

**Agriprenuers – A motivation application to generate
entrepreneurs**

Project ID – 2021-90

Project Proposal Report

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Declaration

We declare that this is our own work, and this proposal does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or Institute of higher learning and to the best of our knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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ABSTRACT

Choosing your career to become an entrepreneur is not the best option that an individual would take due to the huge amounts of known risks it has to offer. In the modern world, entrepreneurship is a very vast and diverse domain, and the smartest person will always overcome all boundaries and succeed.

Our aim is to overcome some of these boundaries by the creation of an application which will give a specific individual all the essential tools to become an entrepreneur. It should not be mistaken that a person without the entrepreneurial drive would not benefit to achieve that spirit through our application.

We aim to achieve this by the initial introduction of becoming agriprenuers or entrepreneurs focusing on the agricultural sector within the country. It is certain that most families living in the urban or even the rural areas would be catering some amount of bare land which have had not been utilized for the longest period. Hence this bare land available will be our focus as to drive the individuals/owners to become self-made entrepreneurs through the assistance of the motivational tools provided by our application, agriprenuers.

Primarily, our initial focus will be on the Western province of Sri-Lanka as it has a remarkably high population of employed individuals. The Malabe area will be our initial focus to locate bare land available in the area and to filter out individuals or interested parties to benefit from the extra income that could be earned by our motivational application, agriprenuers. The primary goal of the application will be to utilize those bare land, adding an extra income to the individual/owners of the land with minimum effort.

Key words: Image Processing, Machine Learning

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List of Abbreviation

Abbreviation	Description
GDP	Gross Domestic Product
ML	Machine Learning
AI	Artificial Intelligence

1. INTRODUCTION

1.1 Background

In every developing country, one of the primary issues an individual faces is finding an appropriate job and be employed in a 8 hour job every week day for the rest of their life until retirement. However, a handful of individuals chose the more risk high reward path of business. Digging further, another handful of individuals chose to start their own business or in other words chose to become entrepreneurs.

In developing countries becoming an entrepreneur is of high risk when compared to developed countries. This is mainly because of the higher market risks and other negative factors from the society focused upon those entrepreneurs. Hence due to these factors choosing one's career path of becoming self-made businessmen should be a fact that be thought twice before being engaging in. Moreover, it is strongly believed by many successful individuals that making the money work for you with minimum effort is the best way to earn the most money.

On the other hand, the agriculture sector of Srilanka is one of the most successful among all developing countries. This is due to the highly nutritious soil and ideal climates and temperatures available in all areas of Srilanka. This allows most people to engage in growing vegetables, fruits or even crops hence making a living to most individuals residing in the rural areas or to families with incomes below average. In 2016, the average income of an individual in Srilanka was just over 16000 rupees, with most individuals employed in urban areas earning more than that of individuals residing in the rural areas. This included 2 individuals in each family earning money hence the net household income for a family in Srilanka in 2016 was just above 33000 rupees.

Another uprising and promising development in Srilanka is the information technology sector. Within the past decade the industry has developed significantly adding a significant value to the country's GDP. In the modern world, technology is developed to an extent that it can use computers to do most of the thinking which was previously man stimulated. AI, ML and Computer vision are a few of the broad scopes that are emerging in the current world replacing most tedious tasks for man.

The research component that is going to be implemented in the project, Agripreneurs, involves the combination of all the above domains. The combination will help us achieve self-made entrepreneurs who are self-driven individuals motivated and supported by the application through image processing and machine learning concepts.

1.2 Literature Survey

The problem of this research revolves around the ability to develop the economy of any country through the motivation of generating many self-made businessmen in Srilanka. This lies in the ability for the research to obtain a specific goal which is to make the individuals successful providing all necessary opportunities and minimum investment is key [4]. Moreover, in a research conducted in the upcountry people of Srilanka indicates that an attitude is one of the major factors affecting individuals to become entrepreneurs along with the lack of opportunities, education, and countless other external factors [5]. As of 2016, the department of census and statistics in Srilanka states the average income of an individual in Srilanka is just above 33000 rupees where most people are not fully/permanently employed.

Many different models revolving in the modern machine learning domain have been studied. The model that will be focused from the research component will be on the ability to create a success rate figure according to the area/geographic location the user is using the application.

