

CROP YIELD FERTILIZERS AND CROPS DISEASE PREDICTION USING MECHINE LEARNING

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ABSTRACT

India being an agriculture country, its economy predominantly depends on agriculture yield growth and agro industry products. Data Mining is an emerging research field in crop yield analysis. Yield prediction is a very important issue in agricultural. Any farmer is interested in knowing how much yield he is about to expect and what is the crop that is suitable for the land. Analyze the various related attributes like location, pH value from which alkalinity of the soil is determined. Along with it, percentage of nutrients like Nitrogen (N), Phosphorous (P), and Potassium (K) Location is used along with the use of third-party applications like APIs for weather and temperature, type of soil, nutrient value of the soil in that region, amount of rainfall in the region, soil composition can be determined. All these attributes of data will be analyzed, train the data with various suitable machine learning algorithms like SVM, Random-Forest, KNN and Voting Classifier for creating a model. The system comes with a model to be precise and accurate in predicting crop yield and deliver the end user with the proper recommendations about required fertilizer ratio based on atmospheric and soil parameters of the land which enhance to increase the crop yield and increase farmer revenue. Thus, the proposed system takes the data regarding the quality of soil and the weather related information as an input. The quality of the soil such as Nitrogen, Phosphorous, Potassium and Ph value. Weather related information like Rainfall, Temperature and Humidity to predict the better crop. In our project we are taking the datasets from Kaggle website.

1 INTRODUCTION

Agrulture is one of the most important occupation practiced in our country. It is the broadest economic sector and plays an important role in overall development of the country. About 60 % of the land in the country is used for agriculture in order to suffice the needs of 1.2 billion people. Thus, modernization of agriculture is very important and thus will lead the farmers of our country towards profit. Data analytic (DA) is the process of examining data sets in order to draw conclusions about the information they contain, increasingly with the aid of specialized systems and software. Earlier yield prediction was performed by considering the farmer's experience on a particular field and crop. However, as the conditions change day by day very rapidly, farmers are forced to cultivate more and more crops. Being this as the current situation, many of them don't have enough knowledge about the new crops and are not completely aware of the benefits they get while farming them. Also, the farm productivity can be increased by understanding and forecasting crop performance in a variety of environmental conditions. Thus, the proposed system takes the data regarding the quality of soil and the weather related information as an input. The quality of the soil such as Nitrogen, Phosphorous, Potassium and Ph value. Weather related information like Rainfall, Temperature and Humidity. In our project we are taking the datasets from Kaggle website.

1.2. IDENTIFICATION/ NEED

A crop prediction is a widespread problem that occurs. During the rising season, a farmer had curiosity in knowing how much yield he is about to expect. In the earlier period, this yield prediction become a matter of fact relied on Farmer's long-term experience for specific yield, crops and climatic conditions. Farmer directly goes for yield prediction rather than concerning on crop prediction with the existing system. Unless the correct crop is predicted how the yield will be better and additionally with existing systems pesticides, environmental and meteorological parameter related to crop is not considered. Promoting and soothing the agricultural production at a more rapidly pace is one of the essential situation for agricultural improvement. Any crop's production show the way either by interest of domain or enhancement in yield or both. In India, the prospect of widening the district under any crop does not exist except by re-establishing to increase cropping strength or crop replacement. So, variations in crop productivity continue to trouble the area and generate rigorous distress. So, there is need to attempt good technique for crop prediction in order to overcome existing problem.

1.3 SCOPE AND OBJECTIVE

SCOPE

Applying Naive Bayes Data Mining Technique for Crop selection will depending on the nature of the Naive probability model. It can be trained very easy in a supervised learning section. In several practical applications, parameter estimation for naive Bayes uses the method of naive Bayes model with believing in Bayesian probability or using any Bayesian methods.

ADVANTAGES

1. A supervised classifier can perform tasks which linear program cannot.
2. It works even in the presence of noise with good quality output.

DISADVANTAGES

1. Must have Knowledge on Bayesian probability or Bayesian methods.
2. Time taken for the process is larger.
3. Based on the assumption that features have same statistical relevance.

