

One To One Stop Solution for Crop Guidance

Shubham Patole, Siddhesh Kanse, Siddhesh Todkar,
Prof. Vinita Bhandiwad

*Vidyalankar Institute of Technology, Mumbai, Maharashtra
Vidyalankar Institute of Technology, Mumbai, Maharashtra
Vidyalankar Institute of Technology, Mumbai, Maharashtra
, Vidyalankar Institute of Technology, Mumbai, Maharashtra*

Date of Submission: 15-12-2020

Date of Acceptance: 30-12-2020

ABSTRACT: Nowadays, in India, the climatic conditions changes rapidly. Sometimes the climate is cold, sometimes it turns out to be humid. In such drastic conditions, farmers are unable to decide which crop we must grow in that particular season according to that climate. This becomes a tedious task for the farmers during decision making. Also, it becomes difficult for the farmers to detect what kind of disease has happened to the crops grown by him. Also, it is difficult for the farmers to find the vendors who could take their products and sell them in a good price. Even though, the farmer gets a particular vendor, he could not find profits by selling products to that particular vendor. To overcome all these problems, we would be designing a system known as “ONE TO ONE STOP SOLUTION FOR CROP GUIDANCE” in which farmers would get solutions to all the above mentioned problems. The interface provided by us will be efficiently helpful to the farmers to boost their productivity which would also boost up the agriculture industry in India.

KEYWORDS: Crop Suggestion, Diseased Crop, Crop Selling, Agriculture.

I. INTRODUCTION

According to the various sources available on the web, almost 70% Indians live in rural areas. Rural livelihoods are highly related to agriculture, dairying, cattle rearing, fish farming and other allied occupations. Out of these, the most important occupation is the agriculture. According to 2011 Agricultural Census of India, an estimated 61.5% of the 1300 million Indian population is dependent on agriculture. Agriculture provides the raw materials to the industries. Most importantly, it provides food surplus to increasing population. But nowadays, this industry is facing a lot of issues. Today, the overall climatic conditions in India is changing rapidly.

This is due to the rise in global warming in the

world. Today, because of these changing climatic conditions, farmers are unable to take a decision regarding which crops they have to grow in a particular season. Also, it is difficult for the farmers to detect and predict what kind of disease has happened to the particular crops. In addition to this, farmers are unable to find the vendors who can sell their products in a profitable cost. Sometimes, it happens that the farmers would get the vendors, but they would not benefit the farmers in terms of profits. In order to provide solutions to all of the problems, we would be designing a system named as “ONE TO ONE STOP SOLUTION FOR CROP GUIDANCE”. Basically, our system is a web application which would consist of 3 Modules. The First Module would be testing of the weather conditions and providing results which would contain the various crops which can be grown for that particular weather. The second module would be detection of particular disease in a crop in which farmer would send the pictures of the crops grown by him periodically and we would detect the disease and provide solution to cure the particular disease. The third module would include an interface for the farmer and vendor interaction.

II. LITERATURE REVIEW

In paper [1], Ashwani Kumar Kushwaha, Sweta Bhattacharya have studied and implemented different well-organized mechanisms which would predict and increase the crop yields and make agriculture highly profitable. In this paper, they have tried to predict the crop yield, suggest the best crop thereby improve the quality and profitability of the agriculture sector by processing huge volume of data often called as Big Data using Hadoop platform. The paper also focuses on the soil type and helps to find which particular crop would be suitable for a particular type of soil. In case of crop yield soil plays an important role and soil

information is predicted by considering the weather details of the previous years. Hence this study will predict the suitability of a crop for a particular climatic condition and the possibilities of improving the crops quality by using weather and disease related data sets. This research paper help to identify mechanisms to get good quality and improved crop yields using a new algorithm named as “Agro algorithm” implemented in Hadoop platform and uses Hadoop framework to handle large amount of data sets.

In paper [2], AbiramiDevaraj, KarunyaRathan, SarvepalliJaahnavi and K Indira had explained the methodology for plant disease detection. They have explained that illness is caused by microorganism that is any agent inflicting illness. Automatic detection might prove gain in looking huge fields of crops and leaf disease detection is most significant analysis topic and then from the symptoms that gift on the plant leaves, it can automatically notice the diseases. They have implemented 5 steps in this process which are Image Acquisition, Image Pre-processing, Image Segmentation, Feature Extraction and Classification. They have used K-means cluster technique for segmentation and random forest Classification technique for coaching and testing of the leaf of plants. At last they have done proper analysis and provide solutions for that particular disease.

