

A Thesis/Project/Dissertation Report

ON

FARM'S PARTNER : AN AID FOR THE FARMERS

*Submitted in partial fulfillment of the
requirement for the award of the degree of*

Bachelor of Technology in
Computer Science & Engineering



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Under The Supervision of

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CANDIDATE’S DECLARATION

I/We hereby certify that the work which is being presented in the thesis/project/dissertation, entitled **“Farm’s Partner :An aid for the farmers”** in partial fulfillment of the requirements for the award of the Bachelors of Technology submitted in the School of Computing Science and Engineering of Galgotias University, Greater Noida, is an original work carried out during the period of month, Year to Month and Year, under the supervision of Dr. Prashant Johari , Professor, Department of Computer Science and Engineering/Computer Application and Information and Science, of School of Computing Science and Engineering , Galgotias University, Greater Noida

The matter presented in the thesis/project/dissertation has not been submitted by me/us for the award of any other degree of this or any other places.

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This is to certify that the above statement made by the candidates is correct to the best of my knowledge.

Supervisor Name

Designation

CERTIFICATE

The Final Thesis/Project/ Dissertation Viva-Voce examination of **Abhinav Saxena & Harshit Ranjan** has been held on _____ and his/her work is recommended for the award of **B.tech.(CSE)**.

Signature of Examiner(s)

Signature of Supervisor(s)

Signature of Project Coordinator

Signature of Dean

Date: December, 2021

Place: Greater Noida

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Abstract

Farming is the Prime Occupation in India in spite of this, today the people involved in farming belongs to the lower class and is in deep poverty. The Advanced techniques and the Automated machines which are leading the world to new heights, is been lagging when it is concerned to farming, either the lack of awareness of the advanced facilities or the unavailability leads to the poverty in farming. Farmbook would make all the things automatic which make easier serving as a best solution to all the problems.

Farmbook is a revolution to the agricultural field. Farmbook is an emerging field that focuses on enhancement of agricultural as well as rural development through improved information and communication process. Our idea is to provide various information related to the farming methods and crops. Apart from these services, we will propose some new features to this app by implementing AI features to our app. This includes chat processes, voice processes as well as AI suggestions as per the entered location of the user.

Tools & Technology Used: In building of Farmbook App, we will firstly use the Android Studio to build our app. For database purpose, we will be using Firebase. We will use Artificial Intelligence in our app for the chat and voice processes and location wise agricultural suggestions for the user.

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CHAPTER-1

Introduction

1.1 Introduction

Nowadays, we are living in a digital environment where everything is available online. So, in the field of agriculture as well, things should be digitalized. Spreading the information which is related to agriculture to the farmers, who are living in the poorest communities is easier with the help of online education and from the help of mobile applications. Since these everyone has smartphone, so it's easy for the farmers as well to access the application and use it comfortably. The benefits of such connectivity or information flow are that it helps farmers to create better land management decisions. The various schemes which are launched these days by the government, these farmers are not able to avail those schemes, many of them even don't have the idea about these schemes. So, we are coming with a application which will help in availing those schemes. It will help farmers financially as well as it will help in growing the production of the grains.

Farmbook is a revolution to the agricultural field. Farmbook is an emerging field that focuses on enhancement of agricultural as well as rural development through improved information and communication process. Our idea is to provide various information related to the farming methods and crops. Apart from these services, we will propose some new features to this app by implementing AI features.

This includes chat processes, voice processes as well as AI suggestions as per the entered location of the user. Farming is the Prime Occupation in India in spite of this, today the people involved in farming belongs to the lower class and is in deep poverty. The Advanced techniques and the Automated machines which are leading the world to new heights, is been lagging when it is concerned to farming, either the lack of awareness of the advanced facilities or the unavailability leads to the poverty in farming. Farmbook would make all the things automatic which make easier serving as a best solution to all the problems.

1.2 Status Quo

The dynamic growth of mobile communications combined with the widespread use of all types of mobile devices (i.e. smartphones and tablets) has changed significantly citizens' daily life and business practice. According to the International Telecommunication Union , mobile connections in 2015 have reached 7.08 billion. Towards the same direction, in 2015 the smartphone market grew 13% and it is forecasted that in 2017 more than one third of the world's population will own a smartphone. The increasing penetration of smartphones is due to the fact that it has become the dominant means for communication, entertainment, information, daily life and business.

Among the technical advantages that have turned these devices into useful and necessary tools are: the wide touch screens, easily readable and adaptable to the needs of each user; the high resolution cameras that can substitute to a large extent other devices, such as cameras and camcorders; the geographic positioning system (GPS) that supports specialized navigation services; the powerful processors; and file storage capabilities, music player, radio tuner function, video player, etc. These technical characteristics are used by specialized software and mobile applications (apps) Mobile apps are software programs designed to run on smartphones, tablets and other devices Initially, mobile apps were developed for undertaking basic tasks of computer programs, such as email, web browsing, calendar, contacts, weather forecast etc.

Today, the growing demand for new mobile products and services puts pressure on both businesses and organizations to develop mobile apps for commerce, banking, health, and tourism in order to meet specific needs of various business sectors. The agricultural sector in particular comprises an important pillar of the economy and as a business sector covers the food needs of the world population. However, the development of mobile apps for agriculture compared with other business sectors is limited . In the context of this work, the term “mobile agricultural apps” is used to characterize any mobile app targeting to the needs of the agricultural sector and its stakeholders, such as farmers, agricultural businesses and cooperations. These apps

cover a spectrum of activities from the field (e.g. cultivation techniques) to the agricultural market (e.g. buying and selling products and commodities).

More specifically, mobile agricultural apps offer various kinds of services, such as weather forecasting for farmers, agricultural business news, information for agricultural machinery and equipment, agricultural product market prices, management of agricultural product, dairy farming, management of irrigation systems, management of crop sensors, yield forecasting and monitoring, registration of soil types, and calculation..

Responsible Research and Innovation (RRI) is a paradigm which has grown over the past decade to support the governance of science and innovation with the aim of making new technologies ethically acceptable, fair, sustainable and socially desirable and beneficial (Von Schomberg, 2013). Central to RRI, are four pillars considered important in the research and innovation process: anticipation (exploring possible impacts), inclusion (engaging diverse voices), reflexivity (fostering critical reflection of assumptions) and responsiveness (responding with meaningful action) . Industry, government and funding agencies have championed the development of new innovations for agriculture in recent years, however, there are likely to be challenges balancing the priorities of various agricultural stakeholders as agricultural innovation systems digitalize seeing as research has signaled uneven impacts of new technologies across rural and farming communities.