2.LITERATURESURVEYANDRELATEDWORK

2.1 VIRENDRA PANPATIL ET :It had accomplished gigantic work for Indian ranchers by making productive yield proposal framework. They created framework utilizing classifier models, for example, Decision Tree Classifier, KNN, and Naive Bayes Classifier. The proposed framework can be utilized to figure out best season of planting, development of plant and Plant reaping. They utilized distinctive classifier for accomplishing better exactness for instance: Decision tree shows less precision when dataset is having more varieties yet Naïve Bayes gives preferable exactness over choice tree for such datasets.

The best favorable position of framework that it can without much of a stretch versatile all things considered/be utilized to test on various yields.

2.2 MAYANK ET: It has presumed that this paper fabricate extemporized framework for crop yield utilizing administered AI calculations and with objective to give simple to utilize User Interface, increment the precision of crop yield forecast, investigate distinctive climatic boundaries, for example, overcast cover, precipitation, temperature, and so on In the proposed framework they zeroed in on MAHARASHTRA State for implantation and for information gathering they utilized govt. site, for example, www.data.gov.in. For crop yield forecast they utilized calculations, for example, Random Forest Algorithm and for convenience they created website page so it will be not difficult to use for all. The primary favorable position of proposed framework is precision rate is more than 75 percent on the whole the yields and areas chose in the examination.

2.3 SHWETA ET:

It has inferred that this paper will survey that different utilization of AI in the cultivating areas. And furthermore, helps in can be select appropriate crop select land and select season settled utilizing these procedures. The calculations use is Naive Bayes and K-Nearest Neighbor. The calculations are utilizes precision of execution.

2.4 AMIT KUMAR ET:

It has presumed that this paper helps in foreseeing crop arrangements and augmenting yield rates and making advantages to the ranchers. Additionally, Using Machine learning applications with farming in foreseeing crop sicknesses, examining crop copies, diverse water system designs. The calculations utilized are fake neural organizations. The serious issue with neural organization is that the proper organization which suits best for the arrangement is difficult to accomplish and it incorporates experimentation. The second issue with neural organization is the equipment reliance as the calculation incorporates more calculations in reverse and forward the preparing needs more. Assurance of appropriate organization structure requires insight and time. The proposed framework likewise centers around crop determination utilizing natural just as financial variables. The framework likewise utilizes the monetary factor that is the cost of the crop which assumes a significant part on the off chance that if the yields with same yield yet unique yield cost. The framework additionally utilizes other strategy which is crop sequencing which gives a full arrangement of yield which can be developed all through the season. The proposed framework likewise centers around crop choice utilizing ecological just as financial variables. The framework likewise utilizes the monetary factor that is the cost of the crop which assumes a significant part on the off chance that if the crops with same yield yet unique yield cost. The framework additionally utilizes other technique which is crop sequencing which gives a full arrangement of yield which can be developed all through the season

2.5 MANJULA ET:

It has have presumed that this paper helps in improving the yield pace of crops by utilizing rule based mining. The paper utilizes affiliation rule mining to foresee the yield of the crop. The calculations utilized are k-Means Algorithm, bunching strategy and deduced affiliation rule mining. The significant impediment is that the paper utilizes affiliation rule digging for expectation of crop yield. The issue with affiliation decides mining is that it creates an excessive number of rules sometimes and the exactness of the expectation decreases. Likewise the principles will in general fluctuate according to dataset and the outcomes additionally enormously. The proposed framework mostly centers around the issue of yield expectation of crop which assumes vital part in yield choice as rancher can choose crop with greatest yield. The frameworks utilize affiliation rule mining to discover rules and crops with greatest yield. This framework centers on formation of an expectation model which might be utilized to future forecast of crop yield

3 EXISTING SYSTEM

Niketa et al in 2016 have indicated that the yield of the crop depends on the seasonal climate. In India, climate conditions vary unconditionally. In the time of drought, farmers face serious problems. So this taken into consideration they used some machine learning algorithms to help the farmers to suggest the crop for the better yield. They take various data from the previous years to estimate future data. They used SMO classifiers in WEKA to classify the results. The main factors that take into consideration are minimum temperature, maximum temperature, average temperature, and previous year's crop information and yield information. Using SMO tool they classified the previous data into two classes that are high yield and

low yield.