In paper [3], Ramesh A Medar, Vijay S Rajpurohit had presented the various crop yield prediction methods using data mining techniques. Agricultural system is very complex since it deals with large data situation which comes from a number of factors. Crop yield prediction has been a topic of interest for producers, consultants, and agricultural related organizations. In this 3 paper, theirs focus is on the applications of data mining techniques in agricultural field. Different Data Mining techniques such as K-Means, K-Nearest Neighbor (KNN), Artificial Neural Networks (ANN) and Support Vector Machines (SVM) for very recent applications of data mining techniques in agriculture field. Data mining technology has received a great progress with the rapid development of computer science, artificial intelligence. Data Mining is an emerging research field in agriculture crop yield analysis. Data Mining is the process of identifying the hidden patterns from large amount of data. Yield prediction is a very important agricultural problem that remains to be solved based on the available data. The problem of yield prediction can be solved by employing data mining techniques.

In paper [4], Deepak RanjanNayak,

AmitavMahapatra, Pranati Mishra had explained that Rainfall prediction is one of the most important and challenging task in the modern world. In general, climate and rainfall are highly non-linear and complicated phenomena, which require advanced computer modeling and simulation for their accurate prediction. An Artificial Neural Network (ANN) can be used to predict the behavior of such nonlinear systems. ANN has been successfully used by most of the researchers in this field for the last twenty-five years. The paper provides a survey of available literature of some methodologies employed by different researchers to utilize ANN for rainfall prediction. The survey also reports that rainfall prediction using ANN technique is more suitable than traditional statistical and numerical methods.

III. PROBLEM STATEMENT

3.1 Problem Definition

Design a system that would provide correct predictions to the farmers regarding what kind of crops can be grown for a particular weather. Also, notify the farmers about the disease which has been detected in the crops grown by him and provide solutions to cure the disease. In addition to this, system should also provide the facility to the farmers to have direct communication with the vendors according to their needs.

3.2 Proposed Solution

In the proposed system, we would be designing a website which will provide the solution for all the three modules. We would be making a dataset which would store the temperature and information regarding locations at which the particular crop is grown. We will be checking temperature conditions by using Openweathermap API. According to these conditions and user's location we will choose suitable crop from dataset as referred from paper

[1], paper [3] and paper[4]. The various diseases happened to the crops can be detected by using Deep Learning technology in which the various images provided by the farmer will be tested by using CNN models as referred from paper [2] . In addition to the detection of disease, we would provide the solution to the farmers to cure the disease. Also, we would be providing a web interface for the farmers where they can select vendors according to their choice.

IV. PROPOSED SYSTEM

Flowchart and its explanation:

The System works as follows. In the first phase, data collection takes place which consist of all the weather conditions in which the various crops grow. Weather conditions would be tested with the help of API and the variety of crops which can be grown for that particular weather would be suggested to the farmers as referred from paper [1], paper [3] and paper [4]. In the second phase, farmer

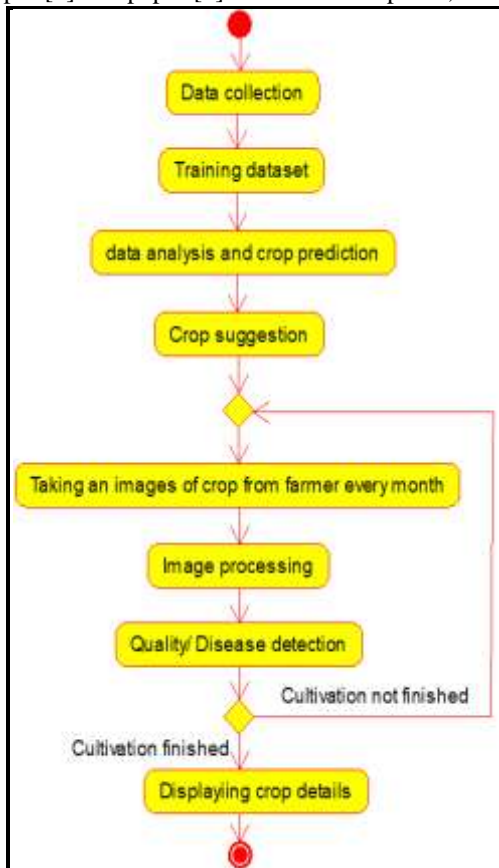


Fig 4.1 Flowchart

V. HARDWARE AND SOFTWARE REQUIREMENTS

5.1 Hardware Requirements:

Desktop PC or Laptop with minimum 4GB RAM and windows OS.

5.2 Software Requirements:

Python 3 and above versions.

Anaconda.

Django.

Matlab2014a or above versions.

VI. METHODOLOGY

There are 3 modules in our system. Each module works as follows:

would send image of the crop every month. Using CNN, Deep Learning Technology would be applied over the images which would detect disease in the crop grown by the farmers as referred from paper [2]. If disease hasn't cured properly or quality of the crop is not up to the mark as required, then crops have grown again and the entire process of second phase will take place. If cultivation is finished successfully, then crop details would be provided to the vendors.