1.3 Co-design approach

In addition to the arguments on RRI, both the European Union (EU) and the World Bank have long stressed that farmers' needs are not sufficiently addressed during innovation generation, and hence innovations are not relevant to them. It is now more widely understood that agricultural innovation needs to address and accommodate complex socio-scientific problems by mobilising a range of stakeholders who can offer multiple perspectives .

Co-design involves heterogeneous stakeholders in the collective exploration of solutions to a common problem and generally seeks to build and maintain a shared conception of the design problem to allow collaboration. Furthermore, co-design provides an opportunity to explore and reflect upon the local needs and concerns of each respective stakeholder, thus, subsequently improving innovation design and delivery and the likelihood of implementation success. This diversity and inclusiveness is one of the dimensions of RRI, which prioritizes the involvement of stakeholders . Through the co-design process, these stakeholders are involved in each step, from the initial conception of the product to the design and testing phases. Few empirical studies have outlined, in methodological detail, the steps taken to successfully implement a co-design approach, which engages multiple stakeholders, in designing new digital communication technologies. Further contributions to this

body of work are made in the current paper by demonstrating how researchers and technology developers engaged with a variety of stakeholders from the farming community to co-develop an agricultural app.

1.4 Design thinking

Empathizing with stakeholders from various backgrounds with different views and ideas on a new product helps to anticipate user needs and potential barriers to success at an early stage. Anticipation, a key pillar of the RRI framework, encourages similar exploration of possible impacts and risks at an early stage of development. The second phase of design thinking helps to define the problem so that the project team and users can come up with solutions and ideas in the next phase, ideation. During the define phase of design thinking, it is important to use the data that was collected in empathize and to frame the issues and problems in a way that will promote problem solving in the next phase.

Design thinking, however, should not be understood only as a process, but rather as a philosophy, could be characterized by nine key attributes, including: ambiguity, collaboration, constructiveness, curiosity, empathy, holism, iteration, non-judgement and openness. Overall, such attributes allow researchers to be comfortable in unclear situations, collaborate and problem-solve across an interdisciplinary team, foster non-judgmental and open communication between and with other stakeholders,

become curious about and gain empathy for the end users' needs, and holistically attempt to find a solution to their problems. Emulating the RRI principle of reflexivity, design thinking represents an innovative, human-centered approach to problem-solving, which allows teams to step away from immediate and reactionary approaches to complex problems in favour of novel, broader approaches (Brown, 2008).

The primary objective in this approach is to keep the needs, desires, and behaviours of all stakeholders in the ecosystem at the centre of the design process. Design thinking creates more extensive, more diverse, and more productive teams in which each member is invested in the changes being designed and proposed. The continuous process of planning, acting, reflecting and readjustment, offered by design thinking, allows researchers and innovation developers to continuously adapt in response to users' issues and solutions that emerge over time, echoing the principles embodied also by RRI.

Study context

In the event of supporting evidence being needed to process a payment claim, farmers and their advisors will be able to use this smartphone app to take a geotagged photo of the land parcel in question and submit the evidence directly to the paying agency. Adoption of this app will reduce the need for on-the-ground farm inspections

and accelerate claim processing, offering significant benefits to both claimants and paying agency administrators. The current process in place requires farmers to submit supporting paperwork to resolve payment claim queries via the general post to the paying agency for acceptance or rejection. If rejected, a farm inspector may be sent out to the farmers land to conduct an on the-ground farm inspection. With the geotagged photo app however, the incentive for the farmer may be a reduced chance of an on-the-spot farm inspection, if they upload the photographic evidence of agricultural activity (e.g. number of animals grazing on the land) or clarify the query with the paying agency. The initial phase of development and testing of the geotagged photo app focuses on the Irish farming community and stakeholders; subsequent work is scheduled for further research and development in other participating countries. The end goal of our design thinking approach is to develop a customizable app for real-time data flows between system users, i.e., farmers/advisors to respective governing bodies, facilitating improved communication relating to agricultural queries. In this paper, we describe how our design thinking approach was implemented to ensure end-users from the agricultural community were involved in the core design process of the geotag photo app. We also present and discuss the results obtained from the design thinking approach employed and indicate how the app will be further developed through subsequent stages of the design thinking process.

1.5 Tools and Technology:

Android Studio:

Android Studio is the official integrated development environment (IDE) for Android application development. It is based on the IntelliJ IDEA, a Java integrated development environment for software, and incorporates its code editing and developer tools. To support application development within the Android operating system, Android Studio uses a Gradle-based build system, emulator, code templates, and Github integration. Every project in Android Studio has one or more modalities with source code and resource files. These modalities include Android app modules, Library modules, and Google App Engine modules.

Android Studio uses an Instant Push feature to push code and resource changes to a running application. A code editor assists the developer with writing code and offering code completion, refraction, and analysis. Applications built in Android Studio are then compiled into the APK format for submission to the Google Play Store. The software was first announced at Google I/O in May 2013, and the first stable build was released in December 2014. Android Studio is available for Mac, Windows, and Linux desktop platforms. It replaced Eclipse Android Development Tools (ADT) as the primary IDE for Android application development. Android Studio and the Software Development Kit can be downloaded directly from Google.

Firestore :

It's a Realtime Database

Real-time data is the way of the future. Nothing compares to it. Most databases require you to make HTTP calls to get and sync your data. Most databases give you data only when you ask for it.

When you connect your app to Firestore, you're not connecting through normal HTTP. You're connecting through a WebSocket. WebSockets are much, much faster than HTTP. You don't have to make individual WebSocket calls, because one socket connection is plenty. All of your data syncs automatically through that single WebSocket as fast as your client's network can carry it. Firestore sends you new data as soon as it's updated. When your client saves a change to the data, all connected clients receive the updated data almost instantly.

Firestore Storage

Firestore Storage provides a simple way to save binary files — most often images, but it could be anything — to Google Cloud Storage directly from the client!!!

Firestore Storage has its own system of security rules to protect your GCloud bucket from the masses, while granting detailed write privileges to your authenticated clients.

It's Authentication

Firestore auth has a built in email/password authentication system. It also supports OAuth2 for Google, Facebook, Twitter and GitHub. We'll focus on email/password authentication for the most part. Firestore's OAuth2 system is well-documented and mostly copy/paste.

If you've ever written an authentication system, let's commiserate for a moment. Custom authentication is terrible. I will never write an auth system again for as long as I live. I fell in love with Firestore Auth at first sight, and the flame has never wavered. Sometimes I get frustrated. Sometimes we fight. But I never forget the cold, dark abyss of a custom auth system. I count my blessings. Oh, and Firestore Auth integrates directly into Firestore Database, so you can use it to control access to your data. I'm writing this as if it's an afterthought. It's not. It's the second reason that you will love Firestore Auth.

