

ST. XAVIER'S COLLEGE

Affiliated to Tribhuvan University

Maitighar, Kathmandu



FINAL YEAR INTERNSHIP PROJECT REPORT

ON

**KrishiGhar- An Initiation of soil study and crop insurance for better
agricultural practices [CSC-452]**

AT

ICT in Agriculture Nepal(ICTAN)

**For the partial fulfillment of Bachelor's Degree of Computer Science and
Information Technology**

Under the supervision of

**Er. Rajan Karmacharya
Lecturer/Supervisor
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**Submitted by
Hemanchal Joshi (2688/070)**

**Submitted to
ST. XAVIER'S COLLEGE
Department of Computer Science
Maitighar, Kathmandu, Nepal
February, 2017**

A Final Year Internship Project Report
on
KrishiGhar- An Initiation of soil study and crop insurance for better
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AT
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[CSC - 452]

An Internship report submitted in partial fulfillment of the requirement for the degree of Bachelor of Science in Computer Science and Information Technology awarded by Tribhuvan University.

Submitted by

Hemanchal Joshi (T.U. Exam Roll No. 2688/070)

Submitted to:

ST. XAVIER'S COLLEGE
Department of Computer Science
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CERTIFICATE OF APPROVAL

The undersigned certify that they have read and recommended to the Department of Computer Science for acceptance, an Internship Project Proposal entitled **“KrishiGhar- An Initiation of soil study and crop insurance for better agricultural practices”** submitted by **Hemanchal Joshi (2688/070)** for the partial fulfillment of the requirement for the degree of Bachelor of Science in Computer Science and Information Technology awarded by Tribhuvan University.

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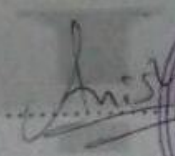
Date: 23-12-2017

Subject: To whom it may concern

This is to certify to Ms. Hemanchal Joshi, a BSc.CSIT student of St. Xavier's College, Maitighar has successfully completed internship program at ICT in Agriculture Nepal. She was designated for Android application development as well as front-end designing. During the internship period, she has shown promising skills and problem-solving techniques in her field of interest along with the great communication skills.

In the past three months (August-November, 2017) of her internship program, she has gradually polished her skills after working on various minor projects.

I wish her best in her future endeavors.


Anish Shrestha

Project Manager (9849636757)

ICT in Agriculture Nepal (ICTAN)



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I would also like to thank my Project supervisor **Er. Rajan Karmacharya**, lecturer, Department of Computer Science, St. Xavier's College for giving us valuable guidelines and suggestions to complete this project. I would like to express my sincere thanks to our teachers **Mr. Jitendra Manandhar, Mr. Bal Krishna Subedi, Er. Nitin Malla, Er. Sansar Jung Dewan, Er. Sanjay Kumar Yadav, Er. Anil Kumar Sah, Er. Saugat Sigdel and Mr. Ganesh Yogi**, Lecturers, Department of Computer Science, St. Xavier's College along with all the faculty members of the Department of CSIT for guiding us to achieve our ultimate goal.

I am also thankful to **Mr. Hridaya Kadel, founder of ICT in Agriculture(ICTAN)** for providing me a golden opportunity for completing my internship at their innovative organization. Similarly, I would like to express my sincere gratitude towards **Mr. Ganesh Khatri, CTO at ICTAN** and **Mr. Anish Shrestha, project manager at ICTAN** for their constant support and guidance during my internship. Lastly, I would like to express our sincere thanks to all our friends and others who helped me directly or indirectly during this learning period.

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ABSTRACT

As a project for encouraging plantation in urban areas as well as enhancing the overall agricultural practices, this is an initiation to provide adequate information regarding soil distribution and productivity of the plants with reference to the distribution. As plantation and farming requires the crops to harmonize with the soil they are planted in, soil study is an important mechanism in agriculture. Similarly, the security of the crops from any unpleasant happenings is also a matter of concern that needs to be focused upon.

This project is an information provider that gives the user overall information on the soil they are living in and the crops that can be grown there. Along with this, the PH state of the soil can also be found which provides the information on intake water and nutrients by the plants of a particular place. The feasibility and achievement of better yield of the crops or even a flower is possible with the soil study and its distribution. This project is a methodology for study soil as well as a guidance for crop insurance. Ensuring the security of their crops, farmers can be relieved from their fear of any human or natural calamities that can hamper their productivity. Working side by side crop insurance and soil study both contribute positively for better agricultural practices.

Keywords: e-Agriculture, ICT-based Advisory Services, Mobile Platform, Information Dissemination

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LIST OF ABBREVIATION

BSc. CSIT	Bachelors in Science, Computer Science and Information Technology
CTO	Chief Technical Officer
TU	Tribhuvan University
UML	Unified Modeling Language
DFD	Data Flow Diagram
ICTAN	ICT in Agriculture Nepal
DOA	Department of Agriculture
ICT	Information and Communication Technology
QA	Quality Assurance
API	Application Program Interface
IDE	Integrated Development Environment
PH	Potential of Hydrogen

CHAPTER 1: INTRODUCTION

1.1 Introduction to Internship

The internship program is designed to provide students engaged in a field experience with an opportunity to share their insights, to explore the links between students' academic preparation and their field work, and to assist participants in developing and carrying out the major research project which will serve to culminate their internship experience. Internships are individualized and tailored to the needs and interests of each student in the program. As part of the internship experience, students are expected to take an active role in finding an appropriate internship for themselves [1].

The internship is done as a partial fulfillment of requirements of the Bachelor's degree in Computer Science and Information Technology under Tribhuvan University. The internship is assigned six credit hours (minimum of ten weeks or 180 hours long) as a part of the course requirement. An internship is a great way to develop specific skills and knowledge, as well as make contacts and build confidence. More and more, employers assess the skills and abilities of prospective employees by evaluating their previous experiences.

