# Study On: Soil Based Crop Prediction and Weather Forecasting

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*Abstract- In Indian economy, agriculture contributes 18% of total India GDP. A model is proposed for predicting soil series and providing suitable crop yield suggestion for that specific soil and weather. The model has been tested by applying different Deep algorithm. CNN shows highest accuracy in soil classification and suggests crops with less time. The type of soil is clay, peat, sand, humus clay. It gives us more accuracy as compared to existing system and gives more benefit to farmers. Crop prediction helps us for increasing crop production. In this paper, a low-cost result given for crop.*

*Indexed Terms- Crop Prediction, CNN Algorithm, python.*

## I. INTRODUCTION

India there are several types of soil series. Every soil series has the different features. Crop prediction is one of the challenging problems in traditional agriculture. For getting the better crop yield in farming, we need to study the climate conditions. Now a days, climate is changing very rapidly. To overcome from this problem, soil moisture helps for the understanding of the hydrology and climate conditions. Soil moisture affects the key farm activities from selection of proper crop, by considering the all conditions such as tilling, planting applying fertilizers. In traditional farming, the crop prediction is get somewhat difficult, due to the day to day change in climate condition. So, we use machine learning methods, empirical and regression. Use of machine learning technique is increased recently; it helps us to overcome some of the problem of traditional farming.

Crop prediction is important step in farming it helps us in rapid decision making. The decision such as the when to grow and what to grow, get easier by using the machine learning techniques.

## II. RELATED WORK

There are lots of research in agriculture using machine learning. Estimating crop yields is a must for quickn decision maker. The exact crop prediction model assist what and when to grow. There are various methods for estimating crop forecast. There are use supervised and unsupervised learnings. To give accuracy apply CNN and SVM algorithm to detect soil and whether.

[1]"Prediction of Crop yield using Machine Learning" in this paper Sachee Nene & Priya was basically to know the prediction crop according to soil and atmospheric conditions.[2] "Weather Forecasting Using Machine Learning Algorithm" in this paper Nitin Singh, Saurabh Chaturvedi and Shamim Akhter was give brief description on how machine learning use to detect weather.[3]Machine learning methods for crop yield prediction and climate change impact assessment in agriculture" Andrew Crane Droesch define semi parametric type of a deep neural network type model to make crop prediction & also for evaluation of effects of the change in climate conditions.[4]"Sugarcane Crop prediction Using Supervised Machine Learning" in this paper Ramesh Medar & Anand M. Ambekar was taken into account for prediction of the unique crop by using the descriptive analytics with the help of three datasets as similar as Yield dataset, Rainfall dataset, & Soil dataset like integrated dataset.[5]"Groundnut Prediction Using Machine Learning Techniques" Vinita Shah & Prachi Shah was taking abiotic attributes, environment & soil to predict yield of groundnut with the help of various ML algorithms. RMSE was used to compare the accuracy of prediction. [6] "Efficient Crop Yield Prediction Using Machine Learining Algorithms" In this Arun Kumar and et al. In this, the categorization of crop produce was did for batch using Artificial neural networks depend on crop produce productivity. Along this it will

also show range of the productivity. Regression was carried for obtaining the actual crop produce or yield along with expected cost

### III. SYSTEM DESIGN

In general, agriculture is the spine of India and additionally performs a critical position in Indian economic system with the aid of using presenting a sure percent of home product to make sure the meals security. The Proposed System follow Naive Bayes classifier, the supervised learning algorithm include the 4 tiers calculated and expect the crop for an appropriate weather in phenomenon such as-

A. Data Collection:
Data consists from a distinct supply and upgraded for records units. And the records are applied to assess descriptively. Many summaries on line outlets, such as Kaggle, Google climate forestation and records government, offer the records from ten-year series. Record units together with soil nature, climatic situations and seed records are used for crop forecasting and higher crop production.

B. Preprocessing step:
Preprocessing of information are taken into consideration important step system mastering stage. Preprocessing is including ideal set of information, lacking values & removing functionality. Data set size is essential to the manner of analysis. Information amassed on this stage precipitated in Google Colab platform withinside the shape of python programming in an effort got favored output.

C. Feature Extraction:
Conclusion of functions might lessen the size of information worried to symbolize huge series of information. The traits of soil, crop & climate amassed from the pretreatment method set up a very last education information series. Technique selects the functions primarily based totally on correlation matrix that is functions is the more correlation charges is chosen as a crucial estimate feature for yield.

D. Data Prediction:
To enhance this step there want break up statistics into educate dataset and check dataset. Using the Naïve Bayes Gaussian classifier must have statistical input

and output statistics. In inspection, if the statistics are examined correctness of e version is satisfactory. Then the brand-new statistics are expected with the aid of using system mastering module.
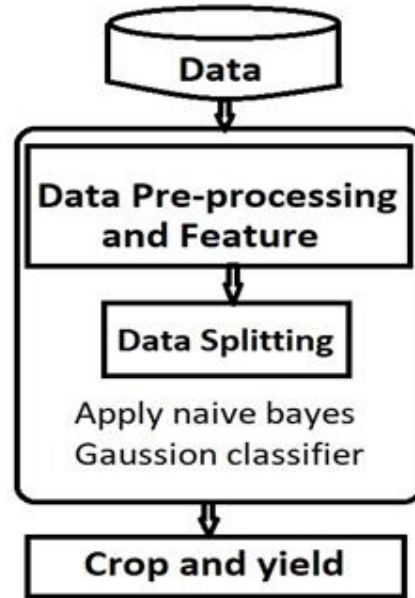


Fig3.1: Steps in Proposed System

### IV. SYSTEM WORKING

The Energised AT Mega-powered set up Arduino UNO the microcontroller has 20 digital input / pin output used control the provided process of connected input and output components with Arduino software program considering the collection of data from the DHT 11 sensor module. DHT11 digital temperature and humidity dual-input sensor and single output pin. This sensation used to measure ambient temperature & humidity air with high accuracy and extra time to capture data. The sensor begins to malfunction when it detects temperature above 680 ° C. At present, the soil moisture the sensor is used to measure the humidity (water) of soil.

