

Overview of Mobile Android Agriculture Applications

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Abstract - India is an agriculture-dominant country. Agriculture sector's net share in the country's GDP is 17.32%. Hence, the dissemination of information to the farmers at the time when it is required becomes very important. With the widespread availability of smartphones and Internet, there is a huge potential for supplying essential information via this means. This paper presents an overview of mobile-apps targeted to the agricultural sector currently available in Google Play Store, Android Operating System. In addition, a solution of the given problem is designed and presented in the form of an Android application- Kissan Sevak. The paper also discusses the scope of the discussed applications and what improvements must be made in order to make them reach to a wider audience.

Key Words: Applications, Google Play Store, Android, Operating System, Kissan Sevak

1. INTRODUCTION

Agriculture is principal means of livelihood for most of India. Our agriculture dependent population has grown by 50% from 1980-2011 which is the largest any country has grown in the same duration. [2] The sector provides livelihood to about 50% of the country's workforce. We are the largest producers of rice, wheat, pulses, and spices, and the second largest of fruits and vegetables in the world. We contribute 7.68% of total global agriculture output. [3] In the light of the given facts, it is self-explanatory how big of a role the agriculture plays in Indian economy. This codependency helps us realize that advancement in agriculture will in turn largely benefit the economy.

To support this sector, government launches new reforms, schemes and policies every year. New techniques and inventions are made to help the agriculture domain, yet the information cannot be reached to farmer. The trouble comes in the dissemination of this information. Though, data is available in the forms of printed media, audio and visual forms, newspaper, Internet, etc., yet it is not available at the same place. The formats and structures of the available data are also dissimilar. For a typical farmer, it becomes very hard to understand and make usage this information.

One solution to curb this problem is with the usage of smartphones. In the recent years, the usage of smartphones and Internet connectivity has largely increased in rural areas which shows their potential in spreading the agriculture-based information to the people. Smartphones have

penetrated in almost all the environments where people carry out their everyday activities, and perform tasks that are normally run on personal computers. Also, mobile literacy is higher than computer literacy, even though mobile devices might have inconvenient user interfaces. Hence mobile applications are an amiable option for transmitting information to the people in villages and rural areas.

Today farmers are receiving diverse facts or information about farming like seeds, crop selection, crop processes weather, fertilizer, pesticides etc. from various resources which are distributed on many different locations according to its origin, its processors, producers or vendors. It is true that the information is available by means of several applications, videos, images, but the problem lies in the fact that the information is not available at the same platform- a system which covers all the important information about all the domains of agriculture, and available at their location.

This paper presents an overview of a number of mobile applications currently available in Google Play Store, and discusses their features, functions, and how they are lacking in some domains.

1.1 Android Operating System

Android is an open-source mobile operating system built on top of Linux kernel owned by Google. It is primarily used for the mobile, touchscreen devices, watches, and television, etc. Most of the android application are written using Java programming language combined with C/C++ using the Android Software Development Kit (SDK), from May 2017 onwards Google has announced support for Kotlin Programming Language. Since 2011, there have been 8 versions released, and the latest one is Oreo. The framework is broadly divided into five different software components, namely: Linux Kernel, Android Libraries, Android Runtime, Applications, Application Framework, and Libraries built on top of Linux Kernel (e.g. SQLite, SSL). [4]

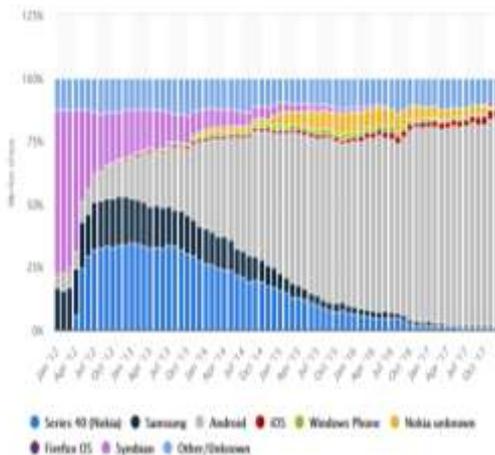


Chart -1: Operating System Usage Distribution [30]

Chart 1 displays that Android holds a share of 82.18% in smartphone industry of India as of December 2017. The Android offers several customization features, has easy UI (user-interface), affordable, and is readily available. This makes it the choice platform for making an ‘application’ which will reach the rural area as opposed to iOS. [1]

2. AN OVERVIEW OF THE AGRICULTURE MOBILE APPLICATIONS

There are several domains which are of an interest to a farmer, as shown in Figure 1. A farmer might need information about the listed categories:

- crop planning (when to grow the crop, which crop to grow, seed variety related to the soil type, the time of harvest);
- buying seeds, pesticides, farm-equipment, and fertilizers, contact with the respective dealers;
- marketing applications (the available price in the current market);
- information applications (about the latest schemes, weather forecast, soil type, new techniques and tricks to increase productivity);
- for contacting farm specialists;
- for checking the available storage facilities;
- for post-harvest technologies.

