agriculture currently faces a host of diverse challenges and fresh constraints due to the ever growing population, increasing food and fodder needs, natural resources degradation, higher cost of inputs & concerns of climate change. A phenomenal increase in food grain production from 51mt. in 1950-51 to a record production of 251mt. in the year 2011-12 could be achieved using improved technology. The country's population is expected to reach 1660 million by the year 2050 and for which 349 million tons of food grains will be required. It is anticipated that land area available in 2050 would be only 137 million hectares. To meet this requirement there is urgent need to double the productivity of agricultural crops from the existing level. Since there is no further scope for horizontal expansion of land for cultivation of farm enterprises, the emphasis should be on vertical expansion by increasing the productivity using the available resources properly and choosing the best enterprises. With decline in farm size due to explosion of population, it would be increasingly difficult to produce enough food for the family by the end of 21st century. The farmers need to be assured of regular income for living at least above poverty line. The progress in production or steady growth in output is necessary to face the challenges posed by present economic, political and technological environment. In this context, modern farming approach is one of the important solutions to face this peculiar situation. It is also a fact that highly productive lands have been diverted from agriculture to infrastructural development, urbanization and other related activities. Under these circumstances the only option is to increase the productivity vertically. In view of these situations, using Information technology is the only way through which the target could be achieved. As we know IT is continuously increasing its roots in every fields and increasing their efficiency and from current scenario only farmers seems to be untouched with it, and probably the reason for the backwardness of our farmers. IT can improve the agriculture technique and hence a noticeable increase in crop yield can be noticed.

MATERIAL AND METHODOLOGY

1. SQLite:

SQLite implements most of the SQL standard, that uses a dynamically and weak typed SQL syntax that does not guarantee the domain integrity. SQLite operations can be multitasked, though writes can only be performed sequentially. The source code for SQLite is in the public domain. SQLite has many bindings to programming languages. It is the most widely used database, the most widely deployed database engine.

2. Conceptual Architecture:



In this section, included basic framework of '**eAgro Android application**' which will be very helpful for farmers for decision making. In the fig 1 we clearly get the idea how eAgro will work. In above class diagram user and admin are primary actors and database and GPS are secondary actors. User is connected to eAgro infrastructure .It can log in, add, update the information. Admin can access database and update it whenever required .User get the pop up messages about different farming actions, fertilizer, pesticide, weather alert using GPS technology etc. Application designed in such a way that it is simple and easy to use .It will work on smart phones with versions (4.0 and next to that)and supports 2G,3G,4G technologies.

3. Android:

Android is a [mobile operating system](#) (OS) based on the [Linux kernel](#) and currently developed by [Google](#). With a [user interface](#) based on [direct manipulation](#), Android is designed primarily for [touchscreen](#) mobile devices such as [smartphones](#) and [tablet computers](#), with specialized user interfaces for televisions ([Android TV](#)), cars ([Android Auto](#)), and wrist watches ([Android Wear](#)). The OS uses touch inputs that loosely correspond to real-world actions, like swiping, tapping, pinching, and reverse pinching to manipulate on-screen objects, and a [virtual keyboard](#). Despite being primarily designed for touchscreeninput, it also has been used in [game consoles](#), [digital cameras](#), regular PCs and other electronics[11].

Android's [source code](#) is released by Google under [open source](#) licenses, although most Android devices ultimately ship with a combination of open source and proprietary software. Initially developed by Android, Inc., which Google backed financially and later bought in 2005,Android was unveiled in 2007 along with the founding of the [Open Handset Alliance](#)—a consortium of [hardware](#), software, and telecommunication companies devoted to advancing [open standards](#) for mobile devices[10].

Android's default user interface is based on [direct manipulation](#), using touch inputs, that loosely correspond to real-world actions, like swiping, tapping, pinching, and reverse pinching to manipulate on-screen objects, and a [virtual keyboard](#). The response to user input is designed to be immediate and provides a fluid touch interface, often using the vibration capabilities of the device to provide [haptic feedback](#) to the user. Internal hardware such as [accelerometers](#), [gyroscopes](#) and [proximity sensors](#) are used by some applications to respond to additional user actions, for example adjusting the screen from portrait to landscape depending on how the device is oriented, or allowing the user to steer a vehicle in a racing game by rotating the device, simulating control of a [steering wheel](#)