It's Hosting

Firestore includes an easy-to-use hosting service for all of your static files. It serves them from a global CDN with HTTP/2. And to make your development particularly painless, Firestore hosting utilizes Superstatic, which you can run locally for all of your testing. I run Superstatic as BrowserSync middleware. The following implementation uses Gulp, but Gulp is purely optional.

CHAPTER-2

Literature Survey

There are various Mobile app developments in the marketplace, designed and developed to make agriculture or farming easy. Some mobile applications have developed to specifically provide information as well as services to farmers. In this literature review, various research paper and Mobile App have reviewed related to agriculture sector.

Santosh G. Karkhile and Sudarshan G. Ghuge, 2015, researchers gave a research paper on "A Modern Farming Techniques using Android Application". In this paper, they have given an entire ideology about designing a mobile-based solution that helps in farm management, which leads to agricultural yield improvement and helps in farm maintenance or simply optimizing farming techniques. The researchers explain that traditional farming tolerated unexpected environment, on the other hand, Modern farming technique provides expected environment by weather forecasting. Traditional farming requires a large amount of labor and different activities for conducting farming. However, Modern farming does not require a huge amount of labor as mobile, machines and new technology take care of the whole process. This mobile application provides real-time weather information, news, and market prices at diverse locations, and all information is provided in local languages. Hence, all the outputs of researcher application are aid

farmers to improve their agriculture to yield more earnings. author expand the System Architecture for the farmer app which includes different operations like registration of farmers Weather forecasting, News and feeds, Multiple language support, Market trading.

Shailaja Patil and Anjali R. Kokate “Precision Agriculture: A Survey”, 2015. In this paper researcher explores how different mobile phone application and precision agriculture services have impacted the farmer’s life in their agricultural activities. Android apps offer proficient functionality to be grown-up with technology. In the ground like precision agriculture farmers get extra benefits from the mobile apps which are developed for the agriculture monitoring purpose and vital information exchange. Mobile apps that are used for agriculture monitoring are of special types which provide information like weather information, market rate and availability, government scheme details etc. Author provides following some apps details used for monitoring and data information exchange purpose.

1) Mkisan application: This android app is designed and developed by CDAC Pune. This app is useful for assistances to farmers.

2) Shetkarimasik android app “ShetkariMasik” is extremely popular monthly magazine in the farming sector since 1965.

Department of Agriculture in Maharashtra published Shetkarimasik mobile app. The important feature of this app is after registration process without use of internet user can upload information on the portal 3) Farm -o-Pedia this app has been developed by CDAC, Mumbai. Multiple language support facility is provided by this app. This Android application is intended for farmers or anybody linked to agriculture in rural Gujarat. This application is available in English and Gujarati language. The functions of the app are: Obtaining crop-wise information, monitoring suitable crops according to soil and season, monitor weather and managing cattle in the herd etc. 4) Markets near me -This mobile app is use to get the market price of crops in the markets in the area near of 50 km of user location. It captures the location of mobile user through sensor and displays the crop's market price of markets nearer to the user.

M. V. Bueno- Delgado, J. M. Molina-Martínez, R. Correoso-Campillo, P. Pavón- Mariño “Ecofert: An Android application for the optimization of fertilizer cost in fertigation”, 2015. In this paper researcher focus on efficient management of fertilizers is reflected into a saving of money and time. In this work Ecofert is presented as easy and powerful software application developed for Android O.S. that calculates the most excellent combination of fertilizers to get the desired nutrient solution for different crops. In this application current

price of fertilizers in the market are also considered. The most important novelties of Ecofert are, first thing is it solves the fertilization mixture by modelling this as a Linear Programming problem, and using specific mathematical libraries to resolve it. On the other hand, Ecofert works with a list of marketable fertilizers hosted in a Data Base in the Cloud, where the composition and cost are updated daily. In addition, Ecofert shows a low-down computational cost, even for huge number of fertilizers (>20). Ecofert is simple application so easily execute in mobile devices, giving farmers and crop growing technicians a powerful tool to support for agricultural tasks.

2.1 Existing Models

NCMRWF and its Agro-meteorological services :

During April-May 1983, unusual persistent cloudiness resulted in excessive losses of wheat crop. Former Prime Minister (Late) Smt Indira Gandhi suggested serious examination of variations and fluctuations in weather and exploration of ways and means to adjust the cropping pattern according to likely weather conditions. The apex committee set up to examine these aspects, recommended setting up a National Centre for Medium Range Weather Forecasting (NCMRWF) in the country having capability to forewarn farmers several days in advance. Government of India established the NCMRWF under Department of Science & Technology (DST) in early 1988 in mission mode with the following mandate;

- Development of global and regional scale numerical weather prediction (NWP) models for forecasting weather in medium range (3-10 days) time scale taking full advantage of existing and concurrent developments both in India and abroad in the field of atmospheric science .
- Set-up a state-of-the-art supercomputing infrastructure to develop suitable NWP models to issue medium range weather forecasts.
- To inform and guide the farmers in advance to undertake various farming activities based on the expected weather.
- Set-up agro meteorological advisory service (AAS) units, each unit representing one of the 127 agro climatic zones spread all over India, to prepare/ issue/ disseminate AAS Bulletins based on weather forecasts and to provide user feedback as well .
- Set-up a stable/fast dedicated communication network with AAS units

Location Specific forecast from T80/L18 model:

Weather elements like cloud amount, rainfall, maximum temperature, minimum temperature, wind speed and wind direction play an important role in agriculture and other economic activities in India. Hence, their accurate prediction is essential to make strategic decisions. The objective forecast for the above meteorological

parameters is directly obtained from T80/L18 model operational at NCMRWF and is called the direct model output (DMO) forecast. However, their accuracy may be fairly low. One reason is that the NWP models are not able to resolve the local orographic features because of the various approximations under which they are developed. The other reason may be attributed to the errors in the NWP models because of coarse representation of model topography and deficiencies in model physics. The unique geographical location of India with oceans on three sides and the Great Himalayas on the fourth adds to the complexities. Statistical-Dynamical models (SD) are developed to overcome this difficulty by developing empirical relationships between the concurrent circulation, certain thermodynamic quantities, and the resulting precipitation (Maini, 2006). The SD models incorporate numerically forecast data into a statistical prediction framework. These models provide a link between the raw output of a NWP model and weather parameters that are required in operational forecasts.

Verification of Location Specific Forecast :

In order to evaluate the skill of the forecasts issued to the AAS units, a verification mechanism has been put in place wherein the verification is done by the service provider (NCMRWF) as well as the user community (farmers). A uniform verification procedure has been developed and circulated to all the AAS units. Therefore rigorous verification of the forecast is done as a routine for all seasons.