For an application to be useful to a farmer, it must have at least these feature:- information of soil, crop varieties to plant, market prices, fertilizer and pesticide types, and information about how to increase the productivity of the crop. Some questions are discussed below which must be answered so as to have better crop production:

- crop to plant and variety of seed,
- weather forecast information and protective measures in case of some unexpected forecasts
- best practices to increase crop productivity corresponding to the soil type

- fertilizers and pesticides to be used
- current market prices, information about available storage. [5]

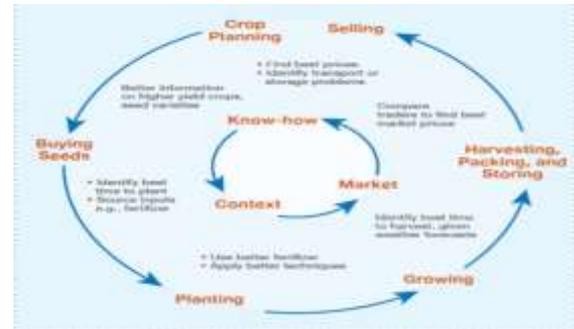


Figure -1: Agriculture Applications Distribution [5]

Table -1: Review of the applications available for Agriculture Sector in Google PlayStore.

Review of the applications available for Agriculture Sector in Google PlayStore			
S.N O.	APPLICATIONS	FEATURES	LANGUAGE SUPPORTED
1.	UHSB HORTI APP [6]	Gives information related to fruits, vegetables, plantation, flowers, medicinal, and post-harvest technology, also provides the contact of nearby SME’s	English, Telugu
2.	Mango Cultivation [8], Tomato Cultivation [9], ICAR-CCRI Nagpur [10]	Developed by ICAR. These applications give information related to the different crop types and practices to be adopted.	English
3.	Kisan.net [11]	Gives information and notification pertaining to 25 different domain-Agriculture, horticulture, irrigation, animal husbandry, farm allied activities, machine and tools, post harvest, agri trading, bio technology, organic technology, organic farming, agro chemicals, agri business, farm services, agri finance and insurance and	English, Hindi, Marathi

		alternate energy.					Hindi, Bengali, Marathi, Odiya	
4.	Kisan Suvidha [12]	Muti-purpose application. This application provides information about the daily weather, dealers contact, and current market price, along with features like call to KCC.	English					
5.	Crop Info [13]	English Kannada Information based application containing information about different varieties of fruits, vegetable crops, flower crops, spice crops, plantation crops, medicinal and aromatic crops and pulses	English, Kannada		12.	Kisan Yojna [20]	Notifications about latest schemes launched by govt. in eight states Maharashtra, Bihar, Jharkhand, Madhya Pradesh, Gujrat, Andhra Pradesh, Uttar Pradesh, Karnataka	Marathi
6.	University of Agriculture Faisalabad [14]	Contains information about citrus fruits and crops such as: wheat and cotton.	English		13.	Kisaan.net [21]	Application designed for sugarcane farmers of UP and Bihar. It gives information about the mills, and sugarcane supply to the registered farmers.	English, Hindi
7.	Kisan Bharti [15]	Provides information about market prices and different variety of crops.	Hindi		14.	Agrofarm [22]	A small scale farm management application.	English
8.	Krishi Vigyan [16]	Daily notifications and updates related to agriculture and weather forecasts.	Hindi		15.	Unnat Kheti [23]	Information about the harvest, new schemes, technologies and notifications.	Hindi
9.	Maha Kisaan [17]	Information about market rates, and current weather and forecast with phone number	Marathi		16.	Farm Management Pro [24]	Application designed for small scale farm management	English
10.	Rml kisan-krishi mitr [18]	A multi-purpose application which provides agriculture related news, current market prices, and daily and weather forecast. Also, connects farmer to nearest agriculture expert, soil specialist. This application also provides feature like 'digi mandi'-online market for crop.	English, Hindi, and all the regional languages state-wise		17.	Agro Connect Kheti Badi Kisan [25]	Information-based application which provides daily notifications about latest schemes and invention related to agriculture.	Hindi
11.	IFFCO kisan [19]	Provides weather forecast, current market prices, notifications related to agriculture and information about different crops.	Punjabi, English, Malayalam, Kannada, Telugu, Tamil, Gujarati,		18.	Big Haat [26]	Application designed for purchasing seeds, plant-nutrients, pesticides and agriculture equipments.	English
					19.	e-krushika [27]	This e-commerce application designed especially for online purchase of machineries, organic input, and farm-nutrients.	English
					20.	Maha kisaan [28]	All type of information regarding latest techniques, equipment, and inventions for farmers in Maharashtra.	Marathi

