

# **E-COMMERCE PLATFORM FOR THE FARMERS**

Project ID: 2021-135

Project Proposal Report

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**Declaration**

This is my own work and I declare that. This work does not contain any material previously presented for a degree or diploma at any other university or institute of higher learning without acknowledgment, and that it does not contain any material previously published or written by another person, except where acknowledgement is made in the text.

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Under my supervision, the above candidates are conducting research for their undergraduate dissertations.

**Supervisor:**

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**Co-Supervisor:**

Name	Signature	Date
<u>Ms. Dammika De Silva</u>		

## **Abstract**

In the current situation, Farmers faced many problems. There is no online platform to help for farmers to communicate with each other. So, they are facing problems when sell and buy product. One of the major problems is many farmers struggle with disease by pest. And they don't know the disease name and how to cure it. So they have to know that disease name and they need pesticide for the disease.

In our research project we are going to develop an application called E-Commerce platform for the farmers. In this project I'm going to develop software that is image processing to find disease by image and suggest the pesticide for that particular disease. In this image processing I am going to use classification algorithms to find diseases in the plant. And image features will be extracted to classify the images and find the disease. After finding the disease of the plant we will suggest pesticide to farmers to use pesticide for that particular plant for curing it in early stage. So that farmers will cure the disease in the early stage. Farmers can protect other plants near by affected plant by cure disease in early stage. And their cultivation will increase. So The users of this app will increase for the reason this app being useful to farmers cultivation.

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## List of Abbreviation

Abbreviation	Description
API	Application Programming Interface
IT	Information Technology
ML	Machine Learning
AI	Artificial intelligent
RGB	Red Green Blue
GUI	Graphical User Interface
ANN	Artificial Neural Network
SGDM	Spatial Gray-level Dependence Matrices
SOFM	Self-Organizing Feature Map
SOM	Self-Organizing Map
BPNN	Back-Propagation Neural Network
GLCM	Grey Level Co-occurrence Matrix
MATLAB	Matrix Laboratory

## INTRODUCTION

### 1.1 Background Study

Sri Lanka is an agriculture country. Agriculture employs 27.1% of Sri Lanka's workforce. In 2020, agriculture contributed 7.4% of GDP (gross domestic product). Rice farming is Sri Lanka's most important method of agriculture. The Maha and Yala seasons are when rice is grown. 1st. Tea is a significant source of foreign exchange in the central highlands. In addition to vegetables and fruits, the country grows oilseed crops. The Department of Agriculture has set up two Agriculture Parks, abbreviated as A. Parks.

Most of farmers face problems by diseases in plants. Many farmers are uneducated in our country. And new farmers also don't know about disease. Many farmers don't know the name of diseases and how to cure this. These diseases may affect other plants near to affected plants. So cultivation will decrease by the diseases. Farmers will lose their income. So they will face financial problems. By this reason Farmers may change their work. So, the number of farmers will decrease. We will develop software called image processing to solve these problems among farmers and help them to find pesticide for the particular disease in the early stage.

Image processing used to perform some functions on an image, in order to get a better photograph or to retrieve any valuable data from it. In this image processing we have to give image as input, and get output its characteristics/features associated with that image. Image processing is one of the most rapidly evolving technologies today. It is also a critical research area in engineering and computer science.

Time is very important to everyone in the modern world. Many farmers face difficulties by disease. It will take time to find disease, and farmers need pesticide for the fastest cure the disease. So in our part find the disease in the image using image processing and suggest the pesticide for the disease. It will reduce their time for finding pesticide to the disease.

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## 1.2 Literature Review

By analyzing and conducting literature research for existing research with similar functions and technologies, knowledge of research impacts, research issues, and research intervals can be gained. Some important research is reviewed here.

In [1] Image processing was created to detect plant disease. Plant leaves are photographed by the camera. For the RGB leaf image, a color transformation structure is created, and the color transformation structure is then subjected to a device-independent color space transformation. Image noise and other unwanted artifacts may be removed using a variety of pre-processing methods. Image clipping and leaf image cropping were used to achieve the desired area of the photograph. The smoothing filter is used to achieve smoothing. The aim of image enhancement is to improve contrast. Convert RGB images to grayscale using equation-based color conversion. The image is then subjected to histogram equalization, which distributes the amplitude of the pixels in order to enhance the plant disease images. Power values are distributed using the cumulative distribution function. What segmentation is all about is splitting the picture into separate sections or creating some similarities with the same features. Various methods for segmentation can be used, including the Otsu' method, k-means clustering, and converting RGB images to HIS format. For segmentation, the RGB image is transformed to the HIS model. The 8-pixel connectivity is taken into account when determining the boundary, and the boundary detection algorithm is used.

Clustering K-means is used to classify an object dependent on a collection of features into a K number of classes. By minimizing the sum of the squares of the interval between the object and the related cluster, object classification is achieved. The infected leaf shows the symptoms of the disease by changing its colour. The color of the leaves will then be used to determine which section of the leaf is tainted. The R, G, and B components are extracted from the image. The Otsu procedure is used to measure the threshold. If the strength of the green pixels is less than the calculated  $t$ , the green pixels are masked and deleted. The green pixels are then masked and removed if the intensity of the green pixels is less than the measured threshold.

Then, to get a unique feature for that image, both color and texture are taken into account. The RGB image is translated into an HSI translation for this reason.

The SGDM matrix is used to calculate texture data, and the GLCM function is used to derive the attribute. Before the color from the background is removed, the input image is tweaked by using an anisotropic diffusion method to carry the information of the affected pixels. The H and B components of HIS and LAB color space are used to distinguish between the grape leaf and non-grape leaf sections. To distinguish disease leaf colors, a SOFM with a back propagation neural network is used. The neural network is used to identify the images in the learning database after attribute extraction. In ANN, these function vectors are known as neurons. The neuron's output is determined by the weighted number of inputs. It is possible to use the back propagation algorithm, which is a tweaked SOM (Multiclass Support vector machines). In a recurrent network, the BPNN algorithm is used.

In 2014 a research was carried out in International Journal of Innovative Research in Electrical, Electronics, Instrumentation And Control Engineering vol. 2, Issue 6. Image Processing in Agriculture[2]. They have adopted some approaches in this project to limit the use of herbicides by spraying them only where weeds are present. They used MATLAB to execute image processing to identify weed areas in an image taken from the fields in this paper. The primary goal of this paper is to use image processing to identify weeds in the crop. Then they'll feed the weed areas' inputs into an automatic spray pesticide that will only spray in those areas. To do so, we'll need to take a clear photograph of the field in order to identify the weeds with greater precision. Photographs can be taken by attaching a camera to a tractor or by taking the picture yourself. They would then use MATLAB to perform image processing on that image in order to find the weed. They have used two approaches for weed detection in this paper.

1. Inter row weed detection
2. Inter plant weed detection

The final product will contain the weed areas, which they will feed into the automatic sprayer, which will be controlled by a “Arduino uno” microcontroller.

In 2008 a research was carried out IEEE International Conference on Systems, Man and Cybernetics. Using Fast Fourier Transform for weed detection in corn fields [3]. In this paper, a technique is suggested for classifying crop and weed leaves in corn fields in real-time using the fast Fourier transform and leaf edge density. This approach is based on the exact shapes and vein systems of these leaves. The technique was tested on a set of corn field photographs and found to be more than 92 percent accurate in identifying weed plants. Finally, the application is compiled into a dynamic linked library (dll) and embedded in a graphical user interface (GUI) for use by a cultivator robot in a real field.

### **1.3 Research Gap**

Concurring to the writing study over conducted it is obvious that space particular image processing part in e-commerce stage may be a much required implementation since no research has been done focusing on that. Up to now within the researches that was conducted beneath space particular discourse acknowledgment.

Looking above research papers there are many applications using image processing. But there is no online platform for farmers to identify diseases using image processing. In our research we will build a platform for farmers which help them search pesticide by images.

## 1.4 Research Problem

In today world farmers are facing many problems. But there is no online platform to communicate farmers each other in our country. They might confront challenges when choosing the cost extend on a web stage. A few farmers don't know which vegetables to cultivate and what vegetables give them more benefit. Some of the time what happens is numerous farmers cultivate the same vegetables from the same place so the cost will go down. So they will face financial problem. Financial problem is the main problem farmers are facing today. Many farmers committed to suicide. So we planned to develop online platform to avoid these problems. Most of farmers face problems by diseases in plants. Many farmers are uneducated in our country. And new farmers also don't know about disease. Many farmers don't know the name of diseases and how to cure this. These diseases may affect other plants near to affected plants. So cultivation will decrease by the diseases. Farmers will lose their income. So they will face financial problems. By this reason Farmers may change their work. So, the number of farmers will decrease. We will develop software called image processing to solve these problems among farmers and help them to find pesticide for the particular disease in the early stage.

## 2 OBJECTIVES

### 2.1 Main Objective

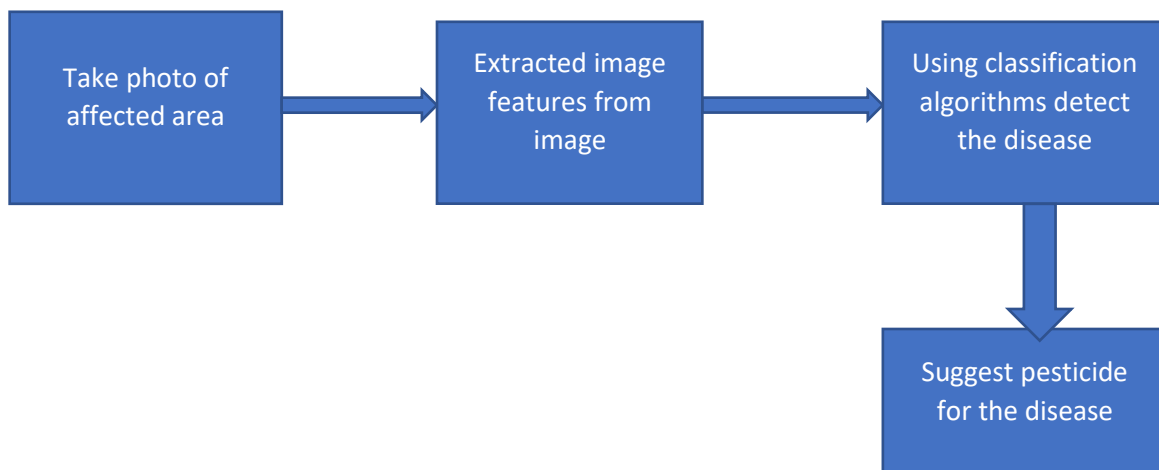
Build image processing software to find diseases by pest specially attacked in rice, chilly plants.

#### Specific Objectives

1. Knowing plant affected by pest diseases or not.
2. Taking photo of that affected area.
3. Finding disease by pest
4. Suggest the pesticide.

## 3 METHODOLOGY

The classification algorithm is used in this paper to classify the image. The image is grouped into different groups based on different characteristics and the pest is identified using the features derived from the image. Then suggest the pesticide for the pest.