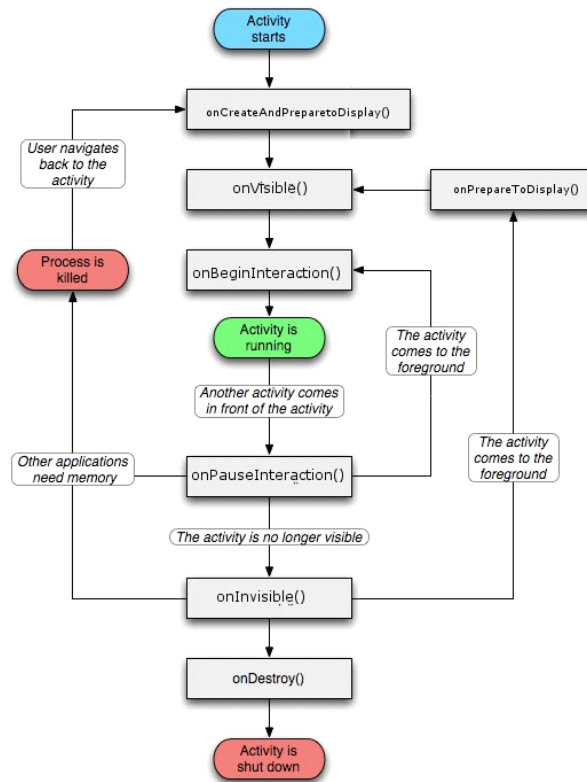


Figure 2: android cycle

PROPOSED SYSTEM

eAgro is an integrated farm management application. It is targeted to those farmers who wish to professionally manage their farm by planning, monitoring, recording, tracking and analyzing all farming activities. eAgro is designed specifically to work on all android platform mobile devices and exploits their GPS activity to implement the aspects of Precision Farming.

• System function

eAgro is an integrated software application, designed for android based mobile devices, targeted to the modern farmer for the professional management of agricultural farms. Using eAgro the farmer can:

- Keep records for all assets of his farm (fields, machines, raw-materials).
- Get access to pesticides, fertilizers and seed databases. Manage all inputs inventories and stock, keep track of inflow and outflow
- Plan farming activities, monitor execution and have a full log of all farming activities.
- Receive information, warnings and alerts regarding natural calamities and weather disturbance and also comes with proper suggestions.
- Prepare financial budgets and monitor its execution.
- Monitor detail farming costs per crop, field, task and individual task input and have a complete picture of financials of his farm.
- Full portability. All required data is available locally on the mobile device. No Internet connection is required to operate the application.
- GPS location tracking. All land fields and farming tasks can be located and annotated on Google Maps[6].
- Use of device camera to capture images/photos and associate/store them with fields, persons, machines, crops etc.

The application features SQLite technology to remotely store (backup) user data to remote servers and supports advanced data synchronization for updating application databases (pesticides etc.).

- **Weather forecasting**

Indian farmers very often have the prior knowledge of weather and seldom have the idea for the measures to best deal with the natural calamities. From a wide period of time many fields and crops are destroyed by natural calamities and are continuously proved as a disease for farmers. The frost and freeze harms the crops in spring and thus what is the effect in future[3]. And for this disease the farmers are dependent on cure rather than prevention. A prior knowledge of such natural calamities will provide its prevention techniques and certainly will less harm the agriculture. eAgro will continuously provide weather updates and in case any natural calamities it alerts the farmers and also provides them the measures to overcome it. eAgro provides SaaS to monitor the weather conditions without typing any location or position as it will be automatically located using the mobile device GPS system[3]. And also farmers can query for the temperature and humidity required for the particular crop(s) as an Android application.

- **Crop advice and analysis**

India has mainly two agricultural seasons in a year: the Kharif season or summer season and the Rabi seasons or winter season. Indian farmers mainly rely on these traditional techniques for their cultivation[3]. This results in degradation of efficiency of soils. eAgro helps farmers to circulate the crops and helps soil from reduce the farmer's work by providing tools to assist in automating alert system, which would otherwise have to be performed manually. By maximizing the farmer's work efficiency and production of crop's the system will meet the farmer's needs while remaining easy to understand and use.

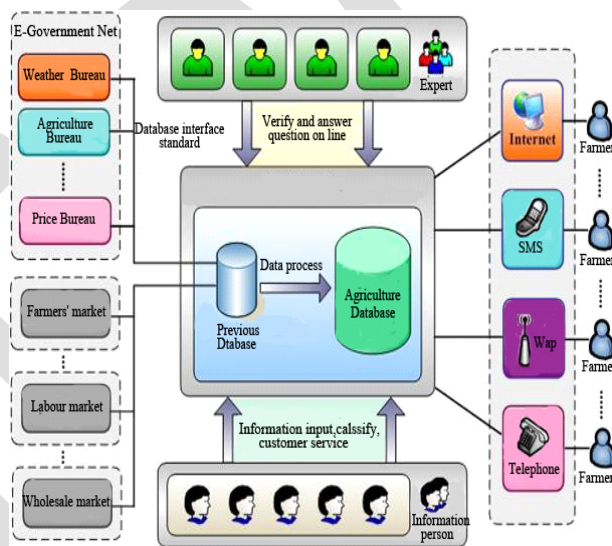


Figure 3: Block Diagram for E-agro

ACKNOWLEDGMENT

We would like to sincerely thank Prof. S. P. Godse, our guide from Sinhgad Academy of Engineering for his support and encouragement and also we would like to sincerely thank sponsored company Shaurya Technosoft Pvt. Ltd for their help.

CONCLUSION

eAgro will offer expertise service to farmers regarding cultivation of crops, pricing, fertilizers, and disease detail method of cure to be used etc. and even suggestions regarding modern techniques for cultivation, usage of bio-fertilizers, can obtain best crop cultivation in the recent history of the region etc. Our main aim will be concentrated on bringing the modern agricultural techniques to the remote farmers. The relentlessly increasing importance and application of Information Technologies (ITs) in Agriculture have given birth to a new field called e-Agro, which focus on improving agricultural and rural development through a variety of technologies. Our android

application eAgro will support all the smart phones on android platform. It will fetch the user workspace through the GPS, and will suggest them the most suitable crop and even with the required fertilizers throughout their work.

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