Success rate figure calculation models are not explicitly implemented but in the research paper [3], an implementation of a business success rate model have had been implemented. This model is used to improve the entrepreneurial or business economy in Nigeria. Prediction models revolve around two main criteria which are classification and regression. Classification predicts model for categorical i.e., discrete, or unordered data while predicting missing or unavailable numerical data is done by regression.

The research conducted by [6] analyses a crop prediction methodology where the crop yield is calculated according to the past rainfall of that specific area. ML algorithms including multiple linear regression (MLR) is used to achieve this. Data mining methodology called density-based clustering for the confirmation of predicted results.

A research conducted in India in 2018 suggested a machine learning model in a proposed system where the farmer will help farmers to identify which crops will be suitable for which season of the year. This system used the past data from the area which includes soil condition, rainfall, yield data and other data to get a final output through K-Nearest Neighbor, Support Vector Machine, Least Squares algorithms. [7]

Another similar research was conducted in Australia of which the main goal was to assist the farmers in taking appropriate decisions. However, it heavily depended on data that was inserted into the system. This system consists of six major component which are data input, data mining, statistical analysis, database, prediction, and visualization. The system utilized data mining done by use of association rules which uses Apriori algorithm [8]

A system that was proposed, utilized a predicting network which was created using an artificial neural network approach. The most appropriate crop will be given as an output parameter according to the predicted soil type and rainfall datasets. Hence, other effective factors affecting for the yield can be determined, this was only applied for wheat yields.[9]

The funamendatals of clinical data science book demonstrates most of the popular methodologies that is being utlizied for prediction models. This includes regression methodologies. Furthermore, it also demonstrates the ideal programming languages which are to be used to build a prediction model.

1.3 Research Gap

Creation of an application that will motivate users to put more effort and time in the agricultural activities is a new domain. There are not existing applications that promotes or assists in the agriculture perspective of motivation. However, there are several applications which will provide various tools to make an individual organized hence positively motivated to do well in the business they are involved in.

These mostly includes motivational applications providing positivity at the beginning of the day such as Elevate helping the brain to exercise mentally. Furthermore, most of the highly trending application for entrepreneurs revolves around the society accepting what they are involved in if they will be making a positive impact to the society. This is being achieved by the agricultural domain as it is a vital area to the country and is also incorporated with information technology in the past decade vividly.

The solution proposed will motivate users as entrepreneurs in the agricultural domain. The component focused on this report will be showing the users a figure of success rate according to the geographical location of the user and according to the crop the chose to harvest. Moreover, Location based predictive analysis is used for the advertising sector. This technology is in every application you will be using in your day-to-day life which includes social media, Facebook, and every other website involved with google ad sense. This strategy is used for the advertising industry throughout the world. However, it is not properly utilized for an application that can forecast yeild yet. We intend to achieve these through the agriprenuers application. Furthermore, a robust image processing model will also be introduced. Traditional image processing model will help users to identify according to an image that has been

uploaded by the user, multiple image processing algorithms will work to give the users the desired output. However, by the introduction of a robust image processing model, the ability to provide results on different crops can be achieved. This model is not 100% accurate but will provide accurate results up to 80%. The application will hence help the users to obtain solutions in the form of fertilizers by the robust image processing model which will help for a wide range of crops.

Table 1.3.1 Application Comparison

Features	FieldCheck App	Descartes Crop App	Agriprenuers
Crop visualization	Y	N	Y
Yield Forecast	N	Y	Y
Success Rate Forecast	N	N	Y
Target Audience	Farmers	Farmers	Anybody/Entrepreneurs
Suitable Crop recommendation	N	N	Y
Success rate according to	N	N	Y

area and crop type			
Disease detection and solutions	N	N	Y
Auction Platform	N	N	Y
IoT Realtime analysis	N	N	Y
Motivational Model	-	-	Y

1.4 Research Problem

The research problem identified revolves around how a specific individual will be motivated by using the application, agriprenuers. The problem identified is the lack of entrepreneurship in developing countries or any other country across the world is due to the lack of motivation and the inability to have a stable level of trust on the market they will be involved in.

Furthermore, an entrepreneur will also be facing many other risks and other valuable skills which should be properly addressed before stepping onto a high risky high reward domain.[1]

These include:

1. Leadership
2. Positive mentality
3. Identifying business opportunities

In a developing country like Srilanka, these risks are further high lightened. Hence, many of these entrepreneurs will be seeking for external support to make their business ventures easier for them. There is no proper platform in Srilanka that will provide every tool for every different entrepreneur to succeed in their specific business.