Table below gives the skill of forecast during the period of study. The parameters considered here are rainfall, maximum/minimum temperature. Here the skill of rainfall occurrence/non-occurrence is given in terms of Ratio Score (RS) and HK Score(HKS) . The skill of maximum temperature (Tx) and minimum temperature (Tn) is given in terms of correlation (CC) and RMSE. The scores are mentioned in detail in Annexure-I. The verification is done during the two main seasons namely; Kharif and Rabi for all the 15 units during the period of survey. For evaluation of usability of forecast of quantitative precipitation and temperature an error structure has been formulated. It is seen from Table that while the skill of Yes/No rainfall forecast is around 90% during Rabi, it is around 69% in Kharif. Maximum temperature has a correlation of 65-70% and an RMSE of 2-3o C in Kharif while in Rabi the correlation is around 60%. On the other hand the correlation of minimum temperature forecast is less in Kharif and more in Rabi season. It is around 50% in Kharif and around 65% in Rabi season. On the other hand the RMSE of Tn is lower than Tx and is in the range of 1-2.5o C during both the seasons. The verification of wind speed, cloud cover shows that both the parameters have reasonably good skill, but the wind direction forecast needs improvement.

2.2 Comparative study:

Skill of forecast during the study period

STATION	RAIN		Tn		Tx	
	<i>RS</i>	<i>HKS</i>	<i>RMSE</i>	<i>CC</i>	<i>RMSE</i>	<i>CC</i>
Kharif						
Anand	74	0.45	1.59	0.68	1.97	0.87
Bangalore	57	0.19	1.29	0.17	1.68	0.7
Bhubaneshwar	65	0.3	1.65	0.54	2.7	0.74
Hisar	75	0.38	2.61	0.55	2.7	0.6
Coimbatore	60	0.13	1.67	0.29	2.33	0.33
Hyderabad	56	0.24	1.53	0.64	2.54	0.81
Jaipur	62	0.25	2.49	0.51	3.13	0.6
Jodhpur	80	0.48	2.78	0.45	2.97	0.65
Ludhiana	70	0.31	2.61	0.6	3.69	0.53
Nadia	78	0.33	1.6	0.28	2.24	0.35
Pantnagar	72	0.56	1.85	0.39	2.63	0.77
Pune	67	0.2	1.21	0.54	1.88	0.54
Raipur	67	0.33	1.79	0.58	2.36	0.81
Solan	70	0.42	1.87	0.56	2.23	0.82
Thrissur	82	0.5	1.22	0.2	1.66	0.6

Table no. 1

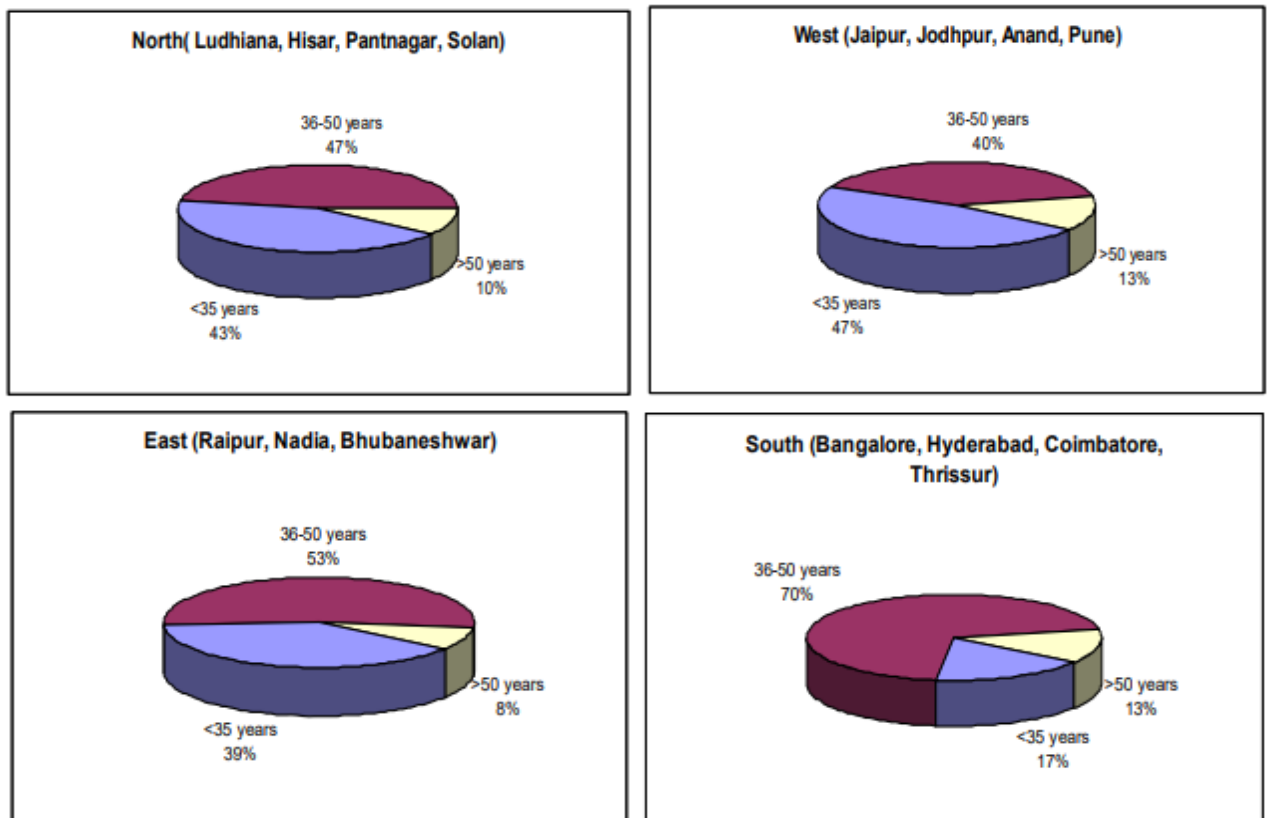
Rabi						
Anand	92	0.37	2.35	0.69	1.54	0.8
Bangalore	84	0.25	1.94	0.64	1.64	0.37
Bhubaneshwar	98	0.41	2.35	0.32	1.93	0.41
Hisar	96	0.3	2.12	0.68	2.85	0.7
Coimbatore	87	0.42	1.89	0.58	1.89	0.61
Hyderabad	95	0.39	1.98	0.74	1.5	0.66
Jaipur	91	0.22	2.99	0.67	2.07	0.76
Jodhpur	96	0.32	2.34	0.69	1.68	0.74
Ludhiana	87	0.38	2.86	0.62	2.41	0.68
Nadia	93	0.74	2.4	0.61	2.64	0.51
Pantnagar	92	0.46	2.14	0.77	3.09	0.31
Pune	98	0.5	2.67	0.53	2.45	0.56
Raipur	94	0.41	2.43	0.52	2.5	0.6
Solan	87	0.56	2.13	0.77	2.86	0.69
Thrissur	89	0.22	1.31	0.62	1.76	0.22