Data collected and sent to Google Colab, an open-source forum written entirely in it Python is also designed for data analyst. Google Colab offers a built-in integration with many popular sciences packages including NumPy, Pandas.
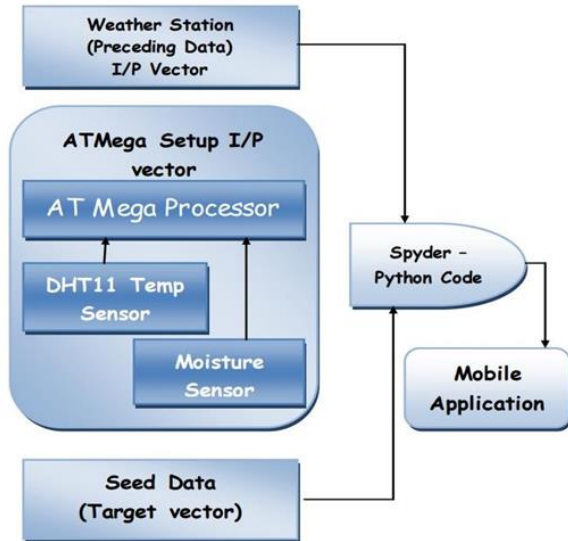
Fig4.1: Block Diagram
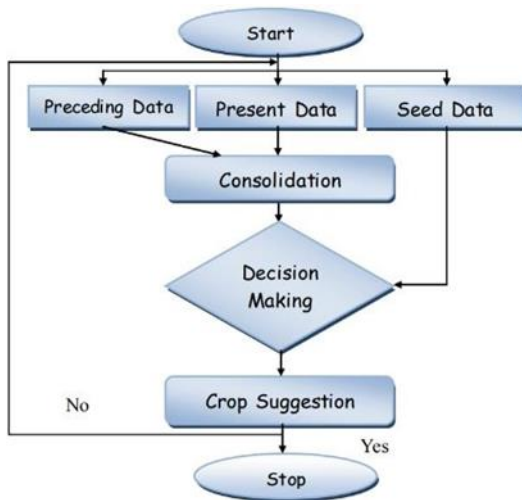
i.  Process Block Diagram of the System



Fig4.2: System Process Flow

The proposed system consist of four major process includes, collection of preceding data about the weather, collecting present data, data consolidation and seed data collection and the block diagram representing the system flow diagram.

ii.  Collecting Preceding Data:
The previous data collection includes temperature, humidity, soil moisture and rain for a whole month from an area containing data with high accuracy for example a weather station. After collecting previous data, current data is collected for a month using Arduino's designed setup. Each section of this setup performs a specific data collection function at the moment. Once the controller is enabled the sensor connected to it will hear the data over time, stored as an .csv file and transferred to the control board and shut down.

iii.  Consolidation of Data:
The need for pre-existing and current collection is perform the merging process to check the accuracy among them. Where there is logical accuracy then there will be no problem in predicting output. Performing the merging process is required create a python program in Google Colab a platform with a panda & NumPy library on which to do mathematical performance as a measure.

## V.  PROPOSED METHOD

In the Naïve Bayes method, the model accuracy is 97%. To improve the accuracy of the reinforcement method is used. By the way a weak law enforcement should be found and integrated these rules make it stronger. The weak rule has always been obtained by a repetitive process. Weak law was discovered by distribution of the Naïve Bayes algorithm. With the right distribution

1.  Distribution taken by basic student and assignment the same weight in all views
2.  In the event of any error in the prediction of 1st Naïve

The basic algorithm of Bayes, deserves more attention
pay. Then follows the basic algorithm of Naïve Bayes
Claim
3.  Repeat step 2 until it provides maximum accuracy

## VI.  RESULT

A Farmer's decision generally clouded by his intuitions about which crops to grow in the field. Crops are suggested to the farmer based on the type of soil which helps the farmer to increase Economic situation. The system that we have built is based on the two datasets as well as the different algorithms are used to increase the performance of the system. We recognized the result from the applying algorithms and further an android application also developed for the farmers for their convenience where, the farmer are

provided with options just to enter the temperature, humidity, soil moisture and its alkalinity. Using machine learning the consolidation of data will be getting automatically and the identified crop will be predicted, where a sample while the machine learning based crop prediction system has predicted the crop successfully for the given input in reference with the data

## CONCLUSION

The prime objective of this work is to develop a low cost, reliable and efficient weather forecasting application using the machine learning concept. Crop yield prediction is an essential task for the decision-makers at national and regional levels for rapid decision-making. An precise edit abdicate expectation demonstrate can offer assistance ranchers to choose on what to develop and when to develop .It is proposed for predicting the soil series and providing suitable crop yield suggestion for that specific soil and weather and has been tested by applying different kinds of deep algorithm .CNN shows highest accuracy in soil classification and suggests crop within less time .It gives us more precision as compared to existing framework and gives more advantage to farmers.

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