



Soil Classification and Crop Suggestion Using Machine Learning

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Abstract- In general, agriculture is the backbone of India and also plays an important role in Indian economy by providing a certain percentage of domestic product to ensure the food security. But now-a-days, food production and prediction is getting depleted due to unnatural climatic changes, which will adversely affect the economy of farmers by getting a poor yield and also help the farmers to remain less familiar in forecasting the future crops. This research work helps the beginner farmer in such a way to guide them for sowing the reasonable crops by deploying machine learning, one of the advanced technologies in crop prediction. Naive Bayes, a supervised learning algorithm puts forth in the way to achieve it. The seed data of the crops are collected here, with the appropriate parameters like temperature, humidity and moisture content, which helps the crops to achieve a successful growth. In addition as the software, a mobile application for Android is being developed. The users are encouraged to enter parameters like temperature and their location will be taken automatically in this application in order to start the prediction process.

Keywords: IoT Enabled Crop Prediction and Irrigation Automation System Using Machine Learning Learning

I. INTRODUCTION

There are so many soil series available in India. Every soil series have different features and every soil is suitable for different crop. The main purpose of the proposed work is to create a suitable model for classifying various kinds of soil series data along with suitable crops suggestion. Series are recognized by machine learning methods using various chemical features and possible crops for that soil series are suggested using geographical attributes. Soil is one of the key components in agricultural field for yielding crops. Soil classification philosophies follow the existence knowledge and practical circumstances.

II. LITERATURE SURVEY

A study on various data mining techniques for crop yield prediction - India is a country where agriculture and agriculture related industries are the major source of living for the people. Agriculture is a major source of economy of the country. It is also one of the country which suffer from major natural calamities like drought or flood which damages the crop. This leads to huge financial loss for the farmers thus leading to the suicide. Predicting the crop yield well in advance prior to its harvest can help the farmers and Government organizations to make appropriate planning like storing, selling, fixing minimum support price, importing/exporting etc. Predicting a crop well in advance requires a systematic study of huge data coming from various variables like soil quality, pH, EC, N, P, K etc. As Prediction of crop deals with large set of database thus making this prediction system a perfect candidate for application of data mining. Through data mining we extract the knowledge from the huge size of data. This paper presents the study about the various data mining techniques used for predicting the crop yield. The success of any crop yield prediction system heavily relies on how accurately the features have been extracted and how appropriately classifiers have been employed. This paper summarizes the results obtained by various algorithms which are being used by various authors for crop yield prediction, with their accuracy and recommendation.

B. Crop prediction using predictive analytics- This work is to construct a model for testing the soil fertility. It also suggests the crop which has to be planted depending upon the value obtained from the sensor. It also provides the regional wise information about the crop in the form of graph. We have farmer chat where the farmers can share and get idea from the expert by registering in this application. It also suggests the fertilizer which has to be added to the soil in order to increase the crop productivity. It helps the farmer to analyze the fertility of their yard and plant the better crop to increase their productivity and profit. It also provides the information about the fertilizer to be added in the soil and also provide the information about the nearby fertilizer shop.



C. IoT based smart agriculture monitoring system - Attendance record is a function used in all schools to keep track of students at all levels every day. The process of attending the signing ceremony is manual. These methods are accurate and do not harm participants, but they require time and effort for many students.

D. Smart Agriculture Using Internet of Things with Raspberry Pi- The project is about smart agriculture system that is implemented with IoT. The system is combined with irrigation system in order to cope with the unpredictable weather in Malaysia. Raspberry Pi 4 Model B is used as the microcontroller of this system. DHT22 and soil moisture Smart Agriculture Monitoring and Control System Using IOT Government College of Engineering & Research, Awasari(Kh) – 2022 E&TC Engineering 9 sensor is used to detect the temperature and humidity in surrounding and moisture level of the soil respectively where the output will be displayed on smartphone and computer. Project Proposed system: In our project rain sensor, soil moisture and humidity and temperature sensor are used. We are using Arduino as main controller. Our system is cost effective. We are using these components which are efficient in working and affordable. In our project we are additionally using rain sensor and wifi module

III. MOTIVATION AND PROBLEM

Yield prediction is an important agricultural problem. Every farmer is interested in knowing, how much yield he is about expect. In the past, yield prediction was performed by considering farmer's previous experience on a particular crop. The volume of data is enormous in Indian agriculture. The data when become information is highly useful for many purposes. Data Mining is widely applied to agricultural problems. Data Mining is used to analyze large data sets and establish useful classifications and patters in the data sets.

We need to know the features and characteristics of various soil types to understand which crops grow better in certain soil types. Machine learning techniques can be helpful in this case. Here we can use clustering technique to group data, and then classified the data by the order of soil and places with Random Tree algorithm. Then apply apriority Mining process to generate an association rule for finding suitable crops for the specific soil. Soil series and land type combine represents the soil class in the database. The machine learning methods are used to find the soil class (i.e. soil series and land type). Three different methods are used: CNN, Gaussian Kernel based SVM, and Bagged Tree.