This internship as per the requirement of the TU for the BSc. CSIT not only fulfils that very requirement but has also developed the author personally by getting oneself acquainted with how the software industry regulates. This program has enhanced the skill and enthusiasms of the students as they get knowledge of the company environments and to learn different aspects of working mechanism that prevail in the organizations. Every subject learned during the BSc.CSIT course have been well implemented during this internship program. During this internship period student were introduced to the organizational structure, professional world, ISO Stands of the organization [2].

1.2 Background

The android market in Nepal is experiencing steady growth. Experts and professionals involved in this business are taking this growth as a positive aspect of developing awareness related to information technology in the country. Government of Nepal recently showed that the computer penetration in Nepal is around 3 per cent among which 20 per cent uses internet. With the rise of mobile applications, the internet users in mobile have reached up to 67 per cent [3].

Similarly, use of ICT in agriculture is now increasing along with the increasing knowledge of using technology in various fields. However, proper utilization regarding soil resources and crop insurance is yet to be done in a digitized manner.

1.3 Objective

1.3.1 Internship Objective

The report is prepared for the purpose of acquainting the achievement of the author during internship period and the general functions of the company, ICTAN.

The broad objectives of this internship are as follows:

- To build vital career-related skills such as organizational, written and interpersonal communication skills.
- To provide students the opportunity to test their interest in a particular career before permanent commitments are made.
- To prepared to enter into full-time employment in their area of specialization upon graduation.
- To provide an in-depth knowledge of the formal functional activities of a participating organization.

- To explore and create work experiences with respect to the field of interests.

1.3.2 Task based objective

The use of technology to observe soil study and its relationship with agriculture is one of the innovative ideas for improvement in that sector. However, the major objectives of this project are:

- Digitize learning by making a mobile application for soil study and learning
- To help farmers decide the suitable crops for their landform to attain highest yield
- Help deciding farmers to learn about crop insurance plan
- Learn about soil composition and manure evaluation for a particular land
- Create a pathway for digitizing all the available soil nutrition data which can in future be modified to work more efficiently.

1.4 Brief Introduction of Industry

The software market in Nepal is experiencing steady growth. Experts and professionals involved in this business are taking this growth as a positive aspect of developing awareness related to information technology in the country.

Computer Science is the study of principles and practices that underpin an understanding and modeling of computation, and of their application in the development of computer systems. At its heart lies the notion of computational thinking: a mode of thought that goes well beyond software and hardware, and that provides a framework within which to reason about systems and problems. This mode of thinking is supported and complemented by a substantial body of theoretical and practical knowledge, and by a set of powerful techniques for analyzing, modelling and solving problems [4].

The software industry expanded in the early 1960s, almost immediately after computers were first sold in mass-produced quantities. Universities, government, and business customers created a demand for software. The computer/hardware makers started bundling operating systems, systems software and programming environments with their machines.

1.5 Brief Introduction of Organization

ICTAN (ICT in Agriculture Nepal) is a non-profit organization that works for the betterment of the agricultural sectors of Nepal by blending the use of technology in the workflow of the agricultural activities. Its major initiative Krishighar which is an application that helps the farmers in agricultural as well as horticulture activities all over Nepal reflects its overall contribution to the agriculture sector of Nepal. Formed by young entrepreneurs, ICTAN has done various projects and works for use of technology in agriculture with the coordination of the Government of Nepal, various ministries and has achieved various milestones in the development of agriculture sector.

1.5.1 Mission

The main objective of ICTAN is to use ICT in the field of agriculture in Nepal and make a positive impact in the process of uplifting the working status of agriculture dependent individuals.

1.5.2 Vision

The organization has aimed to increase the use of technology in the field of agriculture in near future. The organization works in the government level so as to improvise the root of agricultural development.

1.5.3 Objectives

- To blend ICT with agricultural activities.
- To improvise the agriculture and other related activities with the help of IoT/ICT.
- To develop web application software as per the governmental organization's demand
- To provide training to use the developed application.
- To deliver the knowledge of IT Technologies to the personnel.
- To provide excellent customer services.
- To research for the best technologies in the field of agriculture.

1.5.4 Services

- Website development
- Application development(Android/Cross-platform)
- Mobile Apps Quality Assurance(QA)
- Awareness programs
- ICT trainings

1.5.5 Major Projects

- KrishiGhar(Mobile app)
- Website for DOA
- EFLGP software

1.5.6 Organization Rationale

The strength of the organization is the team of three striving to achieve new height of success in the field of agriculture using the knowledge they possess. Build on young and motivated pillars the organization is consistent on contributing whatever it has got for the betterment of agriculture from the technical point of view.

1.5.7 Organization Hierarchy

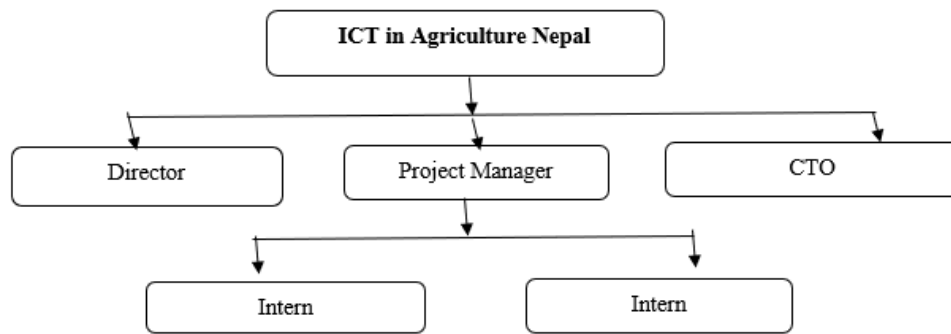


Figure 1: Structure of the organization

As the non-profit organization is run by three motivated batchmates all the positions workers work on the equal level. There is no working under for the main personalities of the organization. Data flow starts from Director to Project manager and is supervised by CTO. All the interns work under all the seniors from time to time. Although the project manager is mostly responsible for intern and their activities, other senior members also participate frequently.