### 3.1 Development Process

Since the distinguished forms are profoundly subordinate on past handle discharges, the rehash improvement demonstrate is the foremost fitting strategy for this research about among other handle models. In the iteration model, the entire requirement for the project is divided into different phases. In each iteration, the development process steps go through a sequence of requirements collection, design, implementation and testing phase. The reason for choosing this model is,

- The require of the framework is clearly characterized. In any case, a few capacities may create or alter over time.
- During the development of the project, new technologies can be used by sites on process requirements. Therefore, it is necessary to repeat the steps when there is such a change.

### 3.2 Data Preprocessing

The basic functionality of this component is find diseases by pest and suggests pesticide for curing that disease. From image extracted image features to classify, using classification algorithms find the disease by pest. Then suggest pesticide to cure the disease. We have to collect number of diseases by pest affected plants and trees.

### 3.3 Technology Selection

- Classification algorism
- Machine learning
- Mobile Application
- Database – Firebase
- AI
- Android

### 3.4 Gantt Chart

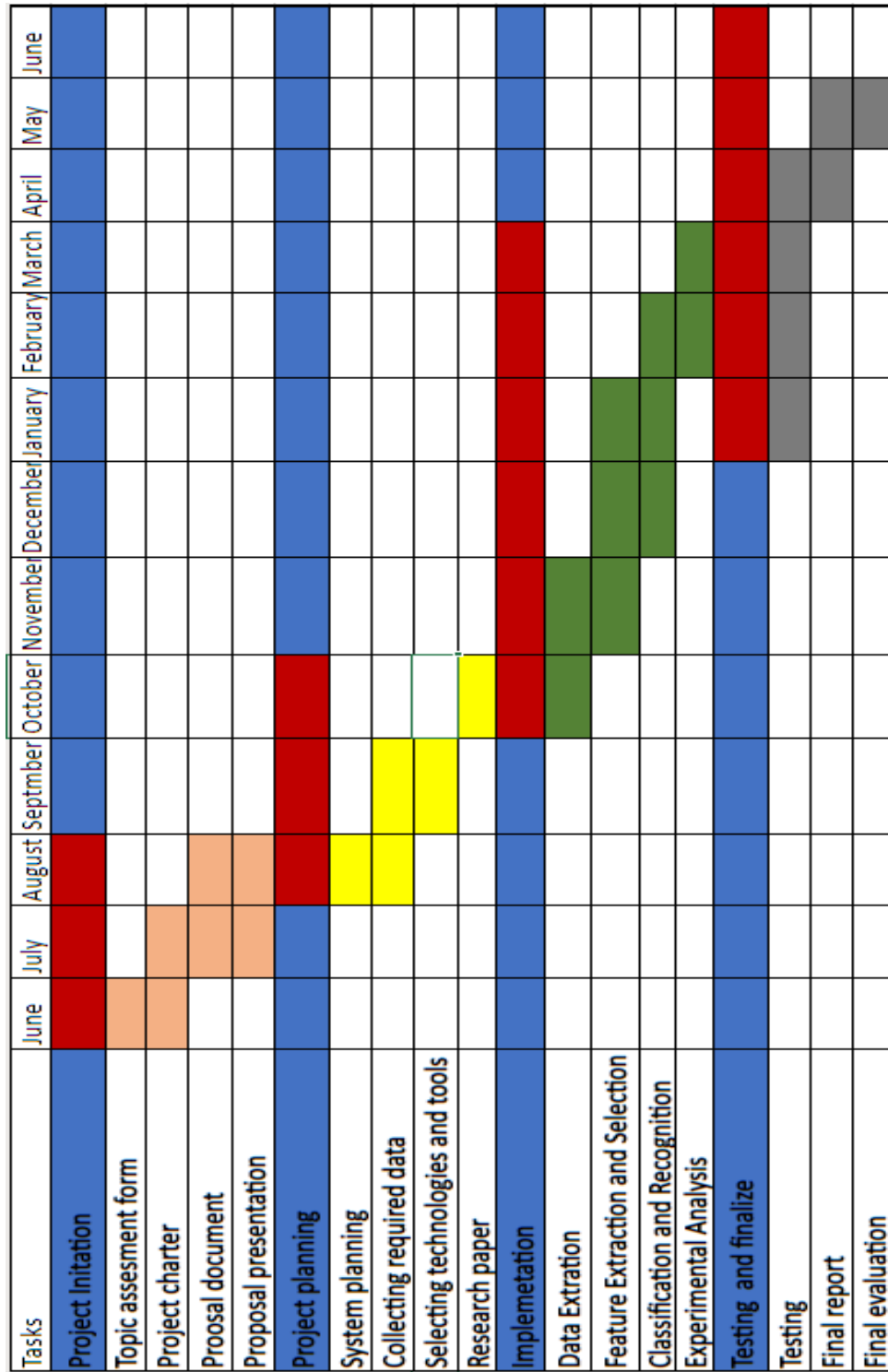


Figure 3.4.1: Gantt Chart

### 3.5 Work Breakdown Structure

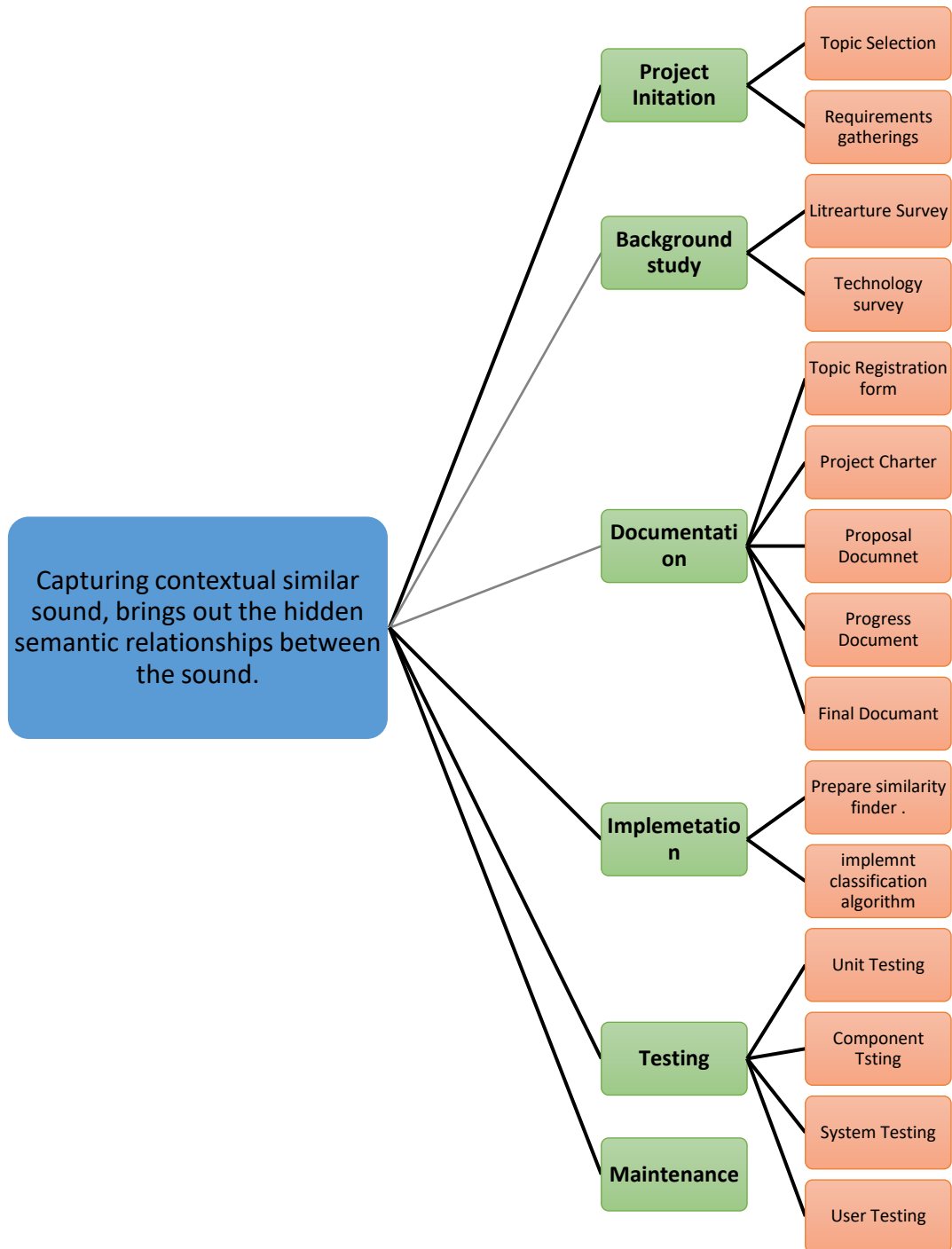


Figure 3.5.1: Work Breakdown chart



## 4 Project Requirement

### 4.1 Functional and non-Functional requirements

- Functional requirements
  - Used to find word analogies and word similarities, Similar words tend to occur together will have similar context and Capturing contextual similar words. Also, it brings out the hidden semantic relationships between the words.
- Non-functional requirements
  - Less manual work
  - Take less time to predict the accurate personality and background of personnel.
  - Accuracy of prediction.

## 5 Budget

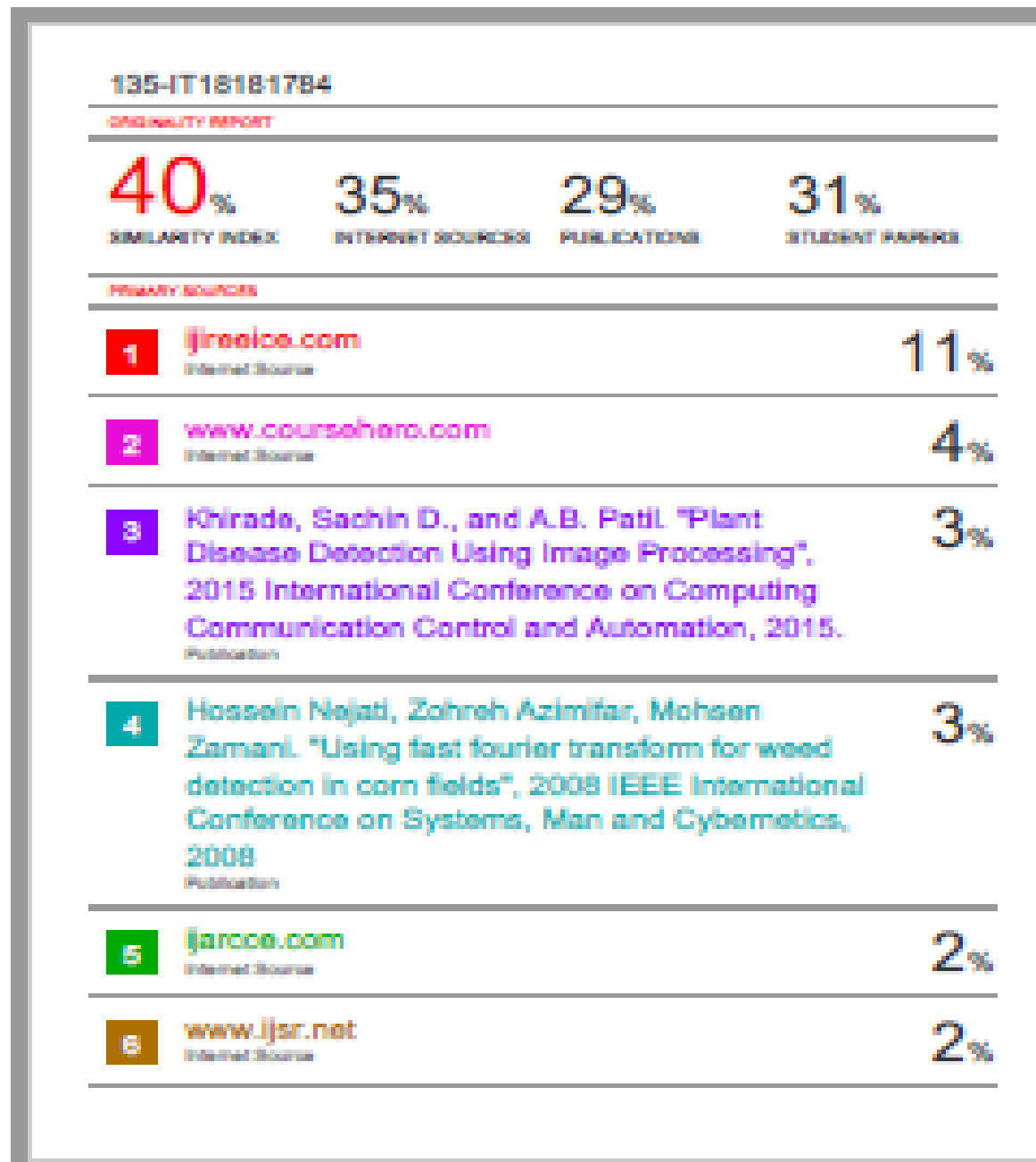
Description	Amount (LKR)
Internet Charges	10, 000.00
Transport charges	5, 000.00
<b>Total</b>	<b>15, 000.00</b>