IV. OBJECTIVE

To predicting or forecasting the crop yield by learning the past data of the farming land. To considering various factors such as soil conditions, rainfall, temperature, yield and other entities the system builds a predicting a model using machine learning techniques

V. SYSTEM ARCHITECTURE

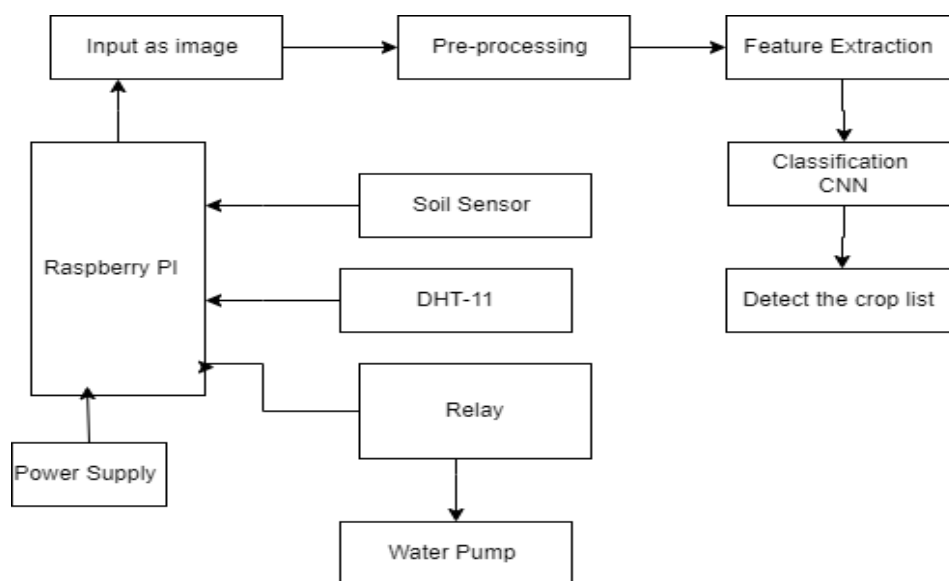


Fig: System Architecture of crop Prediction using ML



VI. METHODOLOGY AND SCOPE

In recent years, there has been heavy loss in soil quality due to incorrect crop and soil management strategies. This is primarily because of the amount of chemical fertilizers used, disturbing the balance of the soil nutrients [33]. These factors have a major impact on the productivity of Tamil Nadu soils. Due to the nature of soil, the presence or absence of specific elements will lead to soil erosion, soil imbalance, and other soil issues. This will limit production in agricultural land. Hence, there is much emphasis on management and conservation of soil in systematic models. It is identified that the gaps in previous methodologies are addressed by identifying the integrating information technology with supporting inputs and services. The agricultural sector can be revived by using this technological advancement of plant health management [35], multiple nutrient deficiencies, and soil acidity treatment.

VII. PROPOSED WORK

To be able to responsibly feed a growing population, it's vital that farmer increase food production on existing farmland to avoid deformation. The longer term work done to optimize practice to extend yields, crop quality and income in an exceedingly proper manner. An Advanced value prognostication system may be developed wherever a dashboard can predict the market value trends exploitation statistical method for a minimum of a period and therefore the production pattern of various crops. A platform for Agriculture ought to use massive information, AI, Machine Learning, satellite representational process and weather information to assess the land area and monitor crop health on a true time basis. So it will notice cuss and sickness infestations, estimate the crop output and yield, and conjointly forecast costs. Other key input such as the prices in major markets of neighbouring states can also be factored into the price forecast. The system should be developed in a way that it does a real time analysis to get an accurate solution to farmers problem and optimize their farming practices. The system can introduce and make available climate-aware cognitive farming techniques and identifying systems of crop monitoring, early warning on pest/disease outbreak based on advanced AI innovation.

VIII. CONCLUSIONS

IOT will help to enhance smart farming. Using IoT the system can predict the soil moisture level and humidity so that the irrigation system can be monitored and controlled. IoT works in different domains of farming to improve time efficiency, water management, crop monitoring, soil management and control of insecticides and pesticides. This system also minimizes human efforts, simplifies techniques of farming and helps to gain smart farming. Besides the advantages provided by this system, smart farming can also help to grow the market for farmer with single touch and minimum effort. Internet of things and cloud computing collectively makes a system that control agriculture sector effectively. This system will sense all the environmental parameters and send the data to the user via cloud. User will take controlling action according to that this will be done by using actuator. This asset allows the farmer to improve the cultivation in a way the plant need. It leads to higher crop yield, prolonged production period, better quality and less use of protective chemicals. Thus the Proposed system deals about the irrigation system in smart way using Internet of Things (IoT) which solved the current problems related to farming such as by reducing human efforts, wastage of water and updating the farmer about the live condition of the field on the mobile device. The work can be extended in such a way it detects plant disease, crop theft etc.

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