Eswari et al in 2018 have indicated that yield of the crop depends on the perception, average, minimum and maximum temperature. Apart, from that, they have taken one more attribute named crop evapotranspiration. The crop evapotranspiration is a function of both the weather and growth stage of the plant. This attribute is taken into consideration to get a good decision on the yield of the groups. They all collected the dataset with these attributes and send as input to the Bayesian network and classify into the two classes named true and false classes and compared with the observed classifications in the model with a confusion matrix and bring the accuracy. Finally, they concluded that crop yield prediction with Naïve Bayes and Bayesian network give high accuracy when compared to SMO classifier and forecasting the crop yield prediction in different climate and cropping scenarios will be beneficial.

DISADVANTAGES OF EXISTING SYSTEM:

The obtained result for the crop yield prediction using SMO classifier gives less accuracy when compared to naïve Bayes, multilayer perception and Bayesian network.

Previously yield is predicted on the bases of the farmer's prior experience but now weather conditions may change drastically so they cannot guess the yield.

Proposed system:

In the proposed system, we develop Prediction of the crop using the efficient algorithm.

The challenge in it is to build the efficient model to predict the better crop

Here in this project we use machine learning algorithms like Voting classifier which is nothing but hybrid classification/ensemble of models. In our project the Voting classifier is an ensemble of models that are obtained from SVM, Random-Forest and KNN. Which can enhance the accuracy and it can give a better prediction system.

ADVANTAGES OF PROPOSED SYSTEM

Predicting the better crop is the ultimate Aim of the project.

Early detection of problems and management of those problems can help the farmers for better crop yield.

For the better understanding of the crop yield, we need to study of the huge data with the help of machine learning algorithm so it will give the accurate prediction of crop and suggest the farmer for a better crop.

4 METHODOLOGIES

MODULES

DATA PRE-PROCESSING

Here the raw data in the crop data is cleaned and the metadata is appending to it by removing the things which are converted to the integer. So, the data is easy to train. Hear all the data. In this pre-processing, we first load the metadata into this and then this metadata will be attached to the data and replace the converted data with metadata. Then this data will be moved further and remove the unwanted data in the list and it will divide the data into the train and the test data For this splitting of

the data into train and test we need to import `train_test_split` which in the scikit-learn this will help the pre-processed data to split the data into train and test according to the given weight given in the code. The division of the test and train is done in 0.2 and 0.8 that is 20 and 80 percent respectively.

Model Creation:

We create data into two models:

A) Training model

B) Testing model

The division of the test and train is done in 0.2 and 0.8 that is 20 and 80 percent respectively.

Model evaluation:

We apply the machine learning algorithm for testing part and get the accuracy of this model.

Prediction:

This module based on GUI part. we create a web page using bootstrap. The web page like (Nitrogen, Phosphorous, Potassium, PH value, Humidity, Rainfall, Temperature).now we get the data's from user to compare the dataset values .finally it will predict for the Crop and soil to be planted.

Methodology:

Give the value of Nitrogen, Phosphorus, Potassium, PH value, Rainfall, Humidity and Temperature. We already trained the dataset. Our value compared to dataset and finally result will displayed what seed we cultivated that particular place.

Data Set Description:

This is the sample data set used in this project. The data in Table I is data used to predict crop yield based on 7 factors. These 7 factors are Nitrogen, Phosphorous, Potassium, PH value, Rainfall, Humidity, and Temperature. We can create a machine learning model and train the model and we can predict the crop and from Table II we can predict the fertilizer should be used to get the proper yield the input parameters are the quantity of Nitrogen, Phosphorus, Potassium and the output is the respective fertilizer should be used. Here in the input parameters 1, 2, 3, 4, 5, 6,7represents the soil quality respectively.