**Table 5.1.1: Budget**

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## Appendix



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# **ECOMMERCE PLATFORM FOR THE FARMERS**

Project ID: 2021-135

Project Proposal Report

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Faculty of Computing

Sri Lanka Institute of Information Technology  
Sri Lanka

February 2021

## Declaration

I declare that typically my work and this proposition does not consolidate without affirmation any material previously submitted for a degree or diploma in any other university or institute of higher learning and to the best of my information and conviction it does not contain any material previously distributed or composed by another individual except where the acknowledgment is made within the content.

Name	Registration Number	Signature
Anjanan M	IT18186048	

The above candidates are researching the undergraduate Dissertation under our supervision.

**Supervisor: Ms. Anjali Gamage**

Signature of supervisor: \_\_\_\_\_ Date: \_\_\_\_\_

**Co-Supervisor: Mr Dammika De Silva**

Signature of co-supervisor: \_\_\_\_\_ Date: \_\_\_\_\_



## **ABSTRACT**

A change is inevitable in the IT industry as the innovations are becoming a common thing in daily life. Sri Lankan Agriculture plays a major role for the Sri Lankan to obtain their foods. So agriculture needs more attention and support from IT field in order to face the competing supply and demand in this fast paced world. Farmers and the government benefit from price forecasting because it allows them to set rules and policies. Depending on the complexity in vegetable price prediction, usage of the features of neural network model such the self-learning and produce the result that is not limited to the data provided to them, to build up the model of Generic algorithm based neural network for the prediction. Beans, carrot , cabbage, and tomatoes are the vegetable used for this research study. For this research Pettah whole sale market was considered.

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## LIST OF ABBREVIATIONS

Abbreviation	Description
BPNN	Back propagation Neural Network
RBFNN	Radial Base Functional Neural Network
ANN	Artificial Neural Network
RMSE	root mean squared error
MAE	mean absolute error

# **1 INTRODUCTION**

## **1.1 Background Study**

A fall in vegetable prices always impact the farmer most[1]. The impact of not earning what they have invested affects the farmers in a huge way. According to amount of investment these impacts vary. Some are clever when it comes to investing , as they might have an idea and link to the retail markets. They might even own the land and all. But most of the farmers are not that fortunate. They might have to sell the vegetable lower than the usual just so they can survive. These situation make life get harder for the farmers who supply us vegetables. Sri Lankan farmers are faced with many difficulties. Even though there are short term solutions provided[2] , that is not sustainable . Policies have to be changed in order for long term benefits of farmers.

In this century ,technology is developing in a faced pace. The society is quickly adopting to new changes and technologies faster than the previous centuries. Information technology is a major change that people have quickly adopted to. Works that need more time have now become easier with in a single click. People have optimized themselves in order to enjoy these benefits of the technological advancement.

Price prediction have been there for a long in the field of research. Most of them have used machine learning in order to predict the future market prices, so farmers can prepare themselves accordingly.

### **Literature Survey**

**Rajeswari et el [3]** have done a fine use of predictive modeling of data in order to predict the price of crops. They have followed four steps which is common for predictive models which are data analysis from the past, preprocessing of data, modelling of data , and estimation of performance. They have chosen classification technique as the process of their prediction. As a technique of classification, they have employed decision trees which finds predictor and target relationship between characteristics of the data set. The researchers' scheme which is based from location of farmers, recommends number of

plants by using data which are available based on the location. . There is a performance increase using this algorithm, but there is a scalability issue for this algorithms as mentioned by the researchers themselves.

They are using previous years month wise average of commodity prices to provide data set for the research. The location they have chosen for this purpose is Virudhunagar. The method they have used consist of two parts which are rule generation and pattern generation. In rule generation they find all frequent item set. They derive a set rules based on these data sets. There was a particular amount of attention paid to reduce the time for the algorithm execution by eliminating redundant item set. Therefore they were able to perform the execution on large data set. The HADT algorithm provided much better accuracy and less time than the C4.5, C5.0, C5.0: ADT classifiers which were used to compare during the research. However, the steps followed in this research was time consuming when it considered at overall level. Therefore they also have suggested automation and synchronization modules for future research as they can make the system efficient.

Keywords: HADT : Hybrid Association rule-based Decision Tree algorithm.

**Hemageetha et al[4]** have had done vegetable price prediction using Radial basis functional model where it has been compared against Back propagation neural network(BPNN) . They have specifically chosen Tomato to be the crop , which's price would be predicted. The fact that vegetable prices have characteristics such as high nonlinearity and noise was considered in this study.

An ANN was developed using following processes: Collection of data, preprocessing of data, normalization of data, determining network, selecting parameters, training of network, testing of network, forecasting. Data preprocessing was done in order to reduce the noise in the data. The price of tomatoes taken as an experimental data. In network design data size and frequency was fixed. But there was unavailability of daily data of prices , therefore they could carry on a short time forecasting. However, they carried a weekly based price data which resulted in less noise. They collected data from [www.tnau.ac.in](http://www.tnau.ac.in) website.

For this research the normalization has been done using Minimax normalization and it is used to accelerate the training time. Dataset was divided for training of network and network validation. When using Backpropagation algorithm they have only used three layers only as the layers increases the time will also increase. Although RBF is considered better accuracy than backpropagation in this study, RBF need a more neurons than BPNN. So for calculating accuracy at the end they have used Mean square error. And as the end result accuracy of BPNN was 77.42% and for RBF it was 85.55 %. And they have concluded with stating that in future genetic algorithm will increase the accuracy.

**Chongguang Li et al [5]** had done a study to predict short term vegetable price using HP filter and a hybrid neural network. In the beginning itself in this paper they have stated that time series data which is the prices of vegetable are not linear, therefore they have justified their reason for using above mentioned filter and the algorithm. For this study they have take prices of 5 vegetables namely ,Cabbages, Peppers, Cucumbers, Green beans, Tomatoes. They have predicted by combining linear and nonlinear patterns , linearly to generate a prediction from the original market price data. HP filter learns trend and seasonal pattern which are part on time series data separately. Then neural network is used to predict the price. In this study they have followed three steps which are data preprocessing, data forecasting, and data merge.

Using hp filter , as mentioned earlier they will separate trend and cyclic component and analyzed it using ANN and merge the result in last using a linear function. Usually in researches , they have not much considered about reducing dimension as more dimensions means complex functions, however in this research they had aimed to reduce the dimensions. ARIMA model is commonly used for timeseries forecasting, however in this study they have presented that ANN is better because there is no need to examine the properties of the original data and determine appropriate parameters. So, in the end of the study using the use of HP filter and hybrid model ,concluded that it produced better accuracy than ARIMA.

**M.Subashree and et al** [7] have done their research on predicting price with genetic algorithm. They have followed following steps in their methodology: normalization, network structure creation, training, testing. They have got data manually from Tirupur new bus stand Ulavar market and used three weeks data for simulating the model and one week data for testing. Features derived were weather, lack of availability (LA), over production (OP), transportation cost (TC), supply, demand. However, normalization of data is a major issue in neural network. In normalization, data has to fit within the limit of transfer function. In this study for normalization, Minimax normalization is used.

Number of hidden layers, neurons and activating function are the basic configuration in order to build a neural network. So for this study they have compared RBF neural network, BP neural network, genetic algorithm based neural network and at last stated that genetic is the best among all.

So, in RBFNN the activation function is radial basis functions and data is normalized using max-min normalization. In this model, error is reduced by purelin layer.

Genetic algorithm optimizes a set of parameters. Basic idea of this model is to produce a set of solution, and these solution are to be considered a generation. And the rule is that next generation would generate better solution than the earlier generation. And it has four steps: initialization, selection, cross over, and mutation. However, for this model they have used 10 hidden layers which should cause increment in execution time. But when comparing the results at last Genetic algorithm has scored high in accuracy and less in time when compared to other two models used for this study. This study was concluded with further research could be done using more vegetables, more influential factors, and use of supervised learning for better accuracy.

**Changshou Luo and et al** [8] has researched four models [3] to predict the vegetable market price. The BP neural network model, the neural network model based on genetic algorithm, the RBF neural network model, and an integrated prediction model based on the three models above were presented here as the theory and building techniques for forecasting the vegetable market price. They used these models and found a price for *Lentinus edodes*



which is a vegetable sold in Beijing Xinfadi wholesale market. The integrated model showed them a best results than the others. To prepare for forecasting they have used monthly price gain. In this study, for BPNN to convert from layer of input to hidden they have used tansig() function and to hidden to output layer they have used purelin() function. And Levenberg- Marquardt algorithm is used for optimization.

For genetic algorithms model, following is the methodology: Gene Encoding, Initial chromosome group generation, Individual fitness computation, operation selection, cross over selection, variation , revaluating fitness value of chromosome group and finally if the result meets the goal output is given or else goes back to selecting operation and process continues so on.

RBFN is considered having better function estimation, classifying, and recognizing pattern than BPNN. Integrated model is made in order compromise the shortcoming of each models. Each model provides each advantages such as BPNN is good at simulation ,GA is good at prediction. So integrated model uses single prediction model and obtain best accuracy. For further research need of considering more influential factor is also mention similar to M.Subashree and et el research.

**Yung-Hsing Peng and et el[9]** has researched price prediction for smart agri management platform(SAMP). This system automatically retrieves historical prices from an official website of Taiwan. Using this data 4 algorithms were implemented and tested in order to predict. These algorithms presented distinct advantages to the crops used which are cabbage, Bok choy, Watermelon, and cauliflower. For example RSMPLS had advantages for some crops , although PLS and ANN were proposed as the algorithms as preferable according the research. The study concluded by recommending that temperature, market location, and planting area be considered as features. Also, to use the ant colony system or particle swarm optimization for feature selection, as features may increase in number in the future.