Table no. 2

2.3 Survey results of socio-economic features of farmers:

(a) Age group of farmers

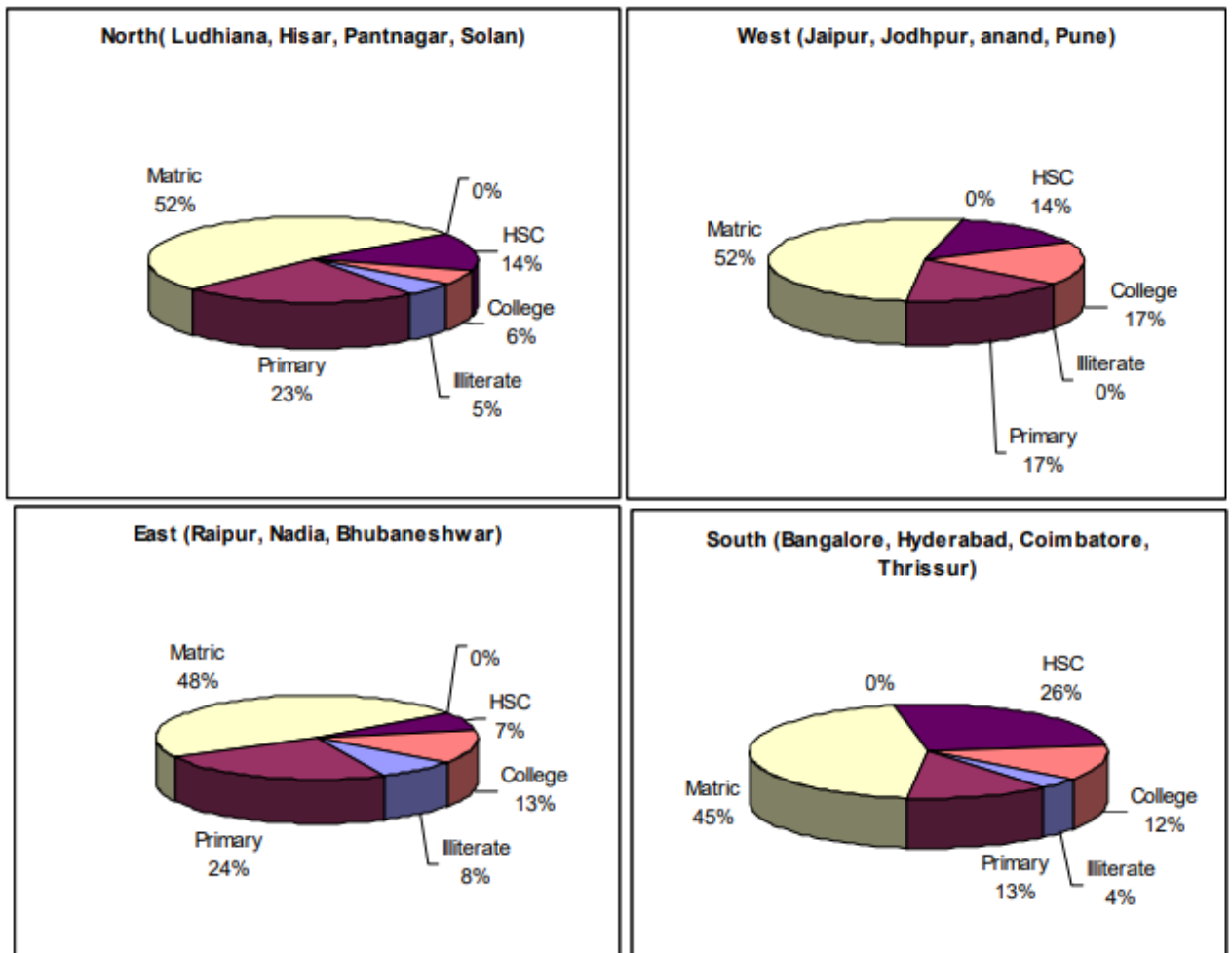
The pie graph below depicts the age group of farmers in different zones of India. It is seen that in the south more than 70% of the farmers are in the age group of 35 or more (83%) followed by east where it is 61% and this is followed by north where 57% of the farmers are in this age group. In the west consisting of station like Jaipur, Jodhpur, Anand and Pune 47% of the farmers are less than 35 years of age. In general, it is seen that on an average over India most of the farmers belong to the middle level age group. This implies that the younger generation may not be interested to take up farming as a profession.



(b) Educational level of farmers:

Below shows the education level of farmer in the four zones of the country.

The pie graph depicts that 52% of the farmers in North and west are at least matriculate followed by east (48%) and south with 45%. Although the percentage of illiterate farmers is very less about 0-8%, it is maximum in east and nil in the west. Interestingly about 6- 17% of the farmers are college pass with west leading in this category.



CHAPTER 3

SYSTEM REQUIREMENT

3.1 System Requirements for Android Studio

- Microsoft Windows 7/8/10 (32 or 64 bit).
- Mac OS X 10.8.5.
- GNOME or KDE or Unity desktop on Ubuntu or Fedora or GNU/Linux Debian.
- 2GB RAM.
- 4GB RAM recommended.
- 500 MB disk space
- 1 GB for Android SDK.
- Java Development Kit (JDK) 7.
- 1280x800 screen resolution.
- A faster processor (according to your budget).

3.2 Prerequisites For the Project

Android app development refers to the creation of an android-based mobile application for your business. As an Android app developer your basic toolkit should include proficiency in Java and C++. It is a basic requirement for getting into android mobile app development.

To get started as an Android developer Android provides the following software toolkits for Android app development:

- Software Development Kit(SDK)
- Integrated Development Kit
- Java Software Development Kit(JDK)

Android Apps can be written in different programming languages (PL). The choice of a language depends on the level of your skillset in different programming languages; strengths and weaknesses of each PL; and more importantly, what you are trying to achieve with your app.

Some of the languages to build Android Mobile Application:

(1)Java: Android applications are officially developed in Java Language. Java is freely available, secure and user-friendly.

(2)Kotlin: Recently added as, among the official language for Android App development by Google, Kotlin is cross-platform and can interoperate with Java through Java Virtual Machine(JVM).

(3)C/C++: Android through Native Development Kit (NDK) allows development in other indigenous languages such as C and C++. This language is more complicated though.

(3)HTML, CSS, and JavaScript: This can be achieved through the Adobe PhoneGap framework. PhoneGap offers a platform to create an app in web-based languages that run on "WebView."