CHAPTER 2: ANALYSIS OF ACTIVITY DONE

2.1 Internship Placement Details

2.1.1 Organization Selection

While selecting a place to enhance our knowledge, it is very important to select organization that fulfills our objectives. It is necessary to select organization where there is learning environment because as an intern our first motive is to learn how the works are carried out in the real field. The four-year degree of BSc. CSIT allows us to attain knowledge on various aspects of Information Technology. At the same time the internship is one of the major highlight of the program to expose the students to the professional world. Among the various criteria and sectors provided to us in internship prerequisite statement, software development company was chosen. Various organizations were shortlisted and approached out of which the organization with the best lucrative offer and environment was selected. A non-profit organization ICT in Agriculture Nepal selected me as their intern so that they could guide me to further enhance my working skills to use ICT in Agriculture. The company helped me gain wide experience by involving me in their various minor and major projects.

2.1.2 Placement

During the internship period, the author was provided with workspace at the organization, not only treated as a trainee staff but also got an opportunity to develop android based applications that were mostly in-house projects. The author was busy with not only coding but overall planning of the project, from proposal writing, planning to prototype presentation preparation for the project. During those period, the author was given access to everything in the organization from which the author could

polish their skills. The author was frequently taken to meetings, seminars so that the vision of the intern period extended fruitfully.

2.1.3 Duration

Start Date	20 August, 2017
End Date	27 November, 2017
Duration	Three months and above
Position	Android app Development Trainee
Supervisor	Mr. Hridaya Kandel
Office Hour	11 AM- 5 PM
Working Days	Sunday-Friday

Table 1: Duration Table

2.2 Literature Review

As the altitude of Nepal increases from North to south, Nepal is considered to be a country of varying landforms. In such a scenario it is obvious to have a varying soil distribution in our country as the landform varies [5]. In an agricultural based country like Nepal the thorough study of soil, its properties and distribution is a must for better yield and productivity. As the use of technology for research works is increasing on a daily basis, using an application for a medium of learning about the soil you are working upon seems like a smart idea [6]. The use of smartphones for learning about the soil distribution in your area or any area you are interested in can result in an advantageous step in agriculture as well as horticulture [6][7].

Soil is a natural body of minerals and organic matter occurring on the surface of the earth that is the medium for plant growth and having ever-changing properties in response to many physical [8], chemical and biological processes going on over a geological period of time [9]. Various factors such as geology, climate and vegetation types have resulted in variations in soil properties [10]. There is very limited research about soils in Nepal due which the proper use of information technology for soil study is not yet established in Nepal. Various application that act as gateways for not only farmers but commoners who are interested in plantation and farming are introduced which can help them in achieving better learning and increased productivity [11]. Among the developing countries, India has been mostly active regarding the use of information technology in the field of agriculture as it is also based on agriculture to some extent [12]. Various mobile applications like KhetiBadhi, Kishan Subidha etc. are trending and being used by people all over India [13].

There are various research activities for soil study [13], its distribution and properties with respect to which crops are planted and manures, nutrition, fertilizers are used [14]. But in the context of Nepal there are few geological research programs like soil study done in mustang which has no relationship with agriculture and productivity [15]. The initiation of such an application which provides the people with abundant information on the soil they intent to do plantation upon can help improvise the plantation activities to control climate change as well as contribute to uplift the standard of agricultural activities in our nation [16] [17].

2.2.1 Crop Insurance and Soil texture study

Similarly crop Insurance is an important subject of concern not only from geological point of view but also from agricultural point of view [18]. During times of disasters, farmers should be able to protect their hard work to some extent because of which an introduction to crop insurance is necessary [19]. Talking about soil distribution, according to the content of nutrients in the soil obtained by chemical analysis and the

requirements of the culture for a certain yield, it is easier to determine the amount of required fertilizer to achieve high and quality yields [20]. In determining the amount of nutrients should be noted that at the best condition in the soil plants can adopt up to 80% of nitrogen, 40% of phosphorus, 60% of potassium and 40% of magnesium [21]. High quality soil analysis is basis of planning of fertilizing, and thus the quality of the entire production cycle, which results in a high quality and yield and better farm management [22].

There are various recent developments in research exploring the interface of plant biology and soil sciences with the Plant and Soil app [23]. Proper study of the soil and its analysis ends on exploring the interface of plant biology and soil sciences, including both fundamental and applied aspects of mineral nutrition, plant-water relations [24]. While soil distribution varies the nutrients intake, the fertility, the productivity and the types of crops and plants that flourish in that soil, information regarding it can enhance the plantation activities in any region [25]. If a person is aware of the soil type they find around it is easy for them to engage in plantation, gardening or farming activities according to the digitized data and guidance they receive from the application [26]. In this way the use of an informative mobile application can contribute not only in gardening and plantation activities but also in agricultural betterment [27]. Various countries have initiated these activities which is being used and is generating more research activities and projects to digitize the field of agriculture and horticulture [28]. In spite of the various other initiations on crop security like insurance on the banana farming [29], there is no solid ground that ensures agricultural security from terms of government.

The increase in mobile apps catering to the agriculture sector will, in the long run, not only increase bottom lines, help people in small scale gardening and encourage plantation activities but help the rural masses bridge the digital divide and use technology to grow their agriculture-based businesses [30].

2.3 Specific Problem Analysis

In spite of various agriculture related applications, the productivity is still not as efficient as it should be. Although ICT is being used in the crops department currently, there is no proper use of technology for soil study as people do not emphasize on the importance on soil for productivity. When farmers plant a crop, they are unaware of the distribution of soil and its composition which results in better yield. As people face all these circumstances an application which help them inform about the land distribution, its nutrition and feasibility of crops can initiate the use of technology for soil study.

2.4 Management Strategy

2.4.1 Time Management Strategy

Time management is the act or process of planning and exercising conscious control over the amount of time spent on specific activities, especially to increase effectiveness, efficiency or productivity.

2.4.2 Cost Management Strategy

By implementing a strategic cost management program, project can not only lower their costs but also create a strategic competitive advantage. Applications of this type of management program include creating a strategic plan, setting priorities in operations and ensuring it is using limited resources appropriately.