Research reference no	Proposed models	Comparison models	Accuracy level	Technology	Is there is implemented platform?
[8]	integrated prediction model of BPNN, RBFN, and genetic algorithm model	BP neural network model, neural network model based on genetic algorithm, RBF neural network model	Mean absolute error (MAE) for prediction is 0.106%.	Matlab	No
[4]	Radial basis neural network	Back propagation neural network	85.55%	Matlab toolbox	No
[5]	linear Hodrick-Prescott (H-P) filter, neural network model	ARIMA, BPNN	MAE for five vegetables respectively are 0.15, 0.37, 0.34, 0.38, and 0.37 and RMSE are 0.19, 0.79, 0.51, 0.46, 0.42	Matlab R2013b	No
[6]	PLS for short term, ANN for long term	ARIMA Partial least square (PLS) ANN, PLS integrate with the response surface methodology (RSM), deriving a new algorithm RSMPLS,	(Given using graph only) PLS achieves best results for PLS and ANN achieves best results for long term)	Visual C#,	Yes

[7]	genetic based neural network	Radial basis function, back propagation neural network	89%	Matlab	No
[3]	Hybrid association rule based association tree.	C4.5, C5.0, C5.0: ADT classifiers	90%	R programming language, Hadoop	No
<b>Agro Panda</b>	Yet to be proposed	Hybrid association rule based association tree, genetic based neural network	Yet to be done	Scit Learn, Flutter	Yes

Table 1.1

## 1.2 Research Gap

Analyzing the above table, it is understandable that there are many algorithms. And some are better than others. The gap here is that there should be a implemented system which have higher accuracy.

## **1.1 Research Problem**

Farmers face difficulties when it comes to predicting prices. So availability of future prices will immensely affect the current demand of a crop. So the research question would be how can the accuracy of the models increased to give a better predictions.

## **2 OBJECTIVES**

### **2.1 Main Objective**

This research study is aimed at finding the proper machine learning algorithm which can be used to predict vegetable prices which can be implemented in a system so that farmers can easily access.

.

### **2.2 Specific Objectives**

- Find out the most suitable algorithm which can provide increase in accuracy.
- Collecting data need from website and transform the data into a format where it could be fed to the algorithm in order to predict
- Test the results and calculate the accuracy of the prediction.
- Implement a mobile application system with good user experience to be able to be used by farmers and others who seeks knowledge on pricing of vegetables.

### 3 METHODOLOGY

#### 3.1 Following are the methodology:

1. Data collection: Data is collected from a website  
<https://www.cbsl.gov.lk/en/statistics/economic-indicators/price-report>  
For this research , planned to consider the market price of pettah and vegetables considered are Bean, Carrot , Cabbage , tomato.
2. Prediction Algorithm: As the data would be time series data which is has non-linear features. The proposed model is genetic algorithm based neural network in order to produce increased accuracy.

#### 3.2 System overview diagram

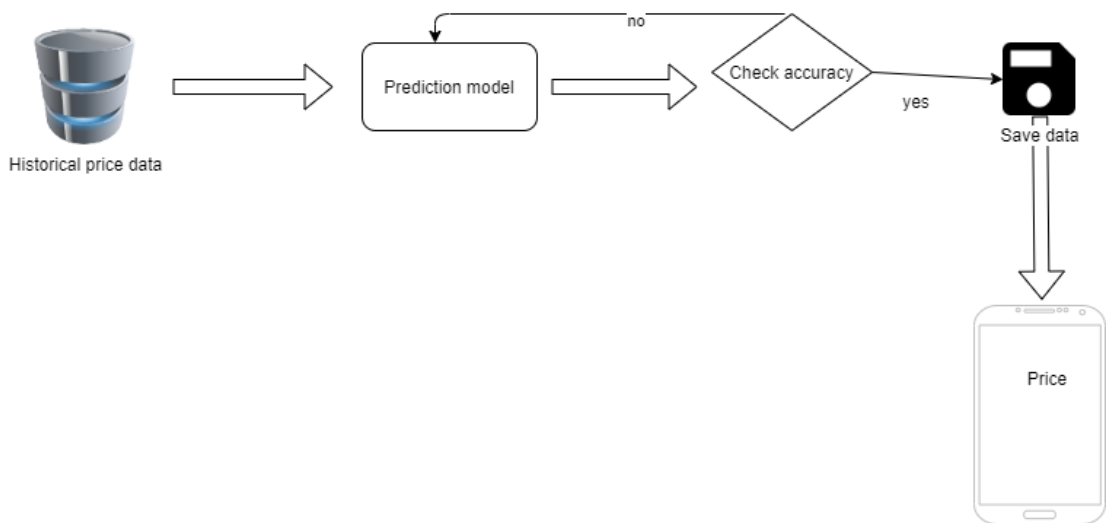


Figure 1.1

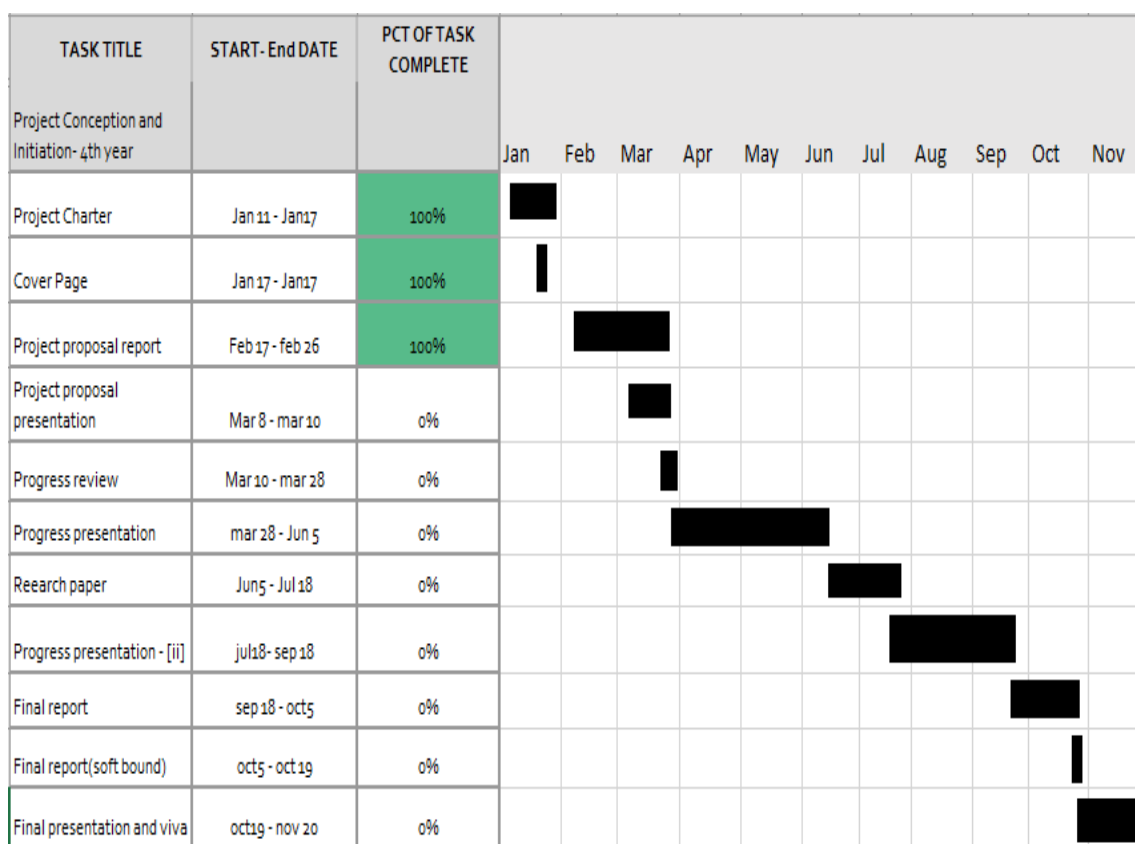
### 3.3 Technology Selection

- Software component:-

Version controlling: Git lab

- Project Management:- Jira
- Android development:- Flutter

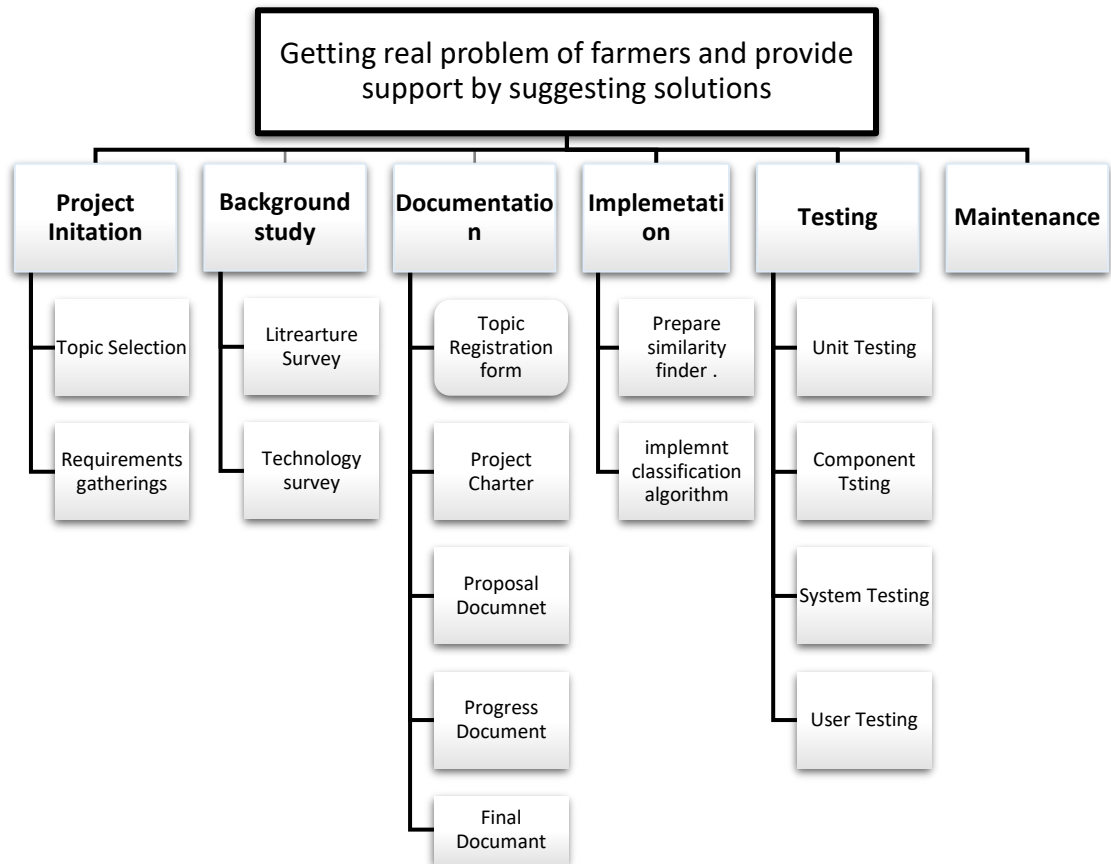
### 3.4 Gantt Chart



**Figure 1.2 - Gantt Chart**



### 3.5 Work Breakdown Structure



**Figure 1.3 – Work Breakdown Structure**

## 4 PROJECT REQUIREMENTS

### 4.1 Functional and non-functional requirements

- Functional requirements
  - Predict price suggestions accurately.
  - Implement mobile application
  
- Non-functional requirements
  - Less manual work
  - Take less time to come up with a price that will be beneficial for the farmers.
  - The mobile app should have better performance.