Necessary Packages:

Numpy

Pandas

Matplotlib

pyplot

Scikit-learn

Tensorflow

Jupyter

5 RESULTSANDDISCUSSION



FIG 1: SCREENSHOTS OF THE IMAGE OF PESTS

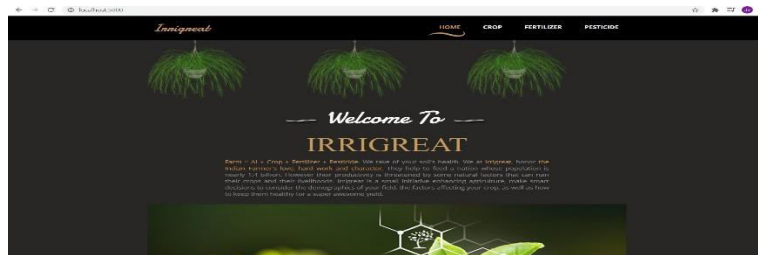


FIG 2:HOME PAGE

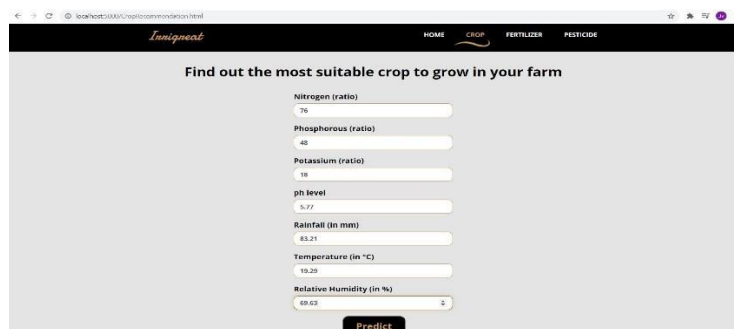


FIG 3 : TAKING INPUTS FOR CROP PREDICTION



FIG 4: CROP PREDICTED

Iunigneat HOME CROP FERTILIZER PESTICIDE

Find out the most suitable crop to grow in your farm

Nitrogen (ratio)
90

Phosphorous (ratio)
42

Potassium (ratio)
43

pH level
6.5

Rainfall (in mm)
202.83

Temperature (in °C)
25.8

Relative Humidity (in %)
82

Predict

FIG 5: TAKING INPUTS FOR CROP PREDICTION



FIG 6 : CROP PREDICTED

Iunigneat HOME CROP FERTILIZER PESTICIDE

Find out the most suitable crop to grow in your farm

Nitrogen (ratio)
18

Phosphorous (ratio)
21

Potassium (ratio)
35

pH level
6.36

Rainfall (in mm)
111.1

Temperature (in °C)
25.2

Relative Humidity (in %)
94.9

Predict

FIG 7: TAKING INPUTS FOR CROP PREDICTION

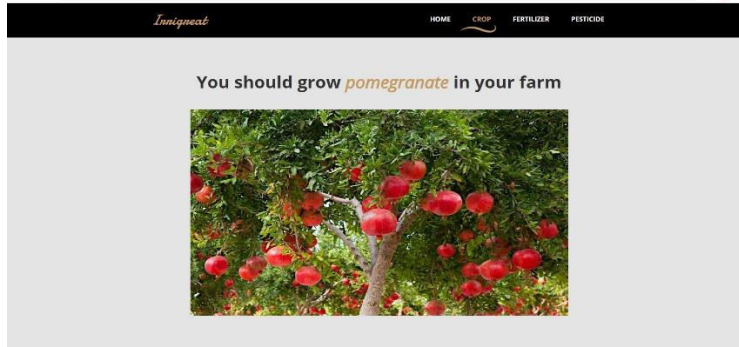


FIG 8: CROP PREDICTED



Fig: 9: Predicting pesticide

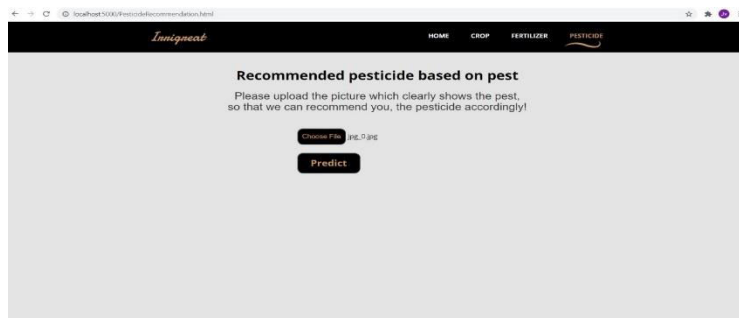


Fig: 10. TAKING INPUT TO PREDICT PESTICIDES

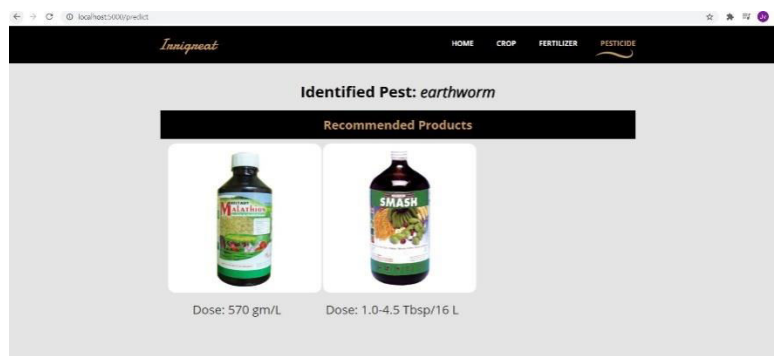


Fig: 11 IDENTIFIED PESTISIDE



Fig: 12. INPUT TO PREDICT PESTICIDES