Out of all available businesses, agriculture is a prominent domain that most individuals are interested in, especially in the rural areas due to high availability of bare land. However, a handful of families and individuals residing in the urban areas possess the bare land and it is not utilized. This is a main problem as most families and individuals have expenditures way more than their monthly income. Hence, this issue could be resolved by triggering the entrepreneurial spirit within them via our application.

The figure below shows the availability of bare land in the Malabe area of Srilanka.

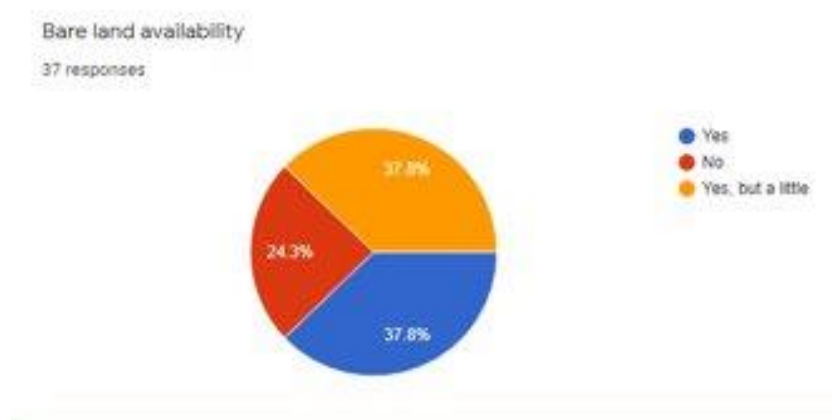


Figure 1.4.1 Bare land availability chart

Agriculture is a domain not only beneficial for those individuals carving to become entrepreneurs but also to the country as it will uplift the country's economy.

Furthermore, due to the current pandemic situation most families especially residing in the urban areas are facing a considerable risk of shortages of vegetables and other dry food due high demand and low supply. Hence, we believe a considerable number

of problems can be resolved to a greater extent by motivating individuals to become entrepreneurs via the agricultural domain.

A survey conducted by our research group also revealed that most individuals residing in the Colombo and Gampaha districts had an average monthly less than 50,000 each month with an expenditure closing to that income value. Furthermore, the agriculture department of Srilanka has the prices of crops and their prices according to the year and month. However, this data cannot be access by the people easily. Hence, out system will have both buyers and sellers on the same platform which will automatically generate the most appropriate price.

The main component focused by me is the creating a model which will show the users the success rate of the crops according to the time and effort invested from their spare time and benefit or profit that can be gained by such devotion. This is a major problem because although an individual will be invested in the business, providing a result according to the effort needed and benefit or success gained will motivate those individuals due to the positive impact it will have on them to add extra effort.

Moreover, the individuals involved in the agricultural processes will be facing other external unavoidable conditions such as soil nutrition conditions or plant diseases or even pest attacks. Hence another identified problem is that if such instance occurs, the motivation of those individuals towards the crops will reduce as extra care must be taken to get the maximum profits without running on losses.

The tools provided by the application will aid the users to gain profits from their first venture without loss as most entrepreneurial businesses focuses on losses initially to break evens and finally to making a proper profit if fortunate.

The problem does not focus on being a competition to the main stakeholder of the agriculture domain but to the families with bare under-utilized land residing in the urban areas. Furthermore, our problem will also aid the other stake holders of the agriculture business which includes buyers, agrochemical companies, seed importers and other financial institutions.[2]

2.OBJECTIVES

2.1 Main Objectives

The main objective revolves around creation of a motivational functionality so that the individuals involved in the agriculture-entrepreneur domain will be further involved applying more effort to maximize their profits.

Motivation to the individuals with the entrepreneurial drive and making the platform reliable in terms of sales of the crops and the addition of effort on a specific crop will be addressed in the main objectives of my component.

Objectives:

- To make users joining the platform motivated and to motivate every other user by the benefits/income made through the application.
- Utilizing spare land across the country making an income to the landowners.
- Implementing an integrated bidding platform to allow buyers to identify crops being made in large and lesser amounts hence allowing them to place appropriate bidding values if satisfied.
- IoT sensor analysis model to detect the humidity, water, temperature, and other external factors to determine the appropriate crop needed to be grown in that environment.
- Making a game-based/gamification model to motivate the users analyzing psychological criteria with reward schemes.
- Adding IoT data into cloud platform making it available to all users across the platform.
- Analyze IoT data and detect that crops that can be grown in specific areas.
- Prediction model to show users the relative effort needed, and the income/benefit gained for specific crops that is recommended to be grown in that area.