## 5 Budget

Description	Amount (LKR)
Internet Charges	8, 000.00
Deployment charges	4, 000.00
Total	12, 000.00

Table 1.2: Budget

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8. Changshou Luo , Qingfeng Wei, Liying Zhou, Junfeng Zhang, Sufen Sun(2011), "Prediction of Vegetable Price Based on Neural Network and Genetic Algorithm"

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10.1109/TAAI.2015.7407108.

## Appendix

proposal

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ORIGINALITY REPORT

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**17** %

SIMILARITY INDEX

**14** %

INTERNET SOURCES

**9** %

PUBLICATIONS

**12** %

STUDENT PAPERS

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**Sri Lanka Institute of Information  
Technology Sri Lanka**

**E-COMMERCE PLATFORM FOR THE FARMERS**

Project ID: 2021-135

Project Proposal Report

R. Jayaraman  
IT16037984

Supervising by : Ms.Anjali Gamage

Bachelor of Science (Hons) Degree in Information Technology  
Specializing in Information Technology

Department of Computer Science and Information Technology  
Faculty of Computing

February 2021

**Sri Lanka Institute of Information  
Technology Sri Lanka**

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Project ID: 2021-135

Project Proposal Report

Supervising by : Ms.Anjali Gamage

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Faculty of Computing

February 2021

## Declaration

I declare that typically my work and this proposition does not consolidate without affirmation any material previously submitted for a degree or diploma in any other university or institute of higher learning and to the best of my information and conviction it does not contain any material previously distributed or composed by another individual except where the acknowledgment is made within the content.

Name	Registration Number	Signature
R. Jayaraman	IT16037984	

The above candidates are researching the undergraduate Dissertation under our supervision.

**Supervisor: Ms. Anjali Gamage**

Signature of supervisor: \_\_\_\_\_ Date: \_\_\_\_\_

**Co-Supervisor: Mr Dammika De Silva**

Signature of co-supervisor: \_\_\_\_\_ Date: \_\_\_\_\_



## **Abstract**

In the current situation farmers face a lot of issues and must spend more time to get basic financial and technical support. To do that we create an efficient online platform where they can sell and buy vegetable and old tools, find a recommendation of vegetable crops which are more profitable to them. The individual component proposed Android application provides a way to help farmers focusing on profitable vegetable cultivation in Sri Lanka. The key technologies used here for this individual component is Machine Learning. First, we get the input of vegetables from farmer to identify which vegetable the willing to cultivate. We are prioritizing and suggest to farmers according to the demand of the vegetables. We can build a model to suggest profitable vegetables. We can feed data using previous history data and get the prediction. Then we can feed our data collected from our app for getting more accurate prediction. We are using Random forest classifier for build our model.

**Keywords :-** Machine learning, Random forest classifier

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## LIST OF ABBREVIATIONS

Abbreviations	Description
AIML	Artificial Intelligence Markup Language
ML	Machine Learning.
RDP	Relational Data Base.
API	Application Programming Interface.
RFC	Random forest classifier
SVM	Support vector machines
RT	Regression tree
NL	Neural networks

# 1. INTRODUCTION

## 1.1 Background Study and Literature Review

There are many studies ongoing in the industry in the field of agriculture. Most of the research associated to prediction of crop are in research level, only few of them are executed as systems but they are also not predictive they are just informative.

There is no huge amount of existing system but still there are few with lack of features. Below is the list of system we have compared. In all systems they are using different technologies for their research.

1. Palanivel et has done their studies on this topic. The study highlights issues such as uncontrolled spending due to water scarcity, supply and demand, and uncertain weather conditions that force farmers to adopt agriculture. In particular, the problem of low crop yields due to unpredictable climate change, poor irrigation equipment, declining fertility and traditional farming methods needs to be addressed. Machine learning is a technique for predicting agricultural production. Different methods of machine learning are used to predict profit, such as forecasting, ranking, regression, and clustering. Artificial neural networks, support vector machines, linear and logistical regression, decision trees, and bilingual algorithms are commonly used for prediction. However, choosing an acceptable algorithm from the pool of available algorithms also presents the researcher with an issue related to the selected culture. During this work, a study was conducted on how to use machine study algorithms to predict crop yields. Estimation to use machine learning methods in big data computing models was proposed. [11].

2. S. Khaki and L. Wang et has done their studies on this topic. Crop yield can be a very complex trait determined by several factors such as genotype, environment, and interactions. Accurate prediction of performance requires a deep understanding of the functional relationship between performance and these interactive factors. Detecting such a relationship requires both large amounts of data and powerful algorithms. As part of the 2018 Syngenta Crop Challenge, Syngenta published several large data sets recording the genotype and yield of two 267 maize hybrids planted at 2,247 locations between 2008 and 2016 and asked participants to forecast the 2017 yield. They joined in to form the winning teams and developed a

DNN approach using the latest modeling and resolution techniques. Our model was found to have superior predictive accuracy, with a mean squared error (RMSE) that is 12% of the ensemble performance and 50% of the quality deviation for the validation data set using predicted meteorological data. With perfect weather data, RMSE would drop to 11% of typical performance and 46% of quality deviation. We also performed feature selection, supported by the trained DNN model, which successfully reduced the dimension of the input space without significantly affecting the accuracy of the prediction. The results of our calculation showed that this model significantly outperformed other popular methods such as the loop, flat neural networks, and the regression tree. The results also showed that environmental factors had a greater impact on crop yield than genotype. [2]

3. Kalimuthu et al has done their studies on this topic. Agriculture is generally the backbone of India and plays an important role in the Indian economy by providing a certain percentage of gross domestic product to ensure food security. But today, unnatural climate change is depleting food production and forecasts, negatively affecting farmers' economies due to low yields and leaving farmers unfamiliar with long-term harvest forecasts. This research effort is helping inexperienced farmers plant rational crops by introducing machine learning, which is one of the most advanced crop forecasting techniques. Naive Bayes supervised learning algorithm is grateful for this. Crop seed data is collected here with appropriate parameters such as temperature, humidity, and water content to help the crop grow successfully. In addition, mobile applications for Android software are being developed. Users are encouraged to enter parameters such as temperature. The application will automatically retrieve your position in the application to start the process.[3]

4. Klompenburg and et al have done their studies on this topic.

Various machine learning algorithms are applied to aid research on crop yield prediction. During this research, he used a scientific literature search to try to extract algorithms and properties that were used in crop yield prediction studies. To support their findings, they retrieved several relevant studies from six electronic databases, of which fifty studies were selected for further analysis using inclusion and exclusion criteria. He carefully examined these selected studies, discussed the methods and characteristics used, and gave suggestions for further investigation. According to his research, temperature, rainfall and soil type are the most used characteristics. The artificial neural network is the most widely used algorithm in these models. It promoted an analysis of fifty articles based on machine learning, followed by another

search of electronic databases to identify studies based on in-depth studies. 30 articles based on in-depth studies were found and intensive applied learning algorithms were extracted. According to this study, sensory neural networks are the most widely used intensive learning algorithms according to these studies, and short-term long-term memory and deep neural networks are also widely used deep learning algorithms. [1]

5. Suganya and et el have done their studies on this topic. All over the world, agriculture has a huge responsibility to improve the nation's economic contribution. However, due to the lack of introduction of ecosystem control technology, major agricultural fields are still underdeveloped. Due to these problems, agricultural productivity does not improve and affects the agricultural economy. Therefore, forecasting plant yield can help improve agricultural productivity. To alleviate this problem, machine learning techniques in agriculture should be used to increase yields from a given dataset. Analysis of Datasets from Supervised Machine Learning Techniques (SMLT) to obtain multiple information. The results show that the efficiency of the proposed machine learning algorithm is compared to the accuracy, recall, and high accuracy of the F1 score. Improving the economic contribution of the agricultural nation. The agricultural sector seems to be underdeveloped due to the lack of introduction of ecosystem control technology. Agricultural productivity is based on the plant yield forecast. Machine learning techniques need to be used to derive yields from specialized datasets in agriculture. A comparative study of machine learning algorithms. [4]

## **1.2 Research Gap**

Nowadays agriculture is the main economical part of our country even though farmers experiencing a huge problem in getting profits from their product. In most of the countries, researchers had suggested a system with different methods, but a lack of systems are implemented. They were not considered all the factors which are affecting farmers in the real world if they consider the main factors then it will be

more accurate. According to our country, many parts affect farmers but there is no executed system. Sri Lankan farming department maintains some data, which are suitable crop recommendation help full for farmers, even though there is no prediction they must go through the data one by one to get any decision.

### **1.3 Research Problem**

There is no online platform to help farmers to communicate with each other. And further they might face difficulties when deciding price range on an online platform. Some farmers don't know which product to cultivate and what product gives them more profit. Sometimes what happens is many farmers cultivate same product from same place so the price will go down. So, our research focuses on these problems that farmer may face.

Agriculture industry covers the large percent of economy in the country. In order, to achieve notable profit farmers should adapt to the agriculture which is getting modernized. However, the GDP is facing a drop nowadays.

So, in order to face this problem, we provide a solution where we build an online platform using mobile applications, which will eventually lead to reduction of problems faced by farmers as they would get the suggestion of profitable crops. This would immensely help them to make their financial decision and other decisions as well.



## **2 OBJECTIVES**

### **2.1 Main Objective**

Sometimes seasonal vegetable also has a low price due to excessive production. So, some farmers don't get the profit. We can give a solution by give a suggestion of which vegetables to cultivate. In the app we get farmer's location, current time and then we can list the top profitable vegetable to farmer. So, the farmer can make profit easily.