The Android Application Development tool Android Studio are the free versions hence there was no issue related to the cost factor. However, some modules were available which would require the payment of some amount which were avoided.

2.4.3 Data Collection Strategy

The main data that is required for the application is the forecast data and provide information. These data are all provided by the experiments and data collected by the governmental organizations that are situated all over Nepal.

2.5 Project Schedule

2.5.1 Time Schedule

Time Schedule				
Task Id	Task	Start Date	End Date	Duration
1	Preliminary Work			
1.1	Planning for the project	9/21/2017	9/25/2017	5
1.2	Analysis on the topics	9/26/2017	9/30/2017	5
1.3	Meeting with Supervisor	9/30/2017	10/06/2017	6
1.4	Background reading	10/07/2017	10/13/2017	7
1.5	Preparation of project proposal	10/13/2017	10/18/2017	5
1.6	Preparing the Gantt Chart and Project Schedule	10/19/2017	10/20/2017	2
1.7	Approval from Supervisor	10/21/2017	10/21/2017	1
1.8	Milestone 1			
2	Research Work			
2.1	Research on Agriculture in Nepal	10/17/2017	10/18/2017	2
2.2	Research on Status of Soil and Soil distribution	10/19/2017	10/20/2017	2
2.3	Research on Cross-platform Application	10/21/2017	10/21/2017	1
2.4	Field Visit and data collection	10/22/2017	10/24/2017	3
2.5	Research to prepare Best Design	10/25/2017	10/26/2017	2
2.7	Milestone 2			
3	Design			
3.1	Application Design			
3.1.1	Data Flow Diagram	10/27/2017	10/27/2017	1
3.1.2	Use Case Diagram	10/28/2017	10/28/2017	1

3.1.3	Class Diagram	10/29/2017	10/29/2017	1
3.1.4	Flow Chart Diagram	10/30/2017	10/31/2017	2
3.1.5	Design User Interfaces	11/1/2017	11/02/2017	2
3.2	Database Design			
3.2.1	ER-Diagram	11/03/2017	11/04/2017	2
3.2.2	Schema Diagram	11/05/2017	11/07/2017	3
3.3	Milestone 4			
4	Implementation			
4.1	Program coding in Ionic/Android/JS	11/08/2017	11/27/2017	19
4.2	Database Design	11/08/2017	11/19/2017	11
4.3	Milestone 5			
5	Testing			
5.1	Unit Testing	11/22/2017	11/22/2017	1
5.2	System Testing	11/23/2017	11/23/2017	1
5.3	Alpha Testing	11/24/2017	11/24/2017	1
5.4	Validation Testing	11/25/2017	11/26/2017	2
5.5	Milestone 6			
6	Dissertation			
6.1	Draft Report Writing	11/27/2017	12/01/2017	4
6.2	Final Report Writing	12/02/2017	12/03/2017	2
6.3	Report Evaluation and Conclusion	12/04/2017	12/06/2017	3
6.4	Submission of Final draft copy Report	12/07/2017	12/07/2017	1
6.5	Corrections for Final draft copy Report	12/08/2017	12/10/2017	3
7	Final Phase			
7.1	Final Documentation Printing and Binding	12/11/2017	12/11/2017	1
7.2	Document Submission to College	12/12/2017	12/12/2017	1