- Robust image processing model to detect diseases on crops and give the relative approximate solution/fertilizer.
- Integrated bidding platform enabling entrepreneurs to sell the crops on a price being bid by different buyers in the platform.
- Export functionality to attract foreign buyer through buyers or directly through the entrepreneurs.
- Allow users to identify trending crops in specific times of the year through a prediction model, hence maximum benefit/profit can be gained.

2.2 Specific Objectives

1. Building a success rate prediction model

The relative effort for a specific crop will be given to the user of the application based on their location and their choice of crop. Hence, gathering data from all users of the regions, the success rate for different crops can be measured.

This will give the new user an idea of the effort they have to put in, several types of unpredictable consequences faced by other individuals involved when growing the crop as well.

Hence the relative profits/benefits gained from those crops will also be displayed to the inexperienced users.

2. Robust Image processing

This functionality will be a tool that will assist individuals in case of any disease been inherited due to nutrition deficiencies or due to other pest attacks.

This component will be based on a largest data set of various leaves and different diseased trained through a robust image processing model which accepts and analyzes different images of different leaf types and identifies if it is healthy or diseased. If diseased, it will suggest relative solutions in form of

crops. Hence, they can upload images and get instant results on what remedy they should use to overcome the situation.

3.METHODOLOGY

3.1 System Overview Diagram

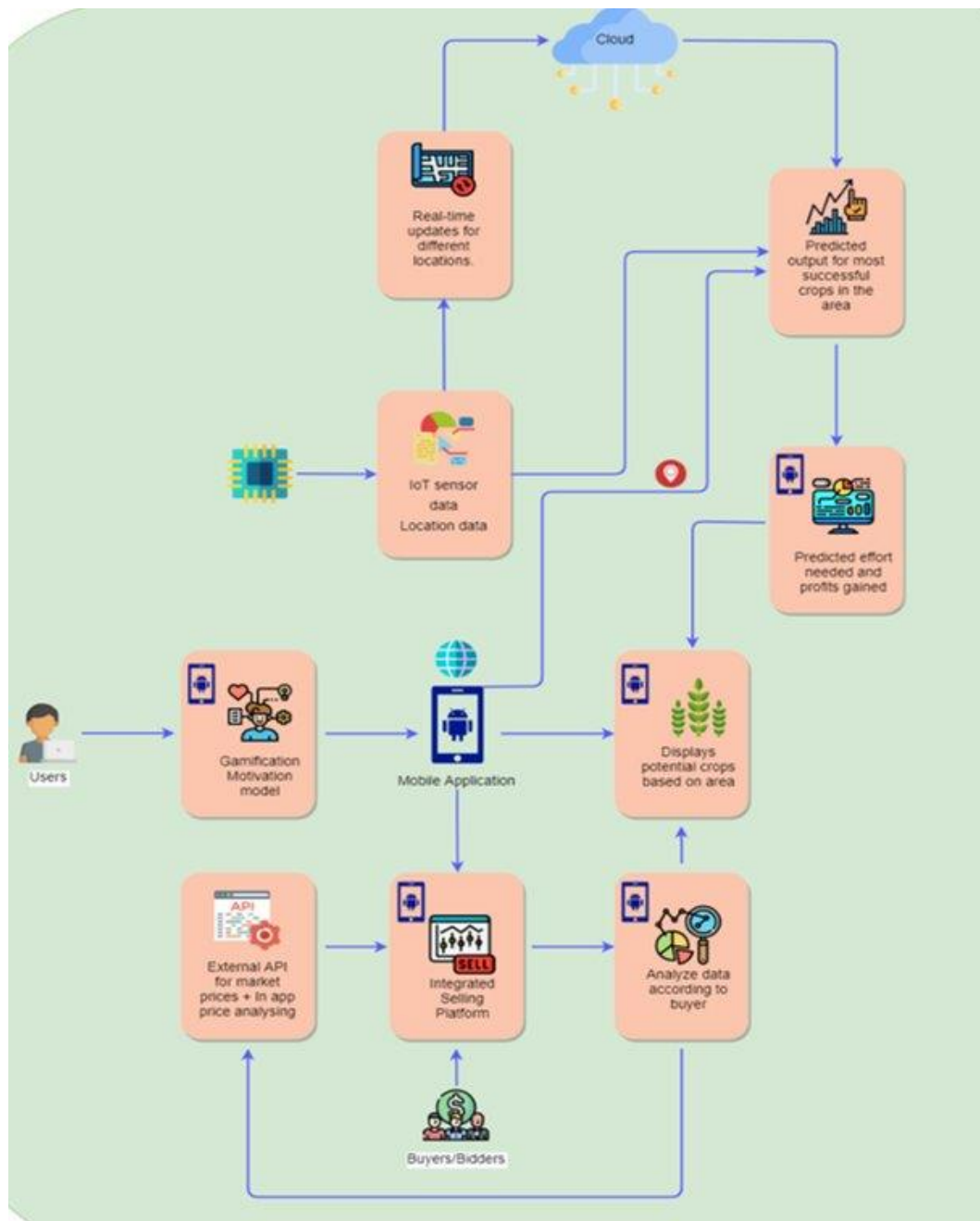


Figure 3.1.1: System overview diagram

3.2 Development process

Iteration development model is the most suitable method for this research among other process models as the identified processes heavily depend on the previous process outputs.

Since the development process will be having many interconnected components among one another, there will be many changes that each component might undergo due to different changes in the implementation. Hence, iterative model will be of best fit. Furthermore, a clean set of data for the prediction model and for the image processing models will also be required.

In the iteration model, the entire requirement for the project is separated into various phases. In each iteration, the development process goes through the sequence of steps requirements gathering, design, implementation, and testing phase. The reason for selecting this model is,

- The requirement of the system is clearly defined. However, some of the functionality may evolve or change with the time.
- During the development time of the project, modern technologies can be used based on the process requirements. So, it is essential iterate steps when necessary.

Scrum agile methodology be used with at least 4 sprints. For better management of assigned tasks, a Trello board will also be incorporated in the development process.

3.3 Feasibility Study

