



Survey Paper On Agro Consultant for farmers Using Machine Learning

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Abstract:

A vast fraction of the population of India considers agriculture as its primary occupation. The production of crops plays an important role in our country. Bad quality crop production is often due to either excessive use of fertilizer or using not enough fertilizer. The proposed system of IoT and ML is enabled for soil testing using the sensors, is based on measuring and observing soil parameters. This system lowers the probability of soil degradation and helps maintain crop health. Different sensors such as soil temperature, soil moisture, pH, NPK, are used in this system for monitoring temperature, humidity, soil moisture, and soil pH along with NPK nutrients of the soil respectively. The data sensed by these sensors is stored on the microcontroller and analyzed using machine learning algorithms like random forest based on which suggestions for the growth of the suitable crop are made. This project also has a methodology that focuses on using a convolutional neural network as a primary way of identifying if the plant is at risk of a disease or not.

the agriculture industry faces numerous challenges, including water scarcity, environmental calamities, and a lack of proper knowledge about crops and how to cultivate them. To truly transform India from a developing to a developed country, we must first understand the farmers' concerns and then assist them using today's technologies. So, we devised a method to assist farmers in determining which crop to produce, as well as the stages of growth and the types of seeds, manures, and other cultivation techniques that can be utilized with each crop. As a result, we're creating a system by using machine learning which will predict the yield of crop, and also analyze the factors which are affecting the crop yield

1. Introduction:

Agriculture has been the main activity in every society and civilization that has existed throughout human history. It is not only a huge part of the expanding economy, but it is also necessary for our survival. It is also a vital sector for the Indian economy and the future of humanity. Additionally, it makes up a sizable amount of employment. As time goes on, the demand for production has dramatically expanded. People use technology in an utterly incorrect manner in order to produce in large quantities. Every day, new hybrid kinds are created. These kinds, however, don't offer the same critical components as a crop grown naturally. These artificial methods degrade the soil. All of this causes more environmental deterioration. Most of these unconventional methods are used to prevent losses.

However, the loss is reduced when agricultural growers have access to reliable crop production information. Machine learning is a rapidly expanding methodology that supports decision-making across all industries to

provide the most useful of its applications. The majority of modern gadgets benefit from models being examined before deployment. The fundamental idea is to use machine learning models to boost the agricultural sector's throughput. The amount of knowledge imparted during the training period is another element that influences the prediction, as the number of parameters was higher in comparison. Precision agriculture, which prioritizes quality over unfavourable environmental variables, would be the main focus. To make an accurate prediction and take a stand against the divergent tendencies in Climate and precipitation To encourage a pattern, a variety of machine learning classifiers including Logistic Regression, Naive Bayes, Random Forest, etc. are used. Our analysis of the aforementioned machine learning classifiers led us to the conclusion that the Random Forest method offers the highest level of accuracy. The system forecasts crops based on the collection of historical data. The information is provided using historical data on the weather, temperature, and a number of other variables. Our application runs an algorithm and displays a list of crops that match the inputted data and their anticipated yield values.

2. Literature Survey:

On the Indian government dataset, Aruvansh Nigam, Saksham Garg, and Archit Agrawal[1] carried out trials and found that the Random Forest machine learning method provides the best yield forecast accuracy. Simple Recurrent Neural Network, a sequential model, is more effective at predicting rainfall than LSTM is at predicting temperature. For the purpose of yield forecast, the article combines variables such as rainfall, temperature, season, area, etc. When all parameters are considered, the results show that Random Forest is the best classifier.

Leo Brieman [2] is an expert in the strength, accuracy, and correlation of the random forest method. The random forest algorithm builds decision trees using several data samples, predicts the data from each subset, and then determines the best solution for the system through voting. The data was trained in Random Forest using the bagging approach. The randomness must reduce correlation while retaining strength in order to increase accuracy.

Crop yield prediction has been implemented by Balamurugan [3] using simply the random forest classifier. To anticipate the agricultural output, various factors like rainfall, temperature, and season were considered. On the datasets, no further machine learning methods were used. Because alternative algorithms were lacking, comparison and quantification could not be done, making it impossible to provide the best algorithm.

Mishra [4] has provided a theoretical overview of a number of machine learning approaches that can be used in different forecasting contexts. But because they don't use any algorithms in their work, they can't really say if the suggested work is viable or not.

According to Dr. Y. Jeevan Nagendra Kumar [5], supervised learning allows machine learning algorithms to forecast an objective or outcome. This study focuses on supervised learning methods for predicting crop yields. To obtain , It must create an acceptable function from a set of variables that may map the input variable to the desired output in order to produce the given outputs. According to the paper, crop predictions may be made using the Random Forest ML method, which achieves the best accuracy value while taking into account the fewest number of models.