Table 2: Time Schedule

2.5.2 Gantt Chart

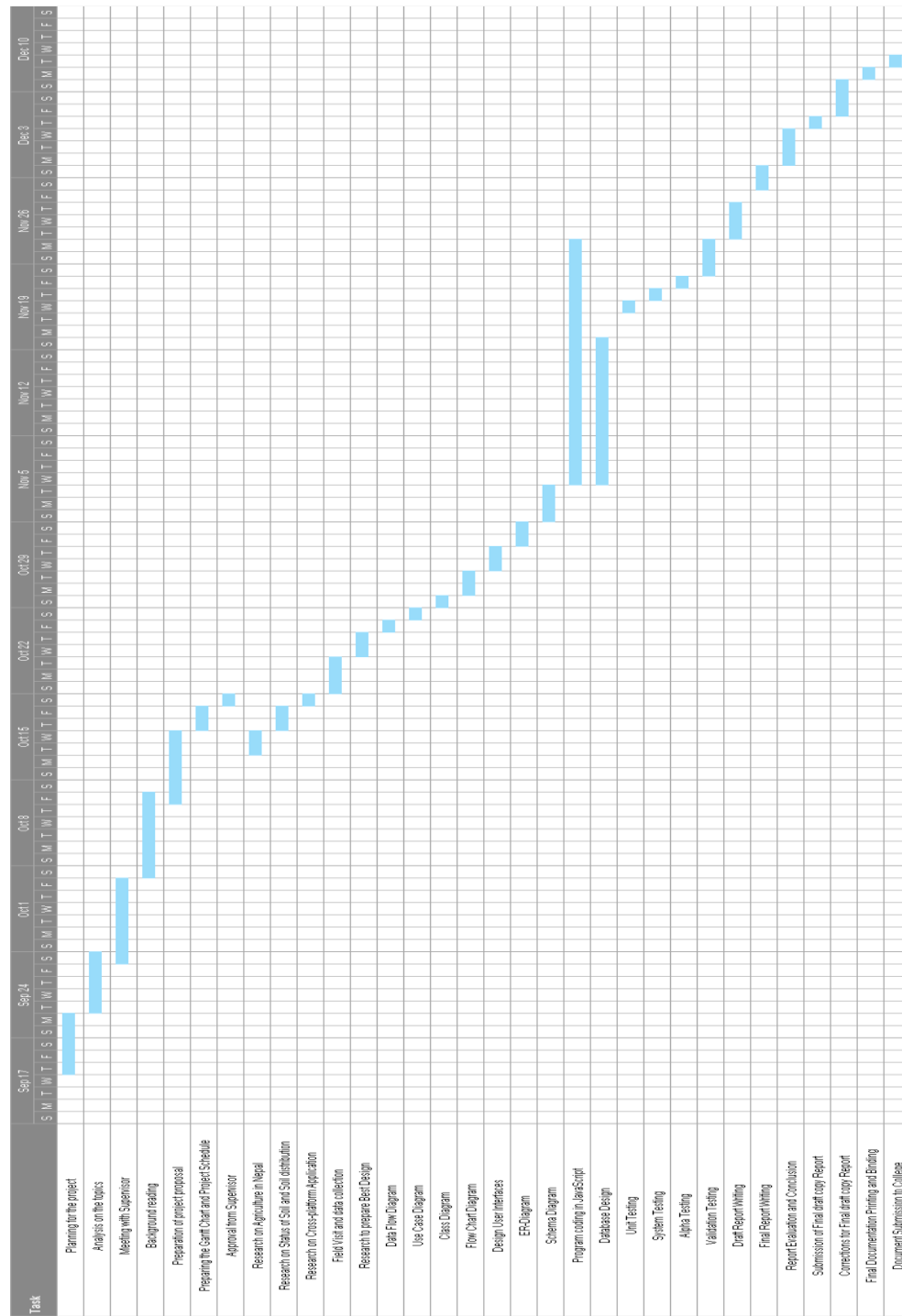


Figure 2: Gantt Chart

CHAPTER 3: SOLUTION DESIGN

The chapter Solution design consists of how the project was managed in the aspects of designing and planning. It also explains about the requirements of the project from hardware used to the software used. It also consists the topics explaining the uses and importance of different tools being used while developing an android application.

3.1 Project Management Plan

Project management plan is a formal, approved document used to guide both project execution and project control. The primary uses of the project plan are to document planning assumptions and decisions, facilitate communication among stakeholders, and document approved scope, cost, and schedule baselines. To complete the internship project the project management plan provides a guideline about what to do, how to do and when to do to obtain the objectives.

3.1.1 System Analysis

Despite the fact that there are a number of weather applications that have been already developed, this application uses the API that has been developed by the organization itself.

3.1.2 System Design

The requirements collected were used to design the application. The application design maybe platform-specific depending upon availability and use of technology. The ER diagram assisted in creation of schema diagram, low level design and high-level design of the system. High level design was developed by analysis organizations process from top down approach. According to the requirement, the high-level design was created first then low-level design and then the data flow diagram to design the system in detail.

The design of the project was completely based on the requirements of the project. The design started with database design and interface design then the coding took place.

3.1.2.1 Context Diagram

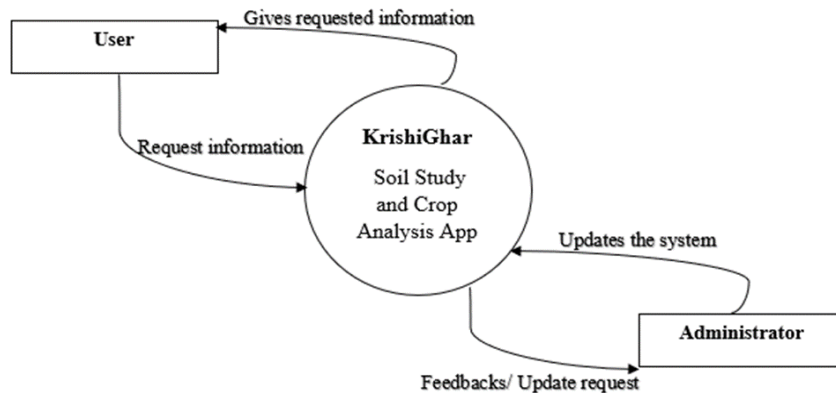


Figure 3: Context Diagram

There are two major entities in this information providing application. The user who uses the application looks for the useful data and information that they want to use in real time. In response to that either the system sends the data or request the administration to add the data as a feedback from the user. The administrator thoroughly keeps on adding data as per the government provides data as well as when feedback is received from the user. This is how the application works and what context diagram actually shows.

3.1.2.2 Data Flow Diagram(DFD)

DFD is a data flow design. It consists of different levels of data flow design.

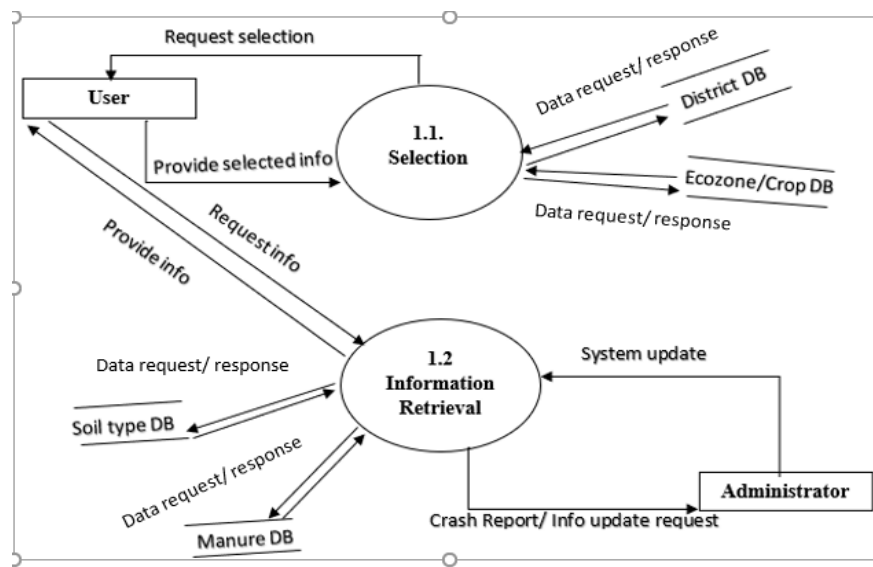


Figure 4: Data Flow Diagram

The data flows in a form of request and response in the overall application as it is the information providing application. After a user selects the desired data part, the information regarding the same data part is retrieved by the user.

