

Crop Prediction Using Random Forest Classifier Algorithm

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Abstract

Since it has the second-largest population in the world and the majority of its citizens work in agriculture, India is a country that deserves our attention. Farmers cultivate the same crops over and over again without experimenting with new varieties, and they apply fertiliser in arbitrary amounts without knowing the amount and quality of the lacking ingredients. In other words, this has a direct impact on crop yield and also affects the top layer of soil and produces soil acidity. So, in order to improve the lives of farmers, we created the system utilising machine learning algorithms. Based on soil characteristics and environmental factors, our technology will recommend the optimum crop for a given piece of land. Additionally, the system offers details on the type and amount of fertiliser needed for a certain area of cultivation, as well as the seeds that are necessary. As a result, by using our system farmers can cultivate a new variety of crop, may increase in profit margin and can avoid soil pollution

Introduction

The notion for food was proposed by an agriculture bureaucrat, and as a result, it is a virtual idea. According to current data, the bulk of the population in India, or those over fifty five degrees Celsius, depend on agriculture. Agriculture is the industry that enables farmers to grow renowned flora while maintaining environmental stability. In India, along with sugar cane, potatoes, soil seeds, and other crops, wheat and rice are the most popular crops farmed. Additionally, farmers produce non-food items like rubber, cotton, jute, and countless others. This economic quarter is the largest and plays a crucial role in the development of India's socioeconomic structure. Weather and other environmental conditions, as well as economic variables such temperature, fertilisers, irrigation, cropping, soil, and rainfall. Historical data on crop output provides essential insight for businesses operating in this area. These businesses employ agricultural products as raw materials for creating things like animal feed and paper. The companies that need to organise their supply chains might do so using the estimation of crop production. In India, the

agricultural sector is suffering from a decrease in crop yield. Rainfall during the monsoon is the primary source of water for more than 60% of the vegetation. Nowadays, studies on this topic are increasingly focusing on smart agriculture, which is driven by information technology. The issue of yield prediction is one of the areas being investigated.

Literature Survey

The following list of linked works includes, among others, "Machine Learning Perspective for Prediction Agricultural Droughts [5]" The supervised learning mechanism and associated Naive Bayesian Classification approach are discussed in this study. In many complex real-world situations, naive Bayesian classification typically outperforms other methods for evaluating the parameters. Drought impacts a huge number of people and may result in greater societal costs than other natural disasters [5]. Droughts are becoming a more serious danger to agricultural development and productivity because they occur so frequently. Figure 1 depicts the proposed system's design and describes how it functions. Here, accurate monitoring of the agricultural drought is accomplished by combining data from several sources. The Bayesian model makes an effort to provide a more precise and thorough description of drought. The complex spatial and temporal aspects of drought

necessitate the use of a variety of methods and data in this model application, however there is still some work to be done in the following research.

In order to increase the farmer's profit and the standard of the agricultural industry, Ashwani Kumar Kushwaha[2] outlines crop yield prediction methods and suggests a suitable crop. In this study, they use the Hadoop platform and an agricultural algorithm to acquire massive volumes of data—also known as big data—for the prediction of crop yield. Therefore, based on repository data, one may forecast if a crop is suitable for a given condition and enhance crop quality.

Girish L [3] describes how to anticipate crop productivity and rainfall using machine learning. In this research, many machine learning techniques for crop yield and rainfall prediction are discussed, along with the effectiveness of various machine learning algorithms such as linear regression, SVM, KNN method, and decision tree. According to that algorithm, SVM has the highest accuracy in predicting rainfall. The many machine learning techniques for increasing crop productivity are discussed by Rahul Katarya in his article from page 4. In this paper, many artificial intelligence methods, including big data analysis for precision agriculture and machine learning

algorithms, are covered. They provide an explanation of the KNN, ensemble-based models, neural networks, etc.-based crop recommender system. The "Tomato Crop Expert System Based on Artificial Intelligence [2]" is another technology that is now in use. The most widely produced vegetable crop worldwide now is the tomato. This expert system is divided into two sections, the Tomato Information System and the Tomato Crop Expert System. In the Information System, the user can find out all the pertinent details about the tomato crop, such as the various ailments, signs and symptoms, treatments, pests, and viruses that affect tomato plants and fruits. The user must respond to the questions posed by the expert system while interacting with it via the advisory system [2]. The expert system determines the disease and presents its control measure based on the response provided by the user via internet.

'Artificial Neural Networks for Rice Yield Prediction' is another approach. Here, neural networks [6] have grown significantly in importance and are utilised in a variety of fields, including prediction and classification, which are typically the domains of regression and other statistical models. This paper proposes a practical solution for agricultural yield prediction that combines neural networks with their statistical counterparts. Artificial neural networks (ANN) and statistical methods like the linear regression

methodology have recently been used to build a number of forecasting and prediction models of diverse agricultural yields [6]. For the planning process, agricultural management developers need straightforward and precise prediction approaches to forecast rice yields.

Problem Statement

Agriculture is the backbone of our economy, but Kerala is a consumer state which depends on other states for their needs and resources. The resources should be efficiently and properly utilized in order to become a producer state. This work includes about the research and the building of an effective agricultural yield forecasting system based on real-time monthly weather information.

Proposed Statement

Our economy is based on agriculture, but because Kerala is a consumer state, it is dependent on other states for its needs and resources. To turn a state into a producer, the resources must be used effectively and wisely. This project focuses on the development of an accurate agricultural production forecasting system based on monthly real-time meteorological data. In accordance with the issue statement, a technique is suggested that aids farmers in learning about planting crops on their farms. Therefore, a farmer can make a decision based on the weather.

Objective

1. To develop and implement crop predictions system
2. To study and analysis of various prediction algorithm
3. To study and develop Open Weather API for weather forecasting
4. To develop and implement GIS based climate determination using Open weather
5. To develop and implement machine learning based model for disease prediction

Tools Used**S/W requirement:**

1. Python IDLE
2. Numpy
3. Sci py
4. Matplot lib
5. Pandas

H/W Requirement:

1. RAM : 8GB
2. HDD : 500 GB
3. Processor : i3 6th Gen

Implications

1. Proposed mechanism must able to predict crop with GIS
2. The proposed mechanism also helps the user to perform identification in user friendly way
3. Proposed System will able to perform evolution of various automation technique in crop prediction with weather parameter
4. Proposed system will take latitude and longitude as input and predict the crop accordingly to that
5. To develop and implement GIS enable crop prediction

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