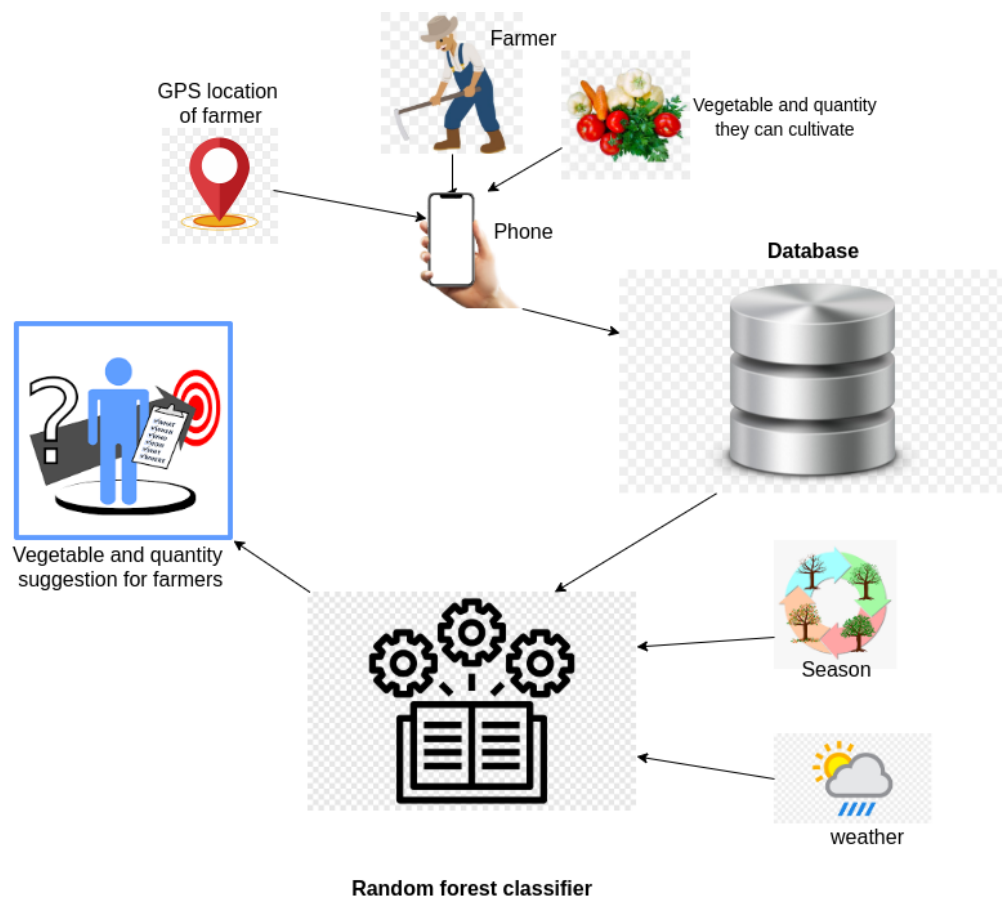
### **2.2 Specific Objectives**

- Perform a thorough research on model to calculate demand for vegetable.
- Prepare to feed correct historical data into model.
- Analyze the solutions and test the solution.
- Providing suggestions in simple and understandable way.

### 3 METHODOLOGY

A model is built in order to predict the demand of the vegetable. We are planning to build this using Random forest classifier.

#### 3.1 System Overview Diagram



*Figure 3.1.1 – Illustration of the system overview*

In the Android app, you need to register first and then log into the app. When a user logs in, the user's location is saved to the system. Otherwise, the user has to manually enter where they want to grow their produce and which vegetables they prefer to grow. The prediction component with a given location will analyze the existing trained model and predict the appropriate crops.

### 3.3. Collecting requirements

We collected the farmers' requirements through face-to-face interviews in various areas. And we can meet the staff of the agriculture department to get a clear knowledge of agriculture and its problems. We made sure that the correct datasets were obtained from the relevant departments.

### 3.4. Testing

Software testing is very important in the development lifecycle to reveal flaws and errors that have been made during the development stages. It is also very important to monitor the quality of the product. Testing is essential for the efficient functioning of an application or software product. Testing is required at all stages of the software development lifecycle, such as unit testing , integration testing , system testing , and user acceptance testing.

#### 3.4.1. Unit testing

Unit testing is the stage where each unit or feature is tested after implementation. Tests the components to make sure each feature is working properly. This is done for each component individually.

#### 3.4.2. Integration tests

After completing the unit tests, each module will be integrated into a different subroutine. This integrated system is tested in this phase. These tests are also performed by group members individually to ensure that the embedded system is working properly.

#### 3.4.3. System testing

The whole system will be tested to assure that the entire system is running correctly. This can be done by any member of the group.

#### 3.4.4. User Acceptance Test

This is performed by end-users to verify that the system meets its requirements.

### **3.5 Technology Selection**

- Version controlling: Git.
- Android development
- Android studio
- MongoDB
- Firebase
- Flutter

### 3.6 Gantt Chart

TASK TITLE	START- End DATE	PCT OF TASK COMPLETE												
Project Conception and Initiation- 4th year			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
Project Charter	Jan 11 - Jan17	100%	■											
Cover Page	Jan 17 - Jan17	100%	■											
Project proposal report	Feb 17 - feb 26	100%		■	■	■								
Project proposal presentation	Mar 8 - mar 10	0%			■	■								
Progress review	Mar 10 - mar 28	0%			■	■								
Progress presentation	mar 28 - Jun 5	0%				■	■	■	■					
Research paper	Jun 5 - Jul 18	0%							■	■				
Progress presentation - [ii]	jul18- sep 18	0%								■	■	■		
Final report	sep 18 - oct 5	0%										■	■	
Final report(soft bound)	oct 5 - oct 19	0%											■	
Final presentation and viva	oct 19 - nov 20	0%											■	■

#### **4.1 Functional requirements and non-functional requirements**

- Functional requirements
  - Build model.
  - Predict demand.
  
- Non-functional requirements
  - Less manual work
  - Take less time to predict the accurate personality and background of personnel.
  - Accuracy of prediction.

## 4 Budget

Description	Amount (LKR)
Internet Charges	8, 000.00
Transport charges	3, 000.00
<b>Total</b>	<b>11, 000.00</b>

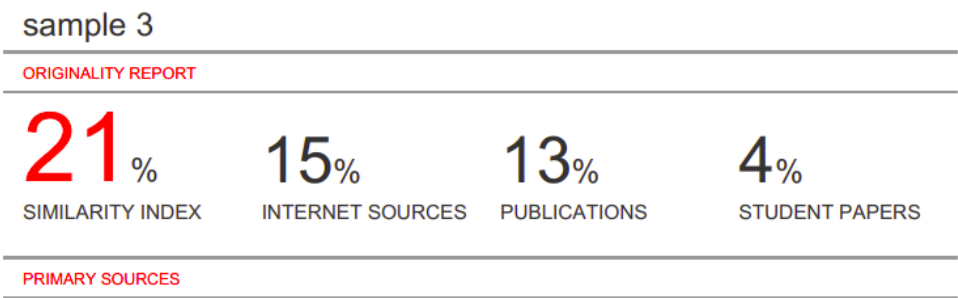
**Table 4.1.1: Budget**

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# Appendix



# **E-COMMERCE PLATFORM FOR THE FARMERS**

Project ID: 2021-135

Project Proposal Report

Keeyani Sivagnanam

IT18179118

Bachelor of Science (Hons) Degree in Information Technology  
Specializing in Information Technology

Department of Computer Science and Information Technology  
Faculty of Computing

Sri Lanka Institute of Information Technology  
Sri Lanka

February 2021

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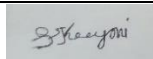
Sri Lanka Institute of Information Technology

Sri Lanka

February 2021

## Declaration

I reveal that typically my work and this proposition does not consolidate without affirmation any material previously capitulated for another degree or diploma higher learning institute or any other university. And to the best of my information and conviction it does not contain any previous distributed material or composed by another individual except where the acknowledgment is made within the content.

Name	Registration Number	Signature
Keeyani. S	IT18179118	

The above candidates are researching the undergraduate Dissertation under our supervision.

**Supervisor: Ms. Anjali Gamage**

Signature of supervisor: \_\_\_\_\_ Date: \_\_\_\_\_

**Co-Supervisor: Mr. Dammika De Silva**

Signature of co-supervisor: \_\_\_\_\_ Date: \_\_\_\_\_

## **Abstract**

In the current situation farmers facing a lot of issues. So, agricultural firms still need to think almost how to optimize administrations and create jobs to form an important resource base and competitive advantage. In remote farms, farmers' generation forms and accomplishments can be assisted by customer communication and agile production visualization by the Chatbot of e-commerce, at which point the farm can be upgraded and included esteem.

When farmers have prior information and affirmation of the farm, the farmers have a good generalization, can provide services, and increase income for the experience activities of e-commerce. And this research assists farmers in employing a chat to progress business activities.

Analysis of farmers interviews revealed that farmers favored chatbots that given either a 'human-like' natural language communication ability. It can even recognize not so well grammatically characterized sentences, incorrectly spelled words, fragmented phrases, etc... This may help assistance individuals to converse effectively with the bot, since this framework uses the NLP method to parse the farmers queries, recognize the key words, coordinate them with Knowledge Base and react with the accurate results. To create the responses more justifiable, the responses are produced utilizing classification algorithms and deliver non-textual reactions so that it can be easily perceived by the farmers such as pictures, small videos.

**Keywords:** - Chatbot, Agriculture, e-commerce, Artificial Intelligence, Farming Industry, Natural Language.

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## LIST OF ABBREVIATIONS

Abbreviations	Description
NLTK	Natural Language Tool Kit
AIML	Artificial Intelligence Markup Language
SVM	Support Vector Machine
KNN	K Nearest Neighbor
ML	Machine Learning.
RDP	Relational Data Base.
CNN	Convolutional Neural Network.
API	Application Programming Interface.
NMT	Neural Machine Translation
NLP	Natural Language Processing



# 1. INTRODUCTION

## 1.1 Background Study

Through the years of developing and perfecting chatbot for farmers, diverse ideas and innovation were investigated within the chatbot community. However, despite these advances, the premise for the creation of chatbot rests in pre-written pattern matching templates, and within the investigation of large stores of prepared small communication responses, although more complex design based on learning were also proposed.

Chatbot in NLP is thinks about how to get it languages like human beings is one of the foremost imperative spaces of AI. As chatbot designers generally want their frameworks with certain characteristics in order to create a chatbot foremost common is to begin by scripting its knowledge base, a database with the desired matches for inputs and comparing answers.

Progressed NLP can indeed get it the expectation of user messages. For example, are they typing simple depiction about their cultivating product. Whereas this could seem unimportant, it can have a significant affect on a chatbot's capacity to carry on a effective conversation with a farmer. Issues that torment incorporate spelling and grammatical mistakes and poor language use in common. Progressed Natural Language Processing (NLP) capabilities can recognize spelling and grammatical blunders and permit the chatbot to decipher their intended message despite the botches. Whereas Natural Language Processing (NLP) certainly can't work supernatural and guarantee a chatbot appropriately reacts to each portrayal of farmers, it is capable sufficient to make-or-break a chatbot's victory. Don't belittle this basic and frequently ignored perspective of chatbot.

There are different range of farming solutions chatbot. First, they can be utilized to compute similarities between problems and solutions. It is useful for cluster records and at last they are helpful for NLP research which are most important for count of tasks that they can be utilized.

Time is of the essence in today's modern world, extraction and parsing is actual, especially in farming field farmers are facing many problems like getting correct equipment, agricultural marketing, scarcity of capital, plant protection, weather, unbiased recommendation of product fertilizers and biocides and getting good quality of seeds. These kinds of problems should be solved within specified time periods. Because temperature zone of the farming people cultivating their products once per year and the land were left fallow during the temperature season. Upland farmers cultivating under rainfed condition with subsidiary food crops under a shifting cultivation system. If they waste their valuable time with these struggles, they cannot engage their agricultural activities. Which will affect their outcome.

The extracted recommendation can be used to simplify the farmers' work until the struggling and reporting time is reduced. The article proposes an algorithm for automated product name suggesting, which is the extraction of information about the farmers' need, agricultural marketing, and basic information, based on NLP methods.