Before Android OS 5, an android app could only have one APK, subsequent Android versions support multiple APKs within a single app. Generation of multiple APKs was an inconvenience for developers, Android, therefore, came up with Android Application Development Bundle. This feature is available in Android Studio 3.2 and subsequent versions. It is a recently added upload feature that involves auto generation and the signing of app's APK files.

Some of the advantages of Android App Bundle system are:

- As a developer, only build one version of the app that includes compiled code and resources; you no longer have to manage multiple versions in form of APKs.
- Users only download your app's code and resources that are only useful to them, such as their native language (a resource). Anything else unrequired is held back from download.

CHAPTER 4

MODULES DESCRIPTION

4.1 To add a new module to your project for a new device, proceed as follows:

1. Click **File > New > New Module**.
2. In the **Create New Module** window that appears, Android Studio offers the following device modules:
 - Phone & Tablet Module
 - Wear OS Module
 - Android TV Module
 - Glass Module

Select the module for the device you want, and then click **Next**.

3. In the **Configure your new module** form, enter the following details:
 - **Application Name:** This FARM'S PARTNER is used as the title of your app launcher icon for the new module.
 - **Module Name:** This text is used as the name of the folder where your source code and resources files are visible.
 - **Package Name:** This is the Java namespace for the code in your module. It is added as the [package](#) attribute in the module's [Android manifest file](#).
 - **Minimum SDK:** This setting indicates the lowest version of the Android platform that the app module supports. This value sets the minSdkVersion attribute in the build.gradle file, which you can edit later.

Then click **Next**.

4. Depending on which device module you selected, the following page displays a selection of appropriate code templates you can select to use as

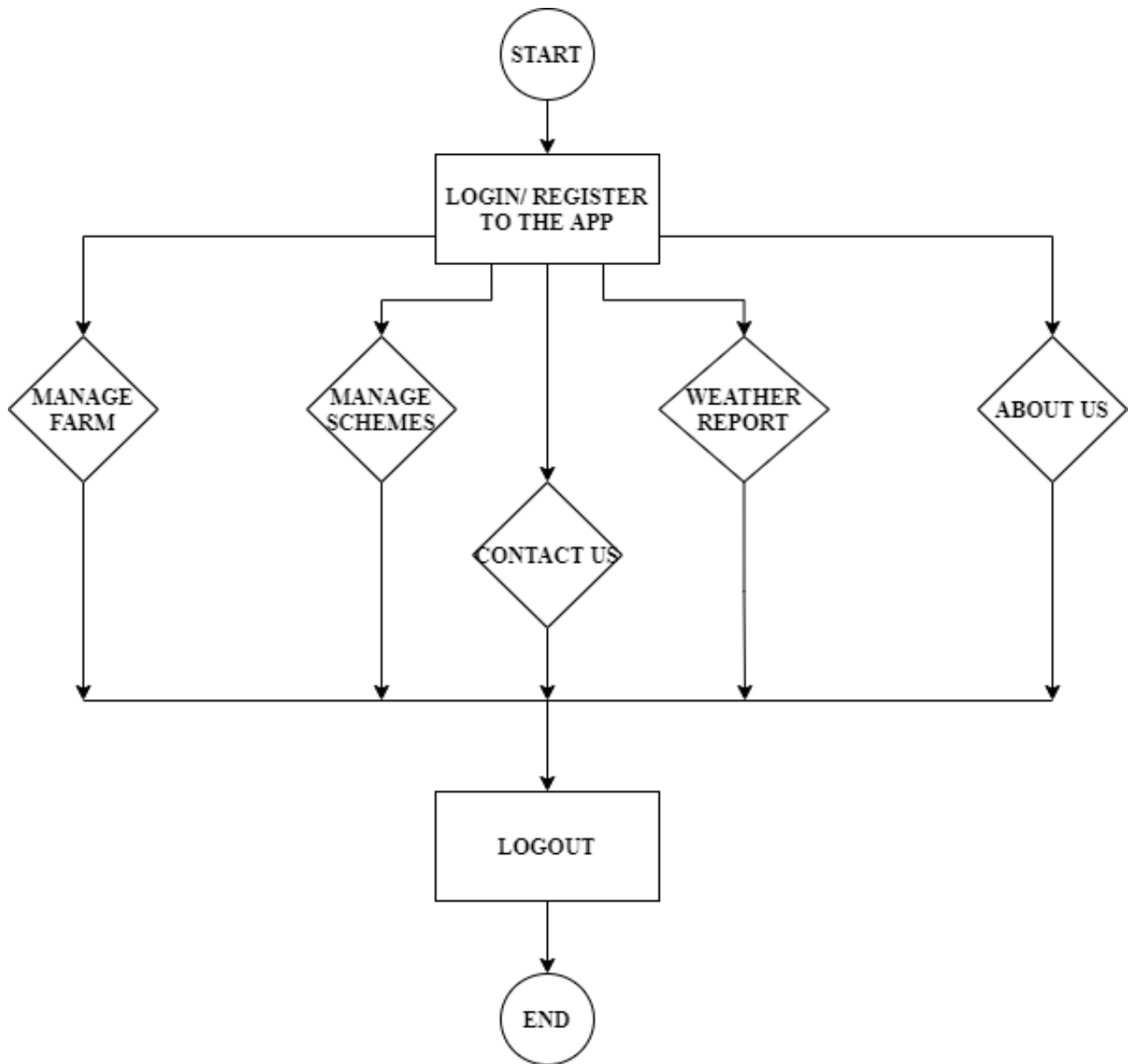
your main activity. Click an activity template with which you want to start, and then click **Next**. If you don't need an activity, click **Add No Activity**, click **Finish**, and then you're done.

5. If you chose an activity template, enter the settings for your activity on the **Customize the Activity** page. Most templates ask for an **Activity Name**, **Layout Name**, **Title**, and **Source Language**, but each template has activity-specific settings. Click **Finish**. When you create an app module with an activity template, you can immediately run and test the module on your device.

Android Studio creates all the necessary files for the new module and syncs the project with the new module gradle files. Adding a module for a new device also adds any required dependencies for the target device to the module's build file.

Once the Gradle project sync completes, the new module appears in the **Project** window on the left. If you don't see the new module folder, make sure the window is displaying the [Android view](#).

4.2 ER DIAGRAM



CHAPTER 5

SOME INITIAL PROTOTYPES



FIG 5.1



FIG 5.2



FIG 5.3

CHAPTER 6

MODULE DESIGN

Import a module

To import an existing module into your project, proceed as follows:

1. Click **File > New > Import Module**.
2. In the Source directory box, type or select the directory of the module(s) that you want to import:
 - If you are importing one module, indicate its root directory.
 - If you are importing multiple modules from a project, indicate the project folder. For each module inside the folder, a box appears and indicates the **Source location** and **Module name**. Make sure the **Import** box is checked for each module that you want to import.