Module 1: Testing of weather conditions and prediction of crops

1. In this particular module, the information regarding the temperature conditions of the various crops will be collected and a dataset would be constructed which would be stored in the system.
2. At the beginning, the weather conditions would be checked with Openweathermap API.
3. After checking the weather conditions, the various crops which can be grown for that particular weather would be suggested to the farmers as referred from paper [1], paper [3] and paper[4].
4. In this way, farmer can proceed to grow the crops suggested by the system.

Module 2: Crop Disease Detection

1. Once the farmer has successfully grown the crops, farmer would send the image of the crops to the system periodically.
2. Using CNN, Deep Learning Technology would be applied over the images and then system will provide the information about the disease detected in the crop as referred from paper [2].
3. Also, system would provide the ways by which the farmer can cure the disease detected in the crop and improve the quality of the crop.

Module 3: Farmer and Vendor Interaction

1. Using the web interface, farmer would enter the details of the crops grown by him.
2. The Vendors who have registered themselves in the system can search for the desired crops in the system.
3. Once vendor selects the desired crops, the farmer would provide all the details of the crop along with details of himself.
4. In this way, Vendor would have direct communication with the farmers for the business purposes.

VII. ANALYSIS

7.1 Process Model used for the Project

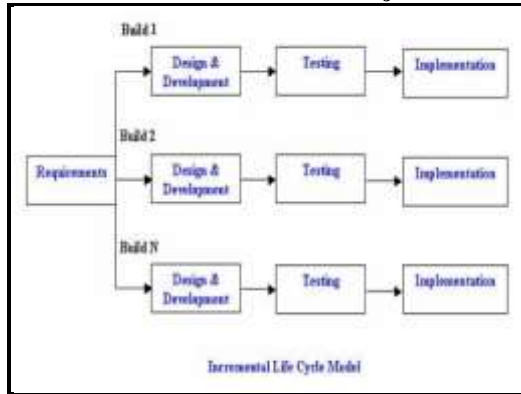


Fig 7.1.1 Process Model

We will be using incremental model in order to develop our project. The reasons for using incremental model are as follows:

- In incremental model the whole requirement is divided into various builds. These builds are smaller, more easily managed modules of our system.
- A working version of software is produced during the first module, so you have working software early on during the software life cycle.
- Each subsequent release of the module adds function to the previous release. The process continues till the complete system is achieved.
- Incremental model is more flexible – less costly to change scope and requirements.
- Also, in the incremental model customer can respond to each built.
- Easier to manage risk because risky pieces are identified and handled during iteration.

7.2 Feasibility Study

1. **Technical feasibility:** Technical feasibility focuses on the technical resources (software and hardware) available and also helps to determine whether the technical team is capable of converting the ideas into working systems. The software required for our project is Matlab, Text editor and Anaconda. The hardware component such as Desktop PC or Laptop is readily available with us.
2. **Economic feasibility:** This assessment typically involves a cost/ benefits analysis of the project. This project is developed in minimal amount which will emerge as a huge market valued project.
3. **Legal feasibility:** This assessment investigates whether any aspect of the proposed project

conflicts with legal requirements like data protection acts, social media laws. The project does not involve any illegal actions since all the required data is provided openly to everyone in the world. Also, all the software requirements would be utilized only by accepting the terms and conditions.

4. **Operational feasibility:** This assessment involves undertaking a study to analyze and determine whether—and how well—the farmer’s needs can be met by completing the project. The main objective of the project is proper suggestion of various crops to the farmers by testing weather. In addition to this, the business communication between the farmers and vendors would be enhanced using our project.

REFERENCES

- [1]. “Crop yield prediction using Agro Algorithm in Hadoop” by Ashwani Kumar Kushwaha, SwetaBhattachrya, a paper from IRACST - International Journal of Computer Science and Information Technology & Security (IJCSITS).
- [2]. “Identification of Plant Disease using Image Processing Technique” by AbiramiDevaraj, KarunyaRathan, SarvepalliJaahnavi and K Indira , a paper from International Conference on Communication and Signal Processing.
- [3]. “A survey on data mining techniques for crop yield prediction” by Ramesh A Medar, Vijay S Rajpurohit, a paper from International Journal of Advance Research in Computer Science and Management Studies 2 (9), 59-64, 2014
- [4]. “A survey on rainfall prediction using artificial neural network” by Deepak RanjanNayak, AmitavMahapatra, Pranati Mishra, a paper from International Journal of Computer Applications 72 (16), 2013
- [5]. “A study on various data mining techniques for crop yield prediction”, an IEEE conference paper by Yogeshgandge, Sandhya.
- [6]. “Crop prediction using predictive analytics”, an IEEE conference paper by P. S. Vijayabaskar, R. Sreemathi, E. Keertanaa.
- [7]. Fast and Accurate Detection and Classification of Plant Diseases :
- [8]. <https://youtu.be/Og-UFpdMi-w>