## **1.2 Literature Review**

The research paper " *The Study of the Application of a Keywords-based Chatbot System on the Teaching of Foreign Languages. ArXiv preprint cs/0310018* " in 2003 [1], They have centered in this research conducted on the on-line human computer exchange framework application of with characteristic dialect (chatbot) on the educating of outside languages. So, a test has been made utilizing this framework online to work as a chat accomplice with the clients learning the foreign languages. Dialogs between the clients and the chatbot are collected. Discoveries demonstrate that the dialogs between the human and the computer are exceptionally brief since the user finds the reactions from the computer are generally repeated and

insignificant with the topics and context and the program does not get it the language at all.

With investigation of the pattern matching process or keywords utilized in this chatbot it can be concluded this type of system cannot work educating collaborator program in other language studying.

Huang, J., Zhou, M., & Yang, D in their research paper ***“Extracting Chatbot Knowledge from Online Discussion Forums. IJCAI'07 Proceedings of the 20th international joint conference on Artificial intelligence”*** in 2007 [2], They present on this paper extracting for novel approach sets as chat data from online discourse gathering so as to proficiently back the buildup for a certain space of a chatbot. A gathering, a cascaded framework helps to extricate the high-quality sets. To begin with, the replies logically pertinent to the thread the root messages extricated with a classifier called SVM from all the replies, based on correlations such as substance. At that point, the extracted sets are positioned with a positioning SVM based on their substance and structure qualities. At last, the Top-N groups are taken as chatbot data. Come about from practical conducted into a movie forum the proposed approach is show effective.

Abdul-Kader, S., & Woods, J in their research paper ***“Survey on Chatbot Design Techniques in Speech Conversation Systems. International Journal of Advanced Computer Science and Applications”*** in 2015[3]. The content of the thought is Human-Computer communication is gaining momentum as a computer interaction procedure. There has been a recent upsurge in associates and speech-based search engines those are Siri, Cortana and Google Chrome. NLP procedures such as for examine speech to NLTK Python can be applied and intelligent reactions can be identified by planning an machine to supply suitable user like reactions. This research presents a study of the methods utilized to plan Chatbots and a comparison is made

between diverse design procedures from some carefully chosen papers regarding to received important strategies.

These researches are type of critical advancements in Chatbots in the last decade. The research examines the differences and similarities in the methods and tests in specific the Loebner prize-winning Chatbots.

Wu, Y., Wu, W., L, Z., & Zhou in their paper “***A New Architecture for Multi-turn Response Selection in Retrieval-based Chatbots***” in 2016[4]. They consider response choice for multiturn discussion in retrieval-based chatbots. Existing work either concatenates expressions in factors or similarities an expression with a exceeding theoretical setting success finally, that may lose connections among expression or vital relevant data. They propose a sequential coordinating network (SMN) to address both issues. SMN begin with matches a reaction with each expression within the setting on different levels of granularity, and distills important coordinating information from each match as a vector with convolution and pooling operations. The vectors are then accumulated in a chronological arrange through a repetitive neural network (RNN) which model connections among articulations. The score is counted with the covered up RNN states.

Yan, Z., Duan, N., Bao, J., Chen, P., Zhou, M., Li, Z., & Zhou in their research paper “***An Information Retrieval Approach for Chatbot Engines Using Unstructured Documents. Proceedings of the 54th Annual Meeting of the Association for Computational Linguistics***” in 2016[5]. This research considered about chat bot, a novel data recovery approach for chatbot machine can be use unstructured reports, rather than Q-R sets, to reply to utterances. A learning to rank model with highlights outlined at diverse levels of granularity is proposed to measure the pertinence between reactions and utterances straightly. This proposed approach is in both Chinese and English. For English, chat bot can access on QASent and WikiQA, two reply sentence determination tasks, compare it with art strategies state. great versatility and sensible improvements and are observed.

Compare for Chinese chat bot with XiaoIce2, a popular China chitchat engine, and step by step evaluation appears that chat bot is a perfect complement for chatbot utilizing QR sets as fundamental reaction source.

Craig Elimeliah in his research paper *“Why chatbots are replacing apps”* in 2016[6]. Conversational based Text messaging specialists, called mostly chatbots, received significant consideration in the last few years. However, have a low penetration rate of the web clients have not utilized a chatbot however. Subsequently, utilization designs of beginning stage clients can potentially inform and direct the pattern of chatbots. This research, report about the discoveries of some beginning level of chatbot users collaborating with some chatbots over many sessions on the Messenger platform of Facebook. Client interviews and investigation of chat logs exhibit that users favored chatbots which addressed either a natural language conversation like human capacity, or experience of an engaging that abused the advantages of the recognizable interface of messaging. From this research suggestions are concluded for advance chatbots design

The research paper *“implementation and Design of a chatbot in the customer support context”* in 2018[7]. This paper contains beginning from chatbot’s objectives and definitions, a group of client imperatives and issues were mentioned on paper in chapters a software solution was developed and designed for deploying and training chatbots. Which makes it conceivable to dynamically extract ticket data from an existing Zendesk environment and label data with tags attached to the tickets as appeared in a chapter. In addition, into several modules decayed about the chatbot concept which illuminate some specific design issues. few of those modules make models of neural network uses. Those structure was properly analyzed from a chapter.

Moreover, it provides an introduction for client problems and additional languages’ support. Chatbot was created focused on the display and search of data obtained from deployed on a vineyard Wireless Sensor Network. It is Telegram Bot based API and

is able to get to information obtained by eKo field sensors and bringing it back to a client through interaction over the Telegram application.

Advance developments are arranged for Chatbot, which are the extension to another messaging API platform, the execution capability of speech communication, continuous data analysis and image classification. It is hoped that weight of accessible data, it becomes conceivable to work towards the avoidance of destructive situations to farming productions, diseases in crops, water waste reduction and energy, and advanced administration abilities for the farmer

### **1.3 Research Gap**

According to the literature review above, the following research gaps are identified:

- There is no enough platform for farmers to getting appropriate suggestions.
- Sometime they have an idea about a product and they do not know the actual name of them.
- So, farmers faced with a difficult choice there when product buying and selling times.
- Researchers also compared some chatbot interface modalities. But mostly farmers do not have sufficient capacaty to come out to the solutions from those outputs.
- Farmers are not fluent in English. By using NLP chatbot farmers can type simple keywords and descriptions related to their problems, those keywords will come out the correct solutions.

Given below is the detailed summary of some of the previous researches,

<b>Ref No</b>	<b>Algorithms Used</b>	<b>Results Obtained</b>	<b>Research Gap</b>
<b>3</b>	Naïve Bayes, SVM, and KNN	Naive Bayes slightly overperforms over SVM and KNN with 60% accuracy.	Accuracy level was below 70%
<b>6</b>	NLP, RDB techniques and NLTK	Speech recognition outperforms over other models	The mostly accepted as the future of interaction is speech recognition. Which is interact with mobile applications and computers.
<b>9</b>	AIML and NLP	Results demonstrated AI chat bot able to interact with students in NLP, an intelligent agent	Accuracy level is below 90% (Different ML methods can be adopted to improve the accuracy level.)
<b>12</b>	CNN and chitchat queries for classification	A response gathering process for chatbot engines dependent on unstructured documents	The period of data gathering has been relatively poor
<b>14</b>	Least absolute shrinkage and selection operator algorithm	presenting the conversational context and giving connections with the context amounts	Methods such as fuzzy logic can be applied to improve performance and accuracy level.

***Figure 1.3.1- Some of previous researches' gap***



## **1.4 Research Problem**

After realizing the important of farming, we focused on farmers' difficulties. They are facing a lot of issues and must spend more time to get basic technical support. To do that they need to get a platform where they can sell and buy vegetable and plants, find a recommendation of vegetable crops and getting solutions from some farming problems.

Farmers might not know the exact name of the plants they use in- order to sell it. These kinds of problem may lead to difficulties in selling and buying products used for agriculture and farming. When farmers confronting these types of situations, they are searching good suggestions in understandable way.

## **2 OBJECTIVES**

### **2.1 Main Objective**

In this component main objective is to develop a chatbot to getting right name of the farming products by providing some description using their simple English. For this problem we are using NLP. And providing support to farmers in decision making activity.

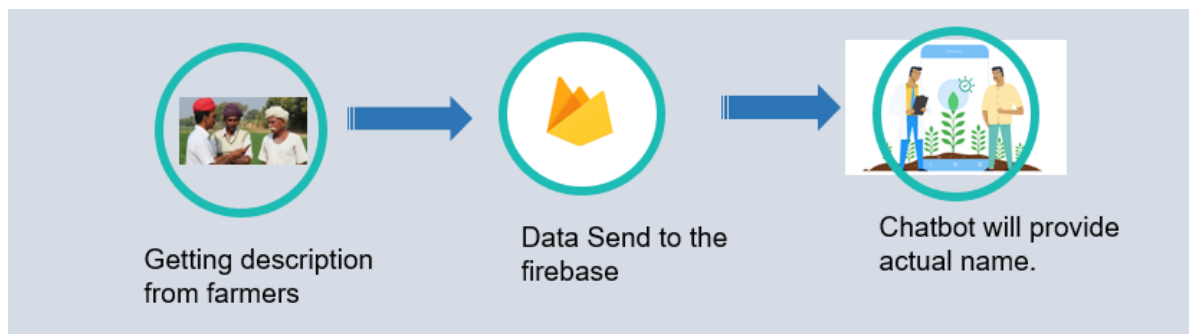
### **2.2 Specific Objectives**

- Prepare the most suitable classification algorithm to answer the queries based on similarities.
- Typing simple description which they've understand about the product and getting right name of the product.

### 3 METHODOLOGY

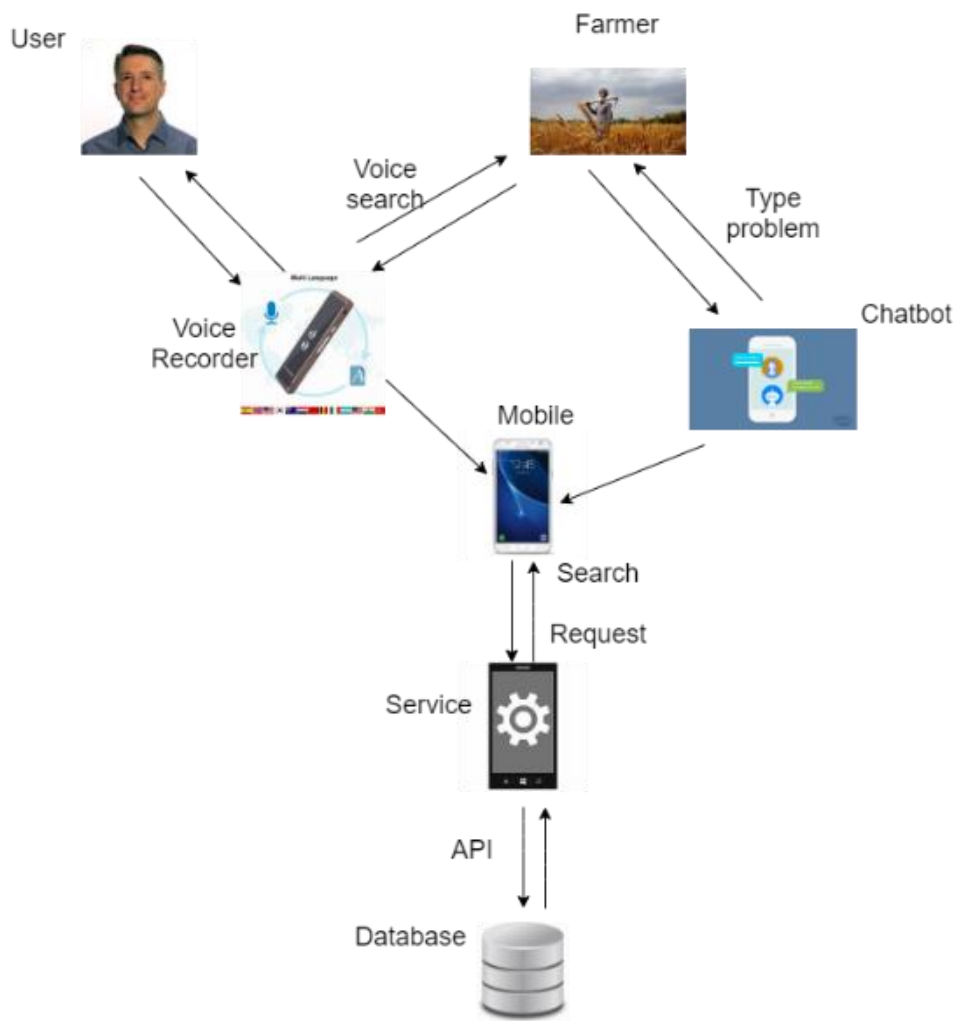
In our research system farmer have to enter a simple description about the product which they have understood. Then the system will get those description and suggest the product name. This project is CONTAIN a CNN + fully connected layer + an embedding layer. If words that have same meanings these vectors are learned will have comparative representations in the vector space.