3.1.2.3 ER diagram

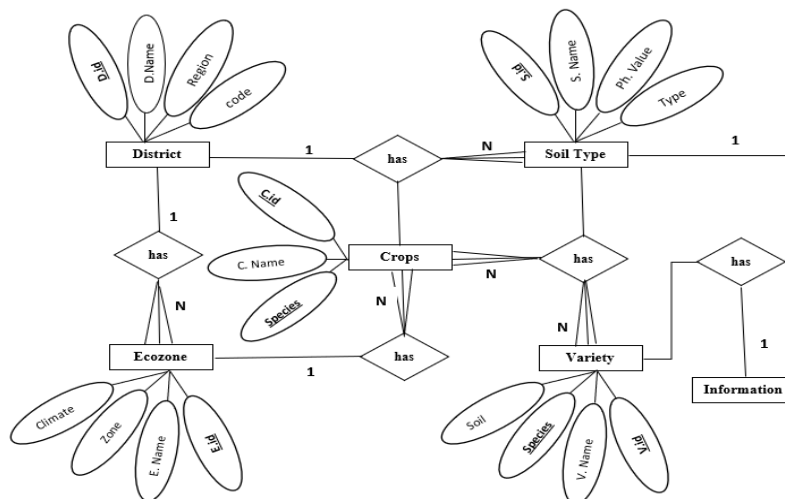


Figure 5: ER diagram for the application

The various entities of the system that make up the database is defined in the entity relationship diagram. As the user chooses a data among various data available the relationship is made on the similar basis. All the crops information is displayed accordingly.

3.1.2.4 Use case diagram

A use case diagram is a type of behavioral diagram defined by the Unified Modeling Language (UML)

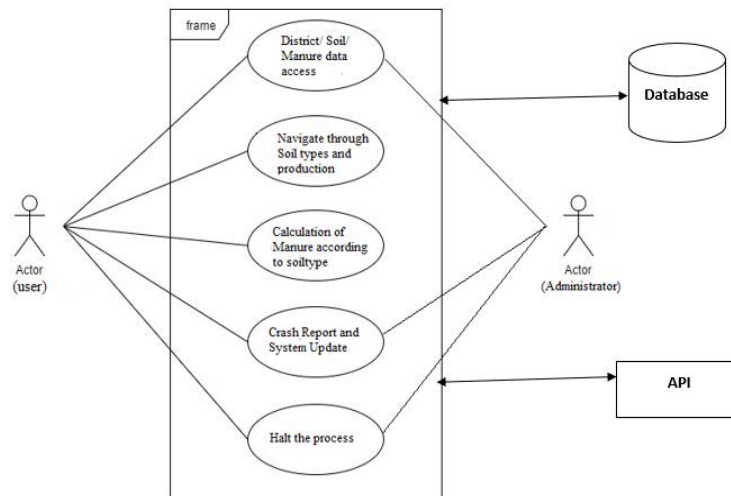


Figure 6: Use case diagram for the application

The two actors of the system are User and Administrator and both of them act along with the API and the database used to work the system. Both actors are driven towards their goal separately with the use of processes alongside.

3.2 Technical Requirements

3.2.1 Hardware Requirements

- Personal Computer/ Laptop
- Android Mobile Device

3.2.2 Software Requirements

- Platform: Windows
- Integrated Development Environment (IDE): Android Studio with SDK
- Programming Language: Java, PHP/MYSQL(db)

CHAPTER 4: IMPLEMENTATION STRATEGIES

4.1 Testing Strategies

The reason behind testing is to ensure the system is fully functioning without any bugs and errors. The testing can be performed at different levels of system development phase [33]. Every new ‘activity’ developed would first undergo unit testing and on success integrating testing would be done. While developing this application, incremental prototyping model was used for each activity. The mostly used testing strategy used in the project is as follows

4.1.1 Unit testing:

First up all each module was divided into smaller modules known as units. The developed units were tested individually to ensure it meets its intended requirements.

4.1.2 Integration testing:

When integrating the developed component with previous other component of the system new properties may emerge. Each of the elements was developed as a module.

4.1.3 System testing:

Integrating of different ‘activities’ comprise a system. Once all the required ‘activities’ were developed and integrated, the system was tested to ensure that the goal had been attained and rectification was done as per the requirement.

4.1.4 Android compatibility test:

After the system was tested, the system was run on android mobile phone to ensure that the system runs well and correctly. The size of the images, buttons and texts were also corrected during the compatibility test.

4.1.5 Acceptance testing:

For acceptance of testing, the developed system had been executed by showing the finished android application to the supervisor and other employees from which their feedback was collected, studied and analyzed carefully.

4.2 Hardware implementation

The developed android application software was first implemented on an android mobile phone which was Huawei YII and other mobile phones as well. The size of the text, images, margins and buttons were analyzed and studied on different mobile phone. In case of any problem with the layout was found, the problem was solved.

4.3 Software implementation

For software implementation, the android development tools were needed. The coding was done from Android Studio. The developed application was turned into an 'apk' file and sent through email to the android mobile phone. After installing the 'apk' file, the application was checked if they would work well as per the requirement and specification.

CHAPTER 5: RESULT ANALYSIS

5.1 Result

The android application that can provide the soil distribution information, Manure analysis and Crop insurance information was successfully prototyped by the author. Some of the features the author has developed are as follows:

- Simple application and very easy to use
- Provides the local data soil Ph and plants feasible for some districts initially to the users.
- Information related to those selected location are only shown to the user.
- Allows the use of application to train agriculture officers to check manure distribution as they input land nutrition value.
- Uses the Krishighar API for market value analysis

The final result of the application was developed to be:



Figure 7: Home fragment of the application

This project has potential to digitize all the soil related data which can help the development of the soil sector of Nepal and link it with the latest technology. Even the farmers who spent most of the time in fields fail to realize how soil alters productivity to some extent as they solely depend on their practical experience. Similarly, this project tends to encourage plantation activities as people will have quick knowledge about the nutrition value and the productivity of the soil.



Figure 8: Crop Insurance fragment of the application

Crop insurance methodologies are initiated by the project among which for now the department of agriculture has proposed to initiate insurance for 50 crops. Gradually the data will be added onto the application and the Premium and the reports can be calculated alongside.