Technologies that are going to be used includes ML and image processing. Algorithm involved in classification and regression will be utilized when the components are being implemented. ML algorithms according to the geographic location will be utilized for the research component to predict success rates of different crops according to the location. The models will be built on python programming language due to it's high support for machine learning.

3.4 Requirement gathering and analysis.

An initial market analysis will be done to identify the availability of bare lands by families in Srilanka. The research will be focused on families and individuals residing in the urban areas of Srilanka. This includes Gampaha and Western provinces .

Hence to analyze the availability of bare lands in these areas, a survey was created using google forms and shared to various persons through internet communication media.

This survey will help us to gather information as for the availability of bare land in urban areas of Srilanka, the monthly income and expenditure of individuals residing in those areas. Furthermore, the free or spare time for those employed individuals will also be considered. As our application will provide most essential tools top obtain the highest benefit out of the harvest, the spare time that will be invested will not go unaccounted.

The relative profit/income gained from those families will also be considered hence with the data collected it can be determined if those families will be invested in such extra activity to earn an income.

Furthermore, the data for the gross income per individual was also take from the Srilanka department of statistics, 2016.

Requirement gathering of these individuals will be done by having one on one interviews and proposing our solution to be approved by them to obtain an extra income according to the amount of bare land they possess.

3.5 Design

The design involves in the creation of the motivational application that will be easy to use. Providing users with the highest user experience and easy navigation within components and to obtain data will also be of primary focus.

The main functional requirements of the research component will be addressed initially, this will also be followed and backed by a high ER diagram and class diagrams for better understanding of the component and to identify database table interconnections.

Furthermore, prototyping of the interfaces and the expected outputs of each component will be analyzed.

3.6 Implementation

The main functional requirements will be focused at this stage, this involves having the image processing model output an accurate result according to the uploaded image. The results of the processed image will include recommendations as for what fertilizer

would be recommended to overcome the above situation. The image processing model must be viable to detect diseases in a wide range of crops, however in the initial stage of development only 3 different crops will be introduced for the users and the relative data will be collected through them.

The final phase involves in the success rate prediction model based on the location of the individual; this will use machine learning algorithms to classify the data gathered.

Non-functional requirements of the component are the accuracy and the reliability of the system with the lowest possible time to output the relevant results. Furthermore, the interfaces and interactions with the user must be highly addictive and motivating the user to get more involved in the agriculture activities during their free time.