Which is better representation than normal classical methods like bag of words, where connections between words or tokens are ignored, or constrained in bigram and trigram approaches. These vectors are updated and learned at the model training period.



*Figure 3.1.1 –system simple process*

### 3.1 System Overview Diagram



*Figure 3.1.2 – Illustration of the system overview*

### **3.2 Development Process**

The 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 output. 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 step 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 time.
- During the development time of the project, modern technologies can be used bases on process requirements.

So, it is essential to use the iteration model through the project development lifecycle.

### **3.3 Data Preprocessing**

The basic functionality of this component is to fetch the problems details from database. Retrieve data set in the database then it will be progressing to text splitting step. Another part is mapping. It is an important portion of this process.

This process contains three stages. Determine related word create set of related words and feature for text categorization. By using word embedding algorithm which things will be apply.

#### **1. Determine related words**

To prediction model suggest related words to the word being exposed. Along with that it also suggests dissimilar words, as well as most regularly utilized words.

#### **2. Make a set of similar words**

Set of things related characteristic together and dissimilar far away. Which is used for semantic grouping.

#### **3. Text classification feature**

Text formats are mapped into arrays of vectors, so this is fed to the model for prediction and training. Unable be trained on the string to classifier model of Text-base, so which is going to convert the text into trainable form of machine. More over its features of building semantic help in classification based on text.

### 3.4 Clarification and Recognition

The neural network-based and rule-based approaches main concept that differentiates is the latter case presence of a learning algorithm in the important refinement should be made between deep learning and traditional machine learning those are the sub parts of previous. Only deep learning methods applied to chatbots are discussed in our research, since conversational modeling is neural networks backbone. Traditional machine learning methods and supplementary methods are utilized very rarely.

A numerical representation method should be used transform data when applying NLP tasks. This is done through word embeddings, which represent each word as a settled size vector of genuine numbers. Handling words as huge vectors of the measure of the vocabulary is difficult, but word embeddings are easy to all, much lower measurements can be represented by them. The vocabulary utilized in NLP tasks is displayed in more detail in our research. Word embeddings are prepared on expansive amounts of natural language data and the objective is used to construct vector representations that capture the semantic similarity between words.

There is a concept which contain words with related distributions should have comparative vector representations. It is called the Distributional Hypothesis. Each vector representing a word can be respected as a set of parameters and these parameters can be together learned with the neural network's parameters, or they can be pre-learned.

Rather than of utilizing hand-written rules deep learning models change input sentences into answers directly by framework. Millions of parameters are in nonlinear functions. There are two types of Neural network based conversational models such as generative models and retrieval based.

The user can getting reply from the dataset by determining the reaction to the current input expression based on an achieving function, so that could be actualized as a neural network or by computing the cosine similarity between the solution suggesting and word embeddings of the input farming problems. However, which is a totally different

field, there are already attempts at making bound together chat platforms for training and assessing different conversational models.

- **3.6 Technology Selection**

- Software component: -

Version controlling: Git

Programming language: Python

- Project Management: -

TFS server

### 3.5 Gantt Chart

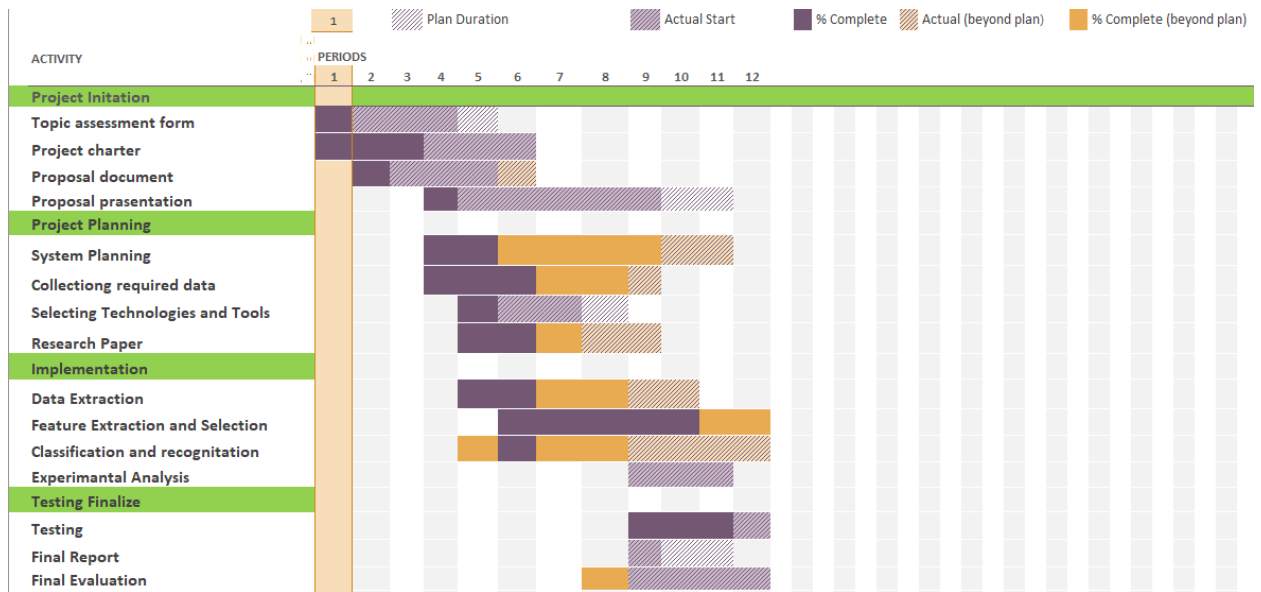
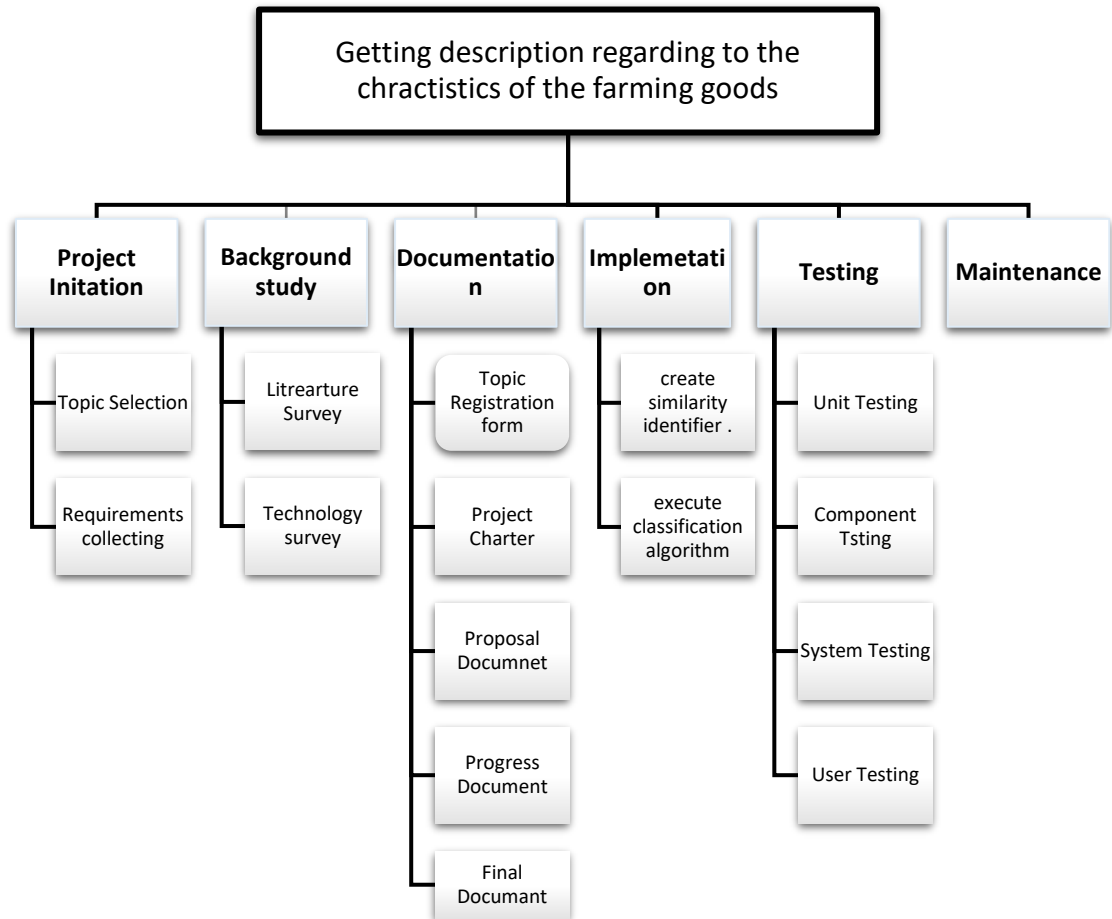


Figure 3.6.1 Grant chart



### 3.7 Work Breakdown Structure



*Figure 3.7.1 – Work Breakdown Structure*

## **4 PROJECT REQUIREMENTS**

### **4.1 Functional requirements and non-functional requirements**

- Functional requirements
  - Getting keywords from description and suggesting term of the products.
  - Providing suggestions for farming problems in NLP.
  
- Non-functional requirements
  - Less manual work.
  - Take less time to getting actual plants names.
  - Come out the correct solutions in products buying and selling periods.

### **4.2 User Requirements**

- By providing simple description regarding to the features of the product and getting genuine name of them.

## 5 Budget

Description	Amount (LKR)
Internet Charges	8, 000.00
Transport charges	3, 000.00
<b>Total</b>	<b>11, 000.00</b>

**Table 5.1.1: Budget**

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# Appendix

## ORIGINALITY REPORT

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