Smart Farm Adviser by Using Machine Learning Algorithms

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***Abstract*— Agriculture plays an important role in Indian economy. But now-a-days, agriculture in India is undergoing a structural change leading to a crisis situation. The only remedy to the crisis is to do all that is possible to make agriculture a profitable enterprise and attract the farmers to continue the crop production activities. As an effort towards this direction, this project would help the farmers in making appropriate decisions regarding the cultivation with the help of machine learning. This project focuses on predicting the appropriate crop based on the climatic situations, fertilizer recommendation and, crop disease prediction based on the historic data by using supervised machine learning algorithms. In addition, a web application will be developed.**

Index Terms: **Random Forest, Interface, Web, Image Processing.**

I.INTRODUCTION

It is argued that the consequence of the agricultural crisis in India is very vast and likely to hit all the other sectors and the national economy in several ways. The only remedy to the crisis is to do all that is possible to make agriculture a profitable enterprise and attract the farmers to continue the crop production activities. In the past farmers used to predict their yield from previous year yield experiences. Thus, for this kind of data analytics in crop prediction, there are different techniques or algorithms, and with the help of those algorithms, we can predict crop yield. Nowadays, modern people don't have awareness about the cultivation of the crops at the right time and at the right place. By analyzing all the issues and problems like weather, temperature, and several factors, there is no proper solution and technologies to overcome the situation faced. Accurate information about history of crop yield is an important thing for making decisions related to agricultural risk management. Therefore, this paper proposes an idea to predict the crop and yield of the crop based on the climatic conditions and historic data related to the crop.

Farming is one of the major sectors that influence a country's economic growth. In country like India, majority of the population is dependent on agriculture for their livelihood. Many new technologies, such as Machine Learning and Deep Learning, are being implemented into agriculture so that it is easier for farmers to grow and maximize their yield.

II. PROBLEM DEFINITION

To design and develop an application to help farmers in farming using technologies like Machine learning so that they can get more benefits and also farming will grow economically

III. LITERATURE SURVEY

In 2018 K. G. Liakos presented a comprehensive review of research dedicated to machine learning applications in agriculture domain. Various parameters on which work was analyzed were: crop management, livestock management, water management and soil management. ML models have applied for crop yield prediction and disease detection. ML based detection can be extracted without the need of fusion of data from other resources. Author claims that farm management systems are evolving into real artificial intelligent systems, with the ultimate scope of production improvement. Author motivates to use ML for the benefit of agriculture as it is the basic need amongst all other needs for survival.

P. Priya (2018) has proposed a random Forest Algorithm for predicting the crop yield of particular area considering various parameters such as rainfall, seasonal crop (Rabi and Kharif) district-wise, temperature (max.), crop production in terms of Kgs/tonnes. Area for doing research was Tamil Nadu. Dataset records were collected from Indian Government over 15years for rice production. They proved in experimental results that prediction analysis done using Random Forest Algorithm – a supervised machine learning algorithm will help farmer to predict the yield of the crop before cultivating onto the agricultural field. This algorithm runs efficiently on large databases with high classification accuracy.

N. Gandhi, L. J. Armstrong, O. Petkar and A. K. Tripathy proposed the SVM for crop yield prediction of rice. In this method, dataset used consists of different parameters such as place, temperature, precipitation and manufacturing. On this dataset, the implemented classifier is sequential minimal optimization. They prepared the dataset through Weka tool to manufacture the set of rules on current dataset. In python, by using SVM algorithm outcomes were produced.

IV. PROPOSED SYSTEM

The fundamental structure of the modules added while creating such structure of website.

A. Crop Recommendation module

Step 1: Inputs like PH, Moisture/Humidity, Phosphorus, Temperature, Nitrogen, and Rainfall will be taken and then will be processed in the machine learning models

Step2: And main purpose of the project is that to calculate the performance of the various machines learning algorithms and then considering the model which gives the best accuracy.

Step3: After 2nd step 3rd step comes. Here, we will use our best model and then showing results via web based UI.