If your module(s) have other dependencies, they will be listed to import under Additional required modules.

3. Type your desired module name(s) in the **Module name** field(s).
4. Click **Finish**.

Once the module is imported, it appears in the Project window on the left.

Next steps

Once you've added a new module, you can modify the module code and resources, configure module build settings, and build the module. You can also run and debug the module like any other app.

- To learn about build settings for a module, see [The Module-level Build File](#).
- To build and run a specific module, see [Select and build a different module](#).

You'll also want to add code and resources to properly support the new device.

CHAPTER 7

SAMPLE OUTPUTS

In most cases, every Android application runs in its own Linux process. This process is created for the application when some of its code needs to be run, and will remain running until it is no longer needed and the system needs to reclaim its memory for use by other applications.

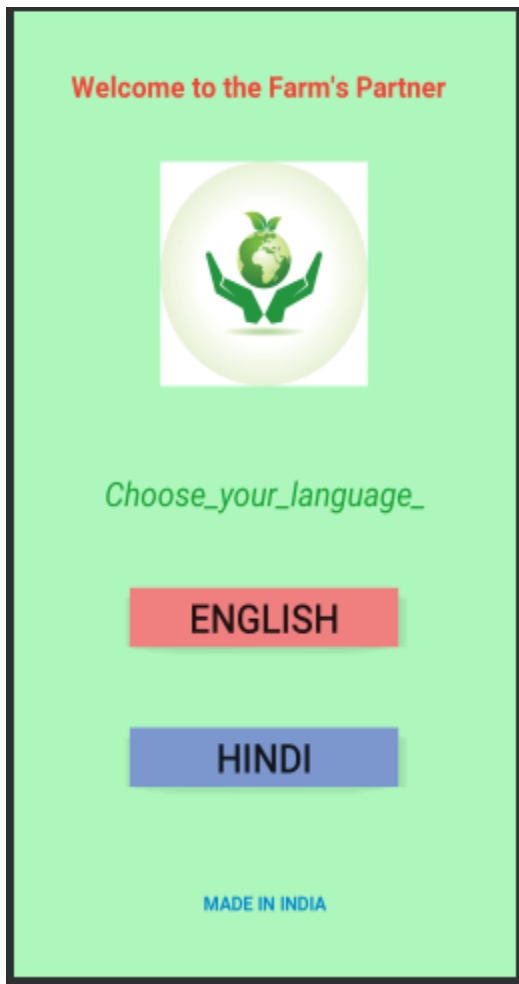


FIG 7.1

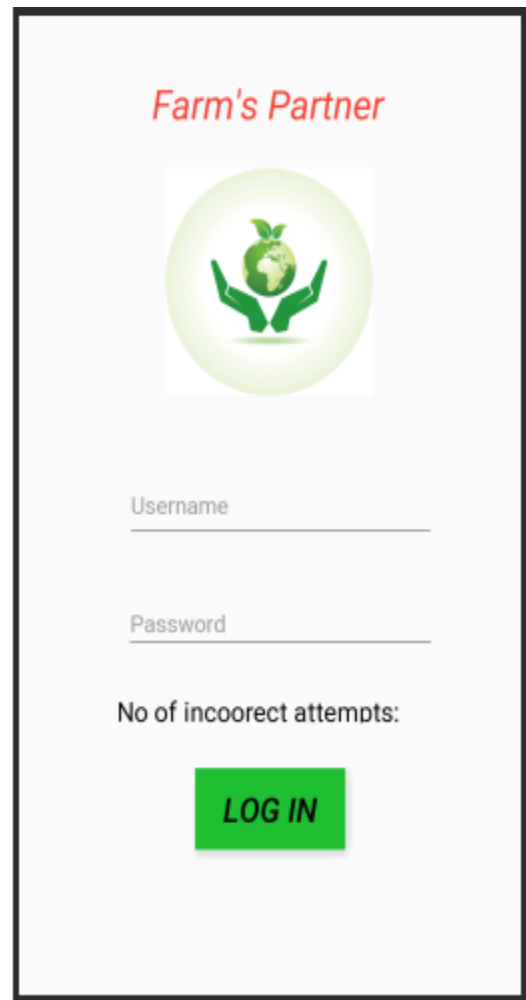


FIG 7.2

An unusual and fundamental feature of Android is that an application process's lifetime is not directly controlled by the application itself. Instead, it is determined by the system through a combination of the parts of the application that the system knows are running, how important these things are to the user, and how much overall memory is available in the system.