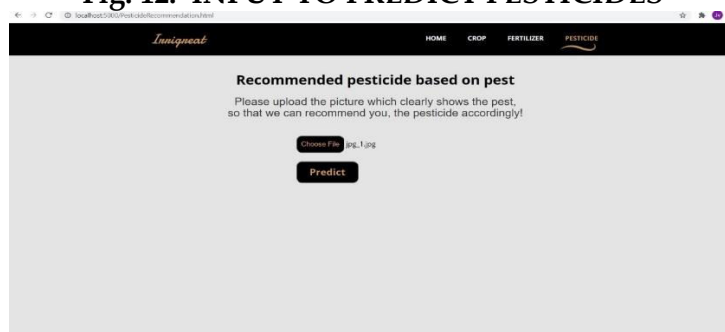


FIG: 13. RECOMMENDED PESTICIDE BASED ON PEST

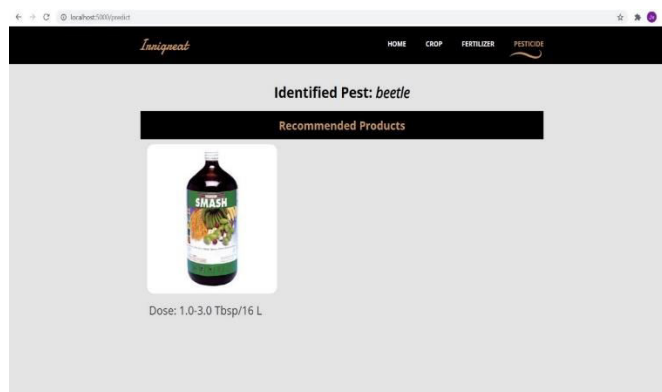


Fig: 14. Identified Pest

6.CONCLUSION AND FUTURE SCOPE

The proposed work presents a crop prediction framework utilizing Voting classifier which is nothing but an ensemble of models. Here in our project voting classifier ensembles the models obtained from SVM, Random-Forest and KNN. Our project predict the crop with more accuracy. In this way the framework will help decrease the challenges looked by the farmers and prevent them from endeavoring suicides. It will go about as a medium to give the farmers effective data needed to get high return and consequently augment benefits which thus will diminish the self destruction rates and reduce his challenges.

FUTURE WORK

It's lead to increasing the Countries' overall profit. In our project we found that the accurate prediction of different specified crop yields across different districts will help to farmer. From this farmers will plant different crops in different districts. In the near future, geospatial analysis can be added to improve accuracy and also implement a better geographical data.

7 REFERENCES

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