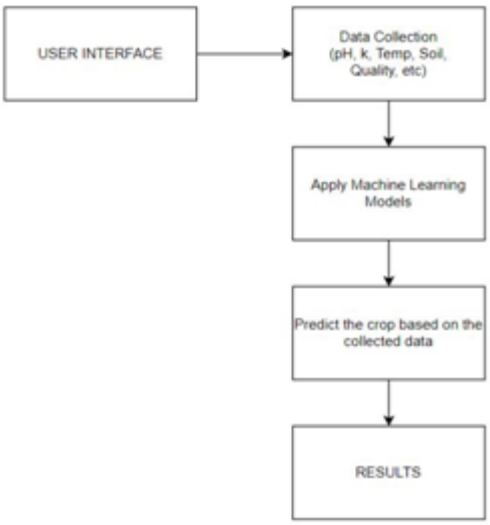

Fig.1. Crop Recommendation Module

B. Fertilizer Recommendation Module

In this module we are going to predict fertilizer on the basis of inputs given by user on the web interface. Following are the steps to perform the activity.

Step 1: Inputs like Temperature and Rainfall will be taken and then will be processed in the machine learning models

Step2: And main purpose of the project is that to calculate the performance of the various machines learning algorithms and then considering the model which gives the best accuracy.

Step3: After 2nd step 3rd step comes. Here, we will use our best model and then showing results via web based UI.

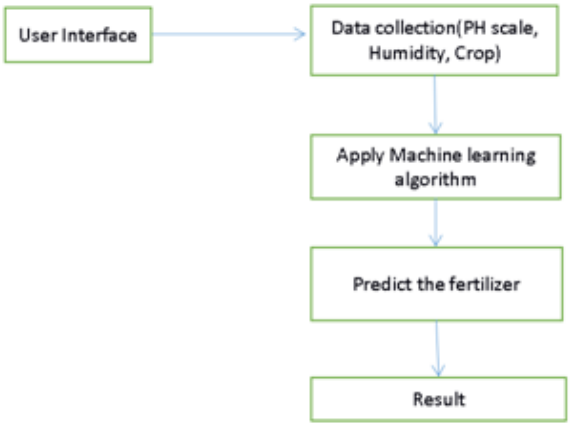

Fig.2 Fertilizer Recommendation Module

C. Crop Disease Prediction Module

In this module we are going to predict disease of the crop and give the solution on the basis of inputs

given by user on the web interface. Following are the steps to perform the activity

Step 1: Inputs image will be taken and then will be processed in the machine learning models

Step2: And main purpose of the project is that to calculate the performance of the various machines learning algorithms and then considering the model which gives the best accuracy.

Step3: After 2nd step 3rd step comes. Here, we will use our best model and then showing results via web based application.

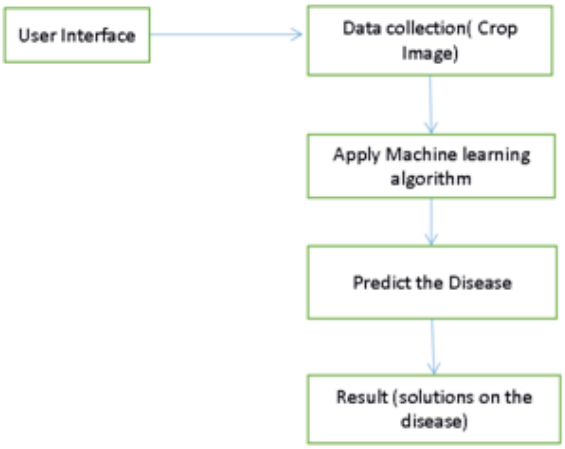

Fig.3 Disease prediction Module

V. ADVANTAGES

1. It will improve the quality of farming
2. Harvesting
3. Protecting crops
4. It enables better decision making
5. It brings cost saving
6. Even low experience farmer can do farming very well using machine learning

VI. CONCLUSION

Crop prediction using intelligent machine learning techniques may improve the crop planning decisions. Accurate forecasts of the climate parameters and better historic data of the crop would result inaccurate crop and its yield forecast in the future. Also, web page will be user friendly and can be made more informative by providing additional useful information like by providing consultation to the user. We can create more interactive User Interface by adding chatbots and speech recognition Systems. This project will help farmers to do effective farming and by using new technologies farming sector will grow

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