Table 1 shows the 20 out of 41 applications used for the overview. Their special features and their usage are described in the column 2. These mobile applications are currently available on Google Play store. Based on their features and their functionalities these can be distributed into these categories, broadly:

- Market apps
- Information- based apps
- Weather apps
- Advisory apps
- Management apps

Market applications are the ones containing the information about the market prices, give access to the available SME (Small and Medium Enterprises) in the area near the user based on their locations, and also contains e-commerce application related to agriculture. Information-based applications are the knowledge-based applications, the ones containing the information related to the crops and their varieties suited to different soil types, the best practices to adopt for increasing the productivity. This category also includes the applications containing information about latest government schemes and plans which can benefit the farmer. Weather applications contain the information about the weather and forecast of a particular location as entered by the user or detected by GPS. Advisory applications are the ones which allow user to contact the labs, scientists, or KCC (Kisan Call Centre) near their location. Management-based applications are the ones which facilitate user to manage small or medium sized farms. Figure 3 depicts the graphical representation of different categories of applications with respect to their percentages. The graph clearly displays that information-based applications contribute the highest percentage while Advisory applications the lowest.

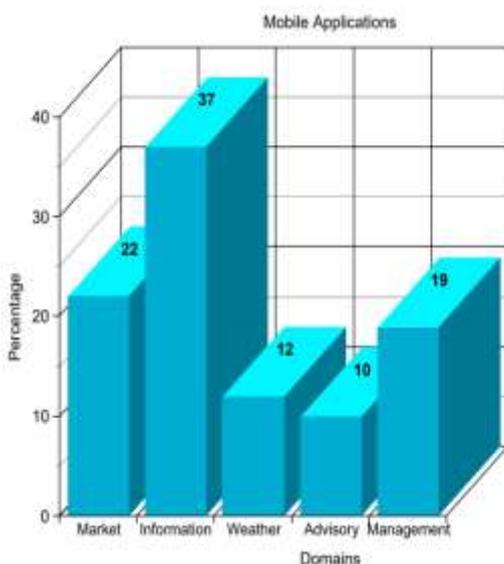


Chart -2: Percentage-wise domain distribution of mobile application

Another criteria on the basis of which the given applications can be categorized is the languages they support. Among the total of 41 applications covered 23 of them are available in English, 10 are in Hindi, and 8 have the option of regional languages like Marathi, Punjabi, Odiya, Telugu, Tamil, Kannada, etc. This is depicted in the form Venn diagram in Chart-3. A total of only 3 are multilingual out of 41 applications overviewed.

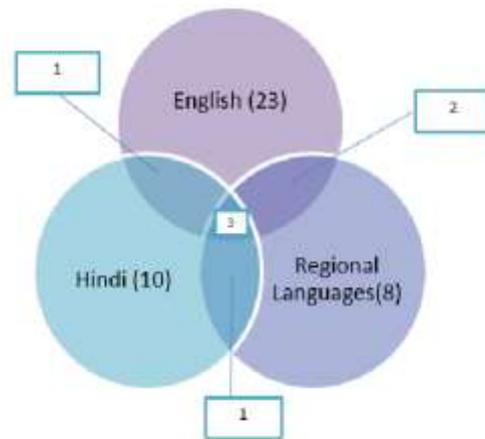


Chart -3: Venn diagram based “Language supported” distribution of mobile application

FUTURE SCOPE AND KISSAN SEVAK :

After surveying and analyzing all the applications available, we designed our own Android application Kissan Sevak . It displays the current News, Market prices and Weather forecast of the coming week. So, it combines first three aspects of the categorization of applications i.e.; Information, Market and Weather. In future, the other aspects like management and advisory will also be added to ensure that application presents a complete solution to all the discussed problems.



Figure -2: News section of Kissan Sevak

Figure 2 depicts the “News” panel of the Kissan Sevak application. The application shows the current updated news whenever the user opens the application.



Figure -3: Market section of Kissan Sevak

Figure 3 depicts the “Mandi” panel of the Kissan Sevak application. The application shows the current updated market prices whenever the user opens the application.



Figure -2: Weather section of Kissan Sevak

Figure 2 depicts the “Weather” panel of the Kissan Sevak application. The application shows the current updated news whenever the user opens the application. The application detects the user location and shows the weather forecast accordingly.

CONCLUSION:

Smartphones can play a vital role in transmitting information to farmers. Many mobile applications are being developed by keeping the farmers in mind. All the applications overviewed in the paper are developed by keeping in mind some specific purpose and provide the functionalities for the same. The functions are diverse ranging from cropping information, market rates, online shopping for farmers to weather forecast, and daily agriculture news. Yet, only few were able to capture all the needs of a farmer in its totality- some applications were only in their testing phase, while some were not dynamic. A barrier of language is also the cause of problem as half of the applications currently available for farmers are in English language, and only a few farmers are able to understand the language completely. We conclude that the functionalities listed in the different applications should be available in a unified one, one which will be easy to access and in the language easier to comprehend.

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