3.7 Integration and Testing

Software testing is important in development lifecycle to point out the defects and errors that were made during the development phases. It is particularly important to ensure the quality of the product. Testing is required for an effective performance of software application or product. Testing is required each phase that we are following in software development life cycle like unit testing, integration testing, system testing, and user acceptance testing.

Integration testing is a major test that the system must pass as data will be taken from 4 different components into a single point. Furthermore, once the entire system is developed the system will be given to different users to test, hence achieving user acceptance testing. System testing will also be conducted as well by testing the individual components of the project.

Table 3.7.1 Expected Outputs

Data	Predicted Success
Crop: Chilies Area: Malabe	75%
Crop: Beans Area: Malabe	90%

3.8 Work Breakdown Chart

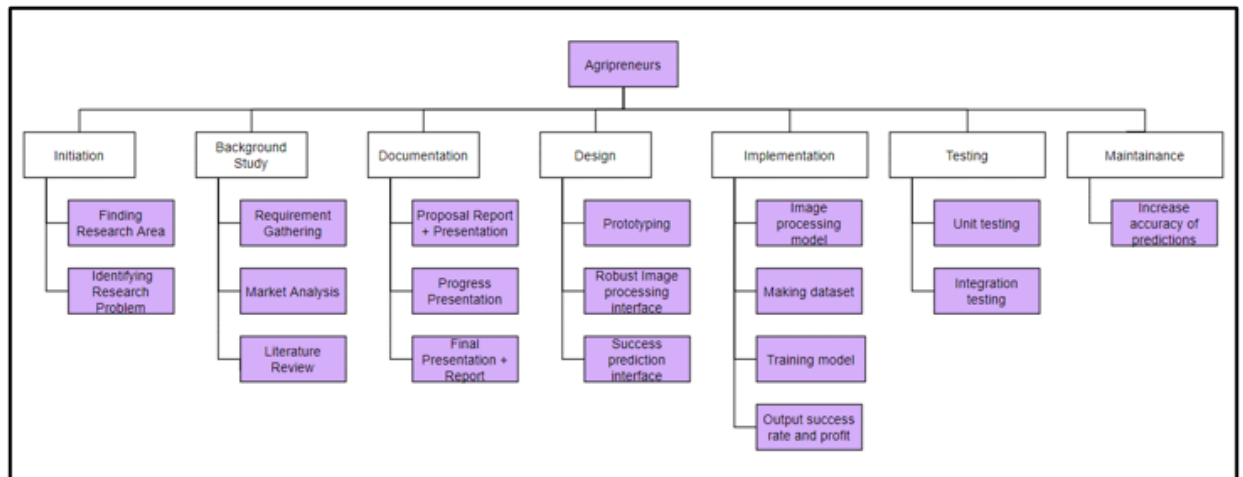


Figure 3.8.1 Work Breakdown chart

3.9 Gantt Chart



Figure 3.9.1: Gantt chart

4.Description of Personal and Facilities

4.1 Functional Requirements and Non-Functional Requirements

The following attributes were considered to improve the quality and reliability of the system.

Functional requirements of this system:

- High accuracy
- High usability
- High reliability (75% accuracy)

Non-Functional requirements of this system:

- Interoperability – Among other components of the system.
- Response time – Reasonable response time to output the results.
- Motivational, addictive UI/UX designs

Other requirements:

- Social Acceptance by society
- Affordability by individuals and families for the IoT kit.
- Research on psychology of users and how they interact with the smart phone application.

4.2 Technology and Tool selection

Technologies

- React Native

- Python-Django
- Cloud service platform
- ML algorithms
- Firebase

Tools

- Visual Studio Code
- Virtual Emulators (android)
- MySQL Workbench/Server management studio.

5.CONCLUSION

This research project will be focused on generating a high number of self-made business individuals and entrepreneurs in Srilanka. The application will be a key platform providing the necessary tools for those individuals to invest their time and effort to build their own agriculture business domain along with the ability to be fully employed. Furthermore, this product will not only create many self-made entrepreneurs in the agriculture business but also will help to in the economic development of the country, where a reduction of imported food can be reduced due to the production of food in the country itself.

Moreover, in a time of a pandemic as in the current situation the country is facing. These agriculture/plantations can even aid families to fulfil their basic needs due to shortages of food supply from the government.

Hence the combination of information technology with the agriculture domain to predict a success rate figure will motivate users to be engaged in this agriprenuer business domain.

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