5.2 Critical Analysis

The viability of the project is determined by various properties and limited number of characteristics that directly or indirectly simulate the project. Such Critical Success factors need to be taken into consideration in order to obtain an efficient project. Nepal's economic future is inextricably linked to the health of its agriculture sector. As

Nepal is a developing country, the share of agriculture in total gross domestic product (GDP) has been declining over the years, it still accounts for one-third of GDP. However, stagnation in the agriculture sector is one reason behind a rural poverty rate that is over three times that of urban areas, 35 percent compared to 10 percent. According to various research conducted in the field of agriculture acceptability of public, government funding, defined legislation, usage of the available resources recklessly, minimal use of technology in agriculture are the major factors that have to be worked upon so as to obtain success on implementation of ICT in agriculture sector.

While evaluating all these factors and working upon them the clear objective in mind is to be able to work efficiently in the field using minimal resources, knowledge of better production and enhancement of agricultural activities using technology. Frequent collection of views regarding the barriers and hindrance that people working in the related field are facing can provide us adequate ideas for problem solving. Access, efficiency and affordability of agricultural information continue to be a major impediment for raising agricultural productivity among smallholders. Recently ICT has provided a possible pathway to distribute information in a wide range.

In context of Nepal, different practices are carried out already in field of Agriculture using ICT. There are many other organizations that have been providing the information to the farmers through various uses of ICT tools such as radio, TV, Mobile etc. but either there are places where there is no hint of technology or the practices are not either carried continuously or effectively. The main reason behind this is the geographical structure of the country, lack of education and ICT either not reachable or not affordable. Global economic liberalization and the country's admission to the World Trade Organization raises new challenges but also opportunities. The subsidies and other support provided to Nepal's farmers and agro-entrepreneurs on either side of the open border with its southern neighbor determine their competitiveness in the cross-border markets. This has created pressure on national agricultural research system to develop cost effective technologies.

After doing all the research on the historical and present scenarios of the ICT implementation in agriculture in the context of Nepal as well as the world, it was concluded that the farmers in Nepal are not being able to mobilize the available resources like in foreign Nations which is the main reason why Nepal is falling backwards in the field of Agriculture in spite of being rich in resources (i.e. Land, Soil and Water). The only difference observed was there was optimization of the resources in the foreign agricultural methods by the use of technology which improvised their productivity as well. Farmers are unaware of the soil textures, its relationship with plant distribution and productivity due to which they end up using available resources recklessly. Similarly, people in Urban areas also tend to have lost interest in plantation activities due to their busy schedule and are forgetting the importance of plants for human survival. Similarly, the farmers are unaware of the idea of securing their agricultural property from the natural calamities using insurance.

To solve these problems the Agriculture center had planned to introduce the concept of crop insurance in Nepal, that too in a digitized informative manner. Krishighar is an existing informative application that was desired to be modified on the basis of soil information as well as additional feature called as the insurance. The collection of manual data from various experiments and research were collected for digitization process. The data collection regarding research on the soil Ph and distribution was done manually in 33 districts of Nepal. Rest of the district are yet on the verge of researching as it is a complex and lengthy process. Similarly, crops are diverse and have numerous species because of which only limited amount of crop information was input due to limited time period. The project is yet on the verse of completion and will be finished along with the completion of soil research all over Nepal. As crop insurance is also a new concept only 50-51 types of crops are to be insured initially and the information regarding these crops are to be digitized initially. The project is just digitizing the accessible information in a learning and informative manner.

From all the research conducted, some of the major advantages of using ICT in agriculture for optimization of resources can be listed out as follows:

- Provides proper knowledge of soil taxonomy, soil distribution, resources required and its capacity that can increase the productivity.
- Security of the crops and land with knowledge on insurance policies.
- Distribution of knowledge of the Ph value of soil and it's feasibility.
- Digitizing all the manually collected data
- Allow the soil technicians to give info on manure use on the basis of soil texture analysis.
- Encourage the people of urban areas for plantation in small scale.

In spite of all these advantages there are certain disadvantages of the project as it is not accessible to farmers without a smartphone. As it is in its initial phase, the project will be modified and completed alongside the completion of manual research as this application is solely responsible for conveying and calculating the requested data and information. The project is to be modified and improvised with further data and information in long run.

Various countries have been researching for implementation soil and productivity and as it is assumed that the demand of food is increasing along with the population growth. In Philippines, "ICT for Development (ICT4D) -Taking Science Knowledge to the Farmers," program was aimed at applying the latest technological innovations in farming that would significantly benefit small holders. Similarly, there are numerous research activities going on in different part of the world for utilizing this era of technology for survival as plants are not only essential for food but for human survival also. With respect to all the research going on this application is a started project for National Agricultural sector to start digitizing the important data and information regarding crops, soil and productivity.

As the application is simple, it has a simple and feasible working mechanism which can be easily operated by people if trained once or twice. The complexities are minimized by taking in account the minimal literate users. The application interface is also easy to use by people who are familiar with android devices as it can be accessed by anyone. The application is informational and data can be further added as per suggestion and research. The application is in its initial state and further data and information are likely to be added alongside the research conducted by the client organization.

CHAPTER 6: CONCLUSION

With this internship opportunity, the author has gained much more insight into the professional environment in IT industry and helped to develop vital skills that go beyond what regular classes and courses cover. During these three months of program, the author got chance to work in an Android development environment.

Within this short span of time, various software development activities have been observed and learnt, which taught the significance of relation, leadership traits and other managerial and software development skills. The greatest things that learned doing internship is how to accomplish the task by doing it in team, how to make best use of internet, how to use different tools to gain efficiency, how to do code so that are in standard according to coming new technologies.

This application is an initiation to digitize the manual research on the soil data as well as to promote crop insurance amongst the farmers which is why it carries a great weightage even though the design is simple. This application carries a lot of room for improvement as agriculture and soil is a vast topic and even in a small land-locked country like ours, it is not possible to research and retrieve data easily due to the landforms. As the governmental organization keep on researching and sending data the application digitizes data and information in every possible way.