3. Proposed Work:

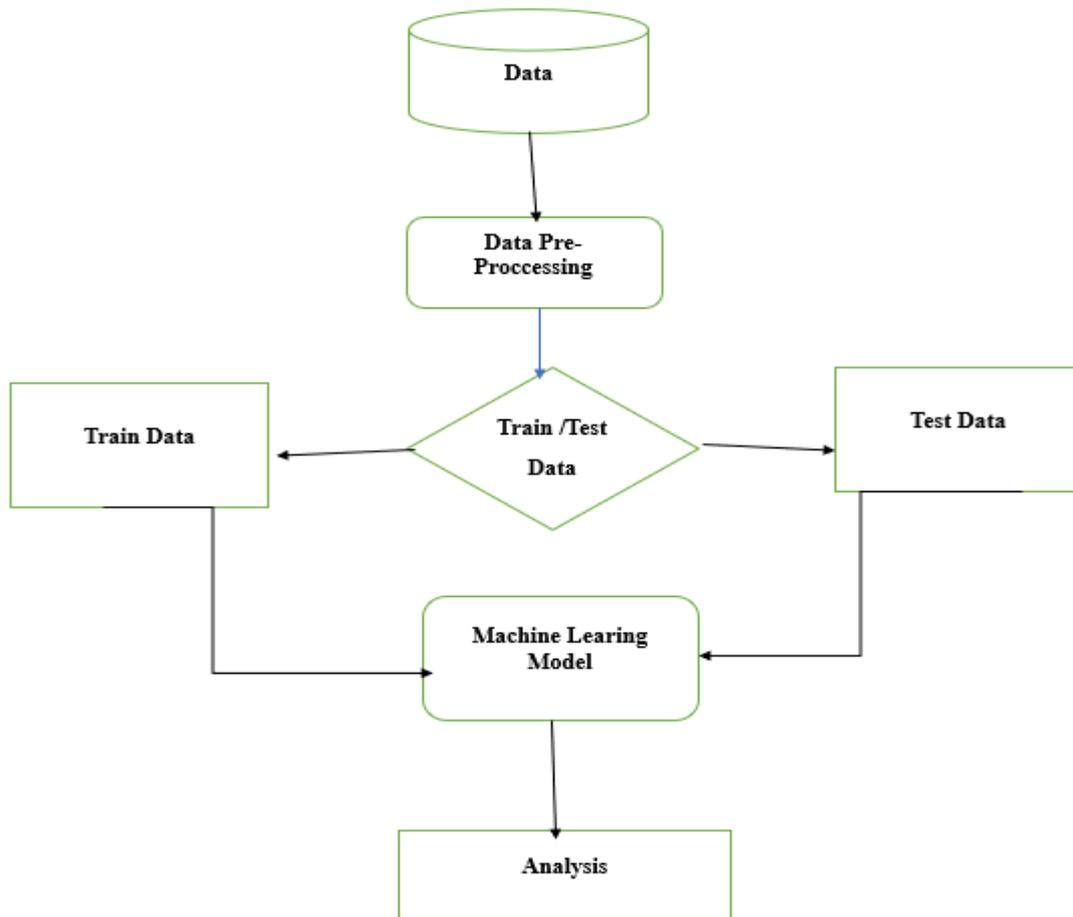


Fig : Architecture Diagram Agro Constant For Farmer Using Machine Learning Model with Application

Before here are the phases of Machine Learning Model for gaining prediction are described below:

A] Data pre-processing, first

A technique called data preprocessing is used to turn the raw data into a clean data set. The data are acquired from various sources, however because they are collected in raw form, analysis is not possible.

B] Factors Affecting Crop Production and Yield

The yield and productivity of any crop are impacted by a wide range of variables. These are essentially the characteristics that aid in estimating a crop's annual yield. We take into account variables like temperature, rainfall, area, humidity, and wind speed in this essay

C. Evaluation and Algorithm Selection for Machine Learning

We must first assess and compare potential algorithms before selecting the one that best fits this particular dataset. The best method for solving the crop production problem practically is machine learning. Numerous machine learning methods are employed to forecast agricultural yield. The following machine learning techniques for selection and accuracy comparison are included in this paper:

D] Predictive Random Forest Model for Crops

A random subset sampled individually, with the same distribution across all of the trees in the forest, is what makes up a random forest, which is an accumulation of tree predictors. The bagging method was utilized by Random Forest to train the data, increasing the accuracy of the outcome.

E] System Architecture

The weather API is the key component of the system architecture shown in Fig. 3, from which we retrieve data on temperature, humidity, rainfall, and other variables. The server module receives the data that was retrieved from the API.

F] Proposed System,

A mobile application that we've suggested predicts the name of the crop and determines its related yield. Numerous factors, such as temperature, humidity, wind speed, rainfall, etc., define the name of the crop, and output is influenced by area and production. The Random Forest classifier is employed in this study to make predictions. It will achieve the best accuracy levels for crop forecast.

REFERENCES

- [1] Aayush Shah, Akash Dubey, Vishesh Hemnani, Divye Gala and D. R. Kalbande "Smart Farming System: Crop Yield Prediction Using Regression Techniques"
- [2] M.Kalimuthu, P.Vaishnavi, M.Kishore, "Crop Prediction using Machine Learning" 978-1-7281-5821-1/20/31.00 IEEE
- [3] "A Machine Learning Approach to Predict Crop Yield and Success Rate" Shivani S. Kale, Preeti S. Patil, Dec 18-20, 2019
- [4] "Crop Yield Prediction Using Random Forest Algorithm" Namgiri Suresh, N.V.K.Ramesh, Syed Inthiyaz, P. Poorna Priya, Kurra Nagasowmika, Kota. V.N.Harish Kumar, Mashkooor Shaik and B. N. K. Reddy [2021]
- [5] "Analysis of agricultural crop yield prediction using statistical techniques of machine learning" Janmejy Pant a, R.P. Pant a, Manoj Kumar Singh a, Devesh Pratap Singh b, Himanshu Pant a.
- [6] "Crop Yield Estimation in India Using Machine Learning" Ms Kavita Information Technology Manipal University Jaipur Jaipur, India, Pratistha Mathur Information Technology Manipal University Jaipur, Jaipur, India.
- [7] "Crop Yield Prediction based on Indian Agriculture using Machine Learning" Potnuru Sai Nishant, Pinapa Sai Venkat, Bollu Lakshmi Avinash, B. Jabber.