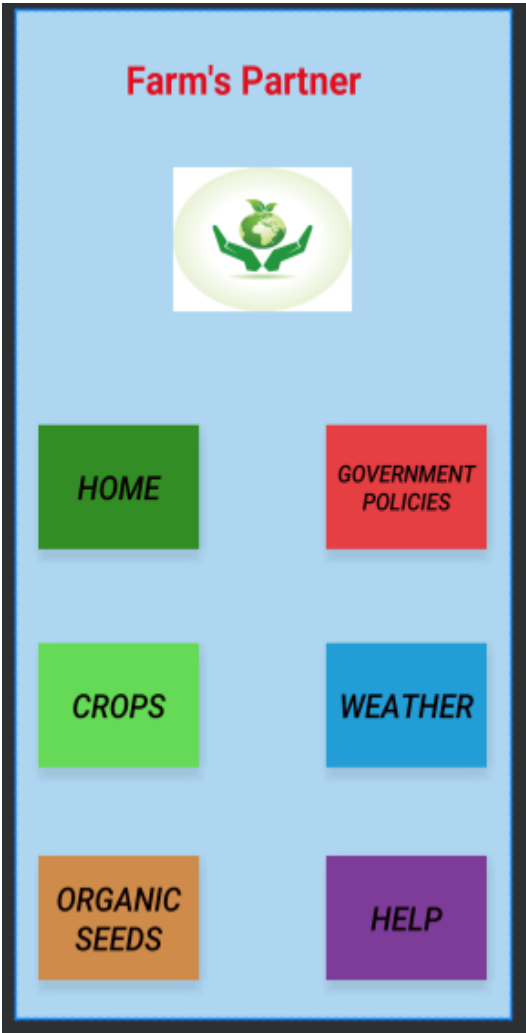


FIG 7.3

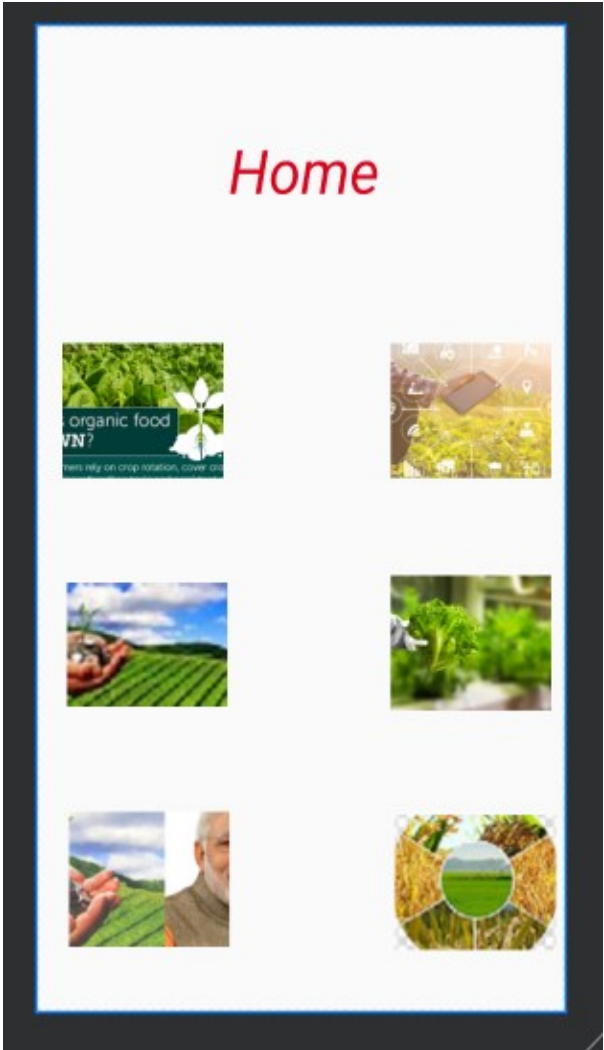


FIG 7.4

The device Home screen is the starting place for most tasks. When a user touches the icon for an app or shortcut in the app launcher (or on the Home screen), that app's task comes to the foreground. If no task exists for the app (the app has not been used recently), then a new task is created and the main activity for that app opens as the root activity in the stack



FIG 7.5



FIG 7.6

CHAPTER 8

CONCLUSION AND FUTURE SCOPE

8.1 CONCLUSION

Agriculture, the backbone of India, provides principal means of livelihood for about two third of the Indian population. 70 percent of the world's rural poor population depends on agriculture as the main source of income and employment .It is one of the largest contributors to the Gross Domestic Product (GDP) in India. Providing right agricultural information to farmers at a right time is a challenge and a key tool to the agriculturalist. The traditional ways of providing information to the farmers has become inoculated, untimed and has a one way communication. Many nations are coming up with the innovative ideas for the same. With a new era of Digital India Movement the introduction of the new technologies have connected people around the world and changed the way people conduct business. Mobile device (Smart phone) has become the need of every common man and is reached in the hands of rich and poor. There are enormous application development to serve the large number of operation .There exit an App for every small support and help in every field and business. Similarly the tech companies and the Government are taking effort to develop many mobile applications for farmers in India to help farmers in different ways and provide assistance through mobile application in different field of agriculture. There are

various applications available in the field of agriculture across different mobile platform (App Store and Google Play Store).

Farming is the Prime Occupation in India in spite of this, today the people involved in farming belongs to the lower class and is in deep poverty. The Advanced techniques and the Automated machines which are leading the world to new heights, is been lagging when it is concerned to farming, either the lack of awareness of the advanced facilities or the unavailability leads to the poverty in farming.

Android apps for the farmers is a kind of revolution to the agricultural field. These applications are an emerging field that focuses on enhancement of agricultural as well as rural development through improved information and communication process. The idea is to provide various information related to the farming methods and crops. Apart from these services, proposal of some new features to this app by implementing AI features to the apps. This includes chat processes, voice processes as well as AI suggestions as per the entered location of the user. We are living in a digital environment where everything is available online. So, in the field of agriculture as well, things should be digitalized.

8.2 FUTURE SCOPE

The mobile application provide the farmers to avail the data on weather condition, market rate and trends, insurance of crops, agricultural news, financial services, price of commodities, Geospatial application etc. The Boston Group Study says that about 315 million rural Indians will get Internet connection by 2020 as against 120 million today. As the Internet connections are getting more popular and there is increase of smartphone penetration in rural areas too, the farmers are able to research on the farming solutions. With massive growth in the mobile development trends the upcoming apps to be integrated with the new technologies like Augmented reality, virtual reality, artificial intelligence and chatbots into their app will surely have new horizon to the mobile world .

Nowadays, it is almost common knowledge that smart phones and apps have the potential to help farmers increase their yields and revenue and Mobile services such as voice, SMS, and simple data are perfect for areas where infrastructure and financial limitations prevent broadband Internet .

According to the study, it is noticed that Phone (Calling), Message, Calculator, Calendar, Notepad General Mobile App were frequently used by the farmers. It was brought to the notice that farmer also make use of social network App like Facebook, WhatsApp, Instagram and Hike. Some of the farmers also made use of banking app like Paytm, Union bank App for the banking transaction where some

also made use of video streaming app like YouTube. The analysis showed that very less farmers were not using phone at all.

India is a nation where farmland mostly depends on rain and where farms provide livelihood to most of the population. By mid to end June, the monsoon usually covers most of India, bringing down the mercury, soaking the ground and swelling the rivers that are the lifeline of Indian agriculture. Most of the farmers believe that their yield is dependent on the god's mercy until they bring their produce to their home. What if rain god bullies farmers at the time of harvesting? In India many occult rituals are being performed to please the rain god. The major challenge is to develop technology which can defy all the myth which persist among Indian farmers and move towards new horizon. Farming methodology varies from one geographical location to the other. It is difficult to have unified approach for building mobile application which will serve purpose of Indian farmers. Farming is a more timecritical and information-intense business hence for better productivity farmer need mobile application which can help them to make informed decision. Distance and time can be eliminated to benefit Indian farmers in all aspects at affordable prices. To do this Indian farmer needs realistic mobile applications which will offer tailor made solution to meet their actual needs. Mobile phone subscription has increased exponentially in India now it is high time to think much ahead. Smart phones and tablets are available at affordable price often available

second hand which makes it cheaper than alternatives. Farmers can use its capabilities for accessing and dissemination of information and knowledge which will reduce the cost of production and transaction facilitating trade, outsourcing business support. Mobile application can be developed for supporting planting decision to selling their produce at the wholesale market which will be game changer in small holder agriculture. Farmers can also use rich user interface smart phone to control automated farming tools. Such application will play the vital role in value chain of Indian Agriculture. The objective is to do field review how mobile application can unfold future agriculture practice in typical Indian village boundaries.

CHAPTER 9

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