The field of agriculture is vast and if ICT is properly used in this field, its prosperity is only certain miles away.

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APPENDIX

APPENDIX A

a) Tab View(Home, Market Value and Weather)

i) Source code

```
public class MainActivity extends AppCompatActivity {

    private TabLayout tabLayout;
    private ViewPager viewPager;
    private MainViewPagerAdapter viewPagerAdapter;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        setUpTabLayout();

    }

    private void setUpTabLayout() {
        tabLayout = (TabLayout) findViewById(R.id.tab_layout);
        tabLayout.addTab(tabLayout.newTab().setText("Home"));
        tabLayout.addTab(tabLayout.newTab().setText("Market Value"));
        tabLayout.addTab(tabLayout.newTab().setText("Weather"));
        final ViewPager viewPager = (ViewPager)
findViewById(R.id.view);
        final MainViewPagerAdapter adapter = new
MainViewPagerAdapter(getSupportFragmentManager(),
tabLayout.getTabCount());
        viewPager.setAdapter(adapter);
        viewPager.addOnPageChangeListener(new
TabLayout.TabLayoutOnPageChangeListener(tabLayout));
        tabLayout.addOnTabSelectedListener(new
TabLayout.OnTabSelectedListener() {
            @Override
            public void onTabSelected(TabLayout.Tab tab) {
                viewPager.setCurrentItem(tab.getPosition());
            }

            @Override
            public void onTabUnselected(TabLayout.Tab tab) {

            }

            @Override
            public void onTabReselected(TabLayout.Tab tab) {

            }
        });
    }
};
```

```

    }

}

```

b) Home Page

i) Source Code

```

<FrameLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context="com.krishighar.fragments.HomeFragment">

    <ScrollView
        android:layout_width="match_parent"
        android:layout_height="match_parent">

        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            android:orientation="vertical">

            <LinearLayout
                android:layout_marginTop="3dp"
                android:layout_width="fill_parent"
                android:layout_height="180dp"
                android:orientation="vertical"
                android:background="#E5E8E8"
            >

            <TextView
                android:layout_width="fill_parent"
                android:layout_height="50dp"
                android:text="कृषिघर सेवामा तपाइको स्वागत छ"
                android:textAlignment="center"
                android:padding="10dp"
                android:textColor="#000"
                android:textSize="20dp"
            />

            <LinearLayout
                android:layout_width="match_parent"
                android:layout_height="wrap_content"
                android:orientation="horizontal">

                <ImageView
                    android:layout_width="180dp"
                    android:layout_height="145dp"
                    android:padding="30dp"
                    android:src="@drawable/crop"
                    android:id="@+id/imageView" />
            </LinearLayout>
        </LinearLayout>
    </ScrollView>
</FrameLayout>

```

```

        <Button
            android:id="@+id/second"
            android:layout_marginTop="30dp"
            android:layout_height="90dp"
            android:layout_width="170dp"
            android:textAlignment="center"
            android:padding="10dp"
            android:background="#28B463"
            android:text="आफ्नो जिल्ला रोज्नुहोस्"
            android:textSize="20dp"
            android:textColor="#fff"
        />
    </LinearLayout>

</LinearLayout>

<LinearLayout
    android:layout_marginTop="5dp"
    android:layout_width="fill_parent"
    android:layout_height="150dp"
    android:orientation="horizontal"
>
    <LinearLayout
        android:layout_marginRight="5dp"
        android:background="#E5E8E8"
        android:layout_width="190dp"
        android:layout_height="150dp"
        android:orientation="vertical">

        <ImageView
            android:id="@+id/premium"
            android:layout_width="wrap_content"
            android:layout_height="100dp"
            android:padding="10dp"
            android:src="@drawable/manure"
        />

        <Button
            android:id="@+id/third"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:background="#28B463"
            android:text="मलजल"
            android:textSize="17dp"
            android:textColor="#fff" />

    </LinearLayout>
    <LinearLayout
        android:layout_marginRight="5dp"
        android:background="#E5E8E8"
        android:layout_width="190dp"
        android:layout_height="150dp"
        android:orientation="vertical">

        <ImageView
            android:id="@+id/guides"
            android:layout_width="wrap_content"
            android:layout_height="100dp"
            android:padding="10dp"

```



```

        android:src="@drawable/feedback"
    />
<Button
    android:id="@+id/fourth"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:background="#28B463"
    android:text="पत्र पठाउनुहोस्"
    android:textSize="17dp"
    android:textColor="#fff"/>

</LinearLayout>

</LinearLayout>

<LinearLayout
    android:layout_width="fill_parent"
    android:layout_height="150dp"
    android:orientation="horizontal"
    >
    <LinearLayout
        android:layout_marginRight="5dp"
        android:background="#E5E8E8"
        android:layout_width="190dp"
        android:layout_height="150dp"
        android:orientation="vertical">
        <ImageView
            android:id="@+id/report"
            android:layout_width="wrap_content"
            android:layout_height="100dp"
            android:src="@drawable/one"
            />
        <Button
            android:id="@+id/fifth"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:background="#28B463"
            android:text="कृषि बीमा"
            android:textSize="17dp"
            android:textColor="#fff"/>

    </LinearLayout>
    <LinearLayout
        android:layout_marginRight="5dp"
        android:background="#E5E8E8"
        android:layout_width="190dp"
        android:layout_height="150dp"
        android:orientation="vertical">
        <ImageView
            android:id="@+id/news"
            android:layout_width="wrap_content"
            android:layout_height="100dp"
            android:src="@drawable/seminar"
            />
        <Button
            android:id="@+id/sixth"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:background="#28B463"

```

```

        android:text="अन्य"
        android:textSize="17dp"
        android:textColor="#fff"/>

    </LinearLayout>

</LinearLayout>

</ScrollView>
</FrameLayout>

```

ii) Screenshot



Figure 9: Screenshot of the home page