



Precision Agriculture using Random Forest Algorithm in Machine Learning

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ABSTRACT

The agriculture plays a dominant role within the growth of the country's economy. Climate and alternative environmental changes has become a serious threat within the agriculture field. Machine learning (ML) is an important approach for achieving smart and effective solutions for this downside. Smart farming prediction involves predicting yield of the crop from the obtainable historical information like humidity temperature, pH, rainfall and label. This paper target predicting the yield of the crop supported the present information by using Random Forest algorithm. Real data of Tamil Nadu was used for building the models and conjointly the models were tested with samples. The prediction can help to the farmer to predict the yield of the crop before cultivating onto the agriculture field. To predict the crop yield in future accurately Random Forest, a most powerful and well-liked supervised machine learning rule is employed.

1. INTRODUCTION

Agriculture is the backbone of each economy and is the primary source of livelihood for about 60% of India's population and is not well developed. And in the country like Bharat, that has ever increasing demand for food also the population is increasing day-by-day so that the agriculture sector should need to satisfy the requirements. From ancient period, agriculture is taken into account because the main and the foremost culture practiced in Bharat. In the past, each and every farmer tries to grasp, what quantity yield can get from his expectation and also yield prediction was calculated by analyzing farmer's previous expertise on a specific crop and crop is cultivated by using some cultivating techniques. But these days the seasonal climatic conditions are also being modified against the elemental assets like soil, water and air. So predicting the crop that

should be cultivated have become harder. Due to this, these days, the farmers don't have much awareness of cultivating the crop in a right time and at a right place. As a result the farmer will get loss and ultimately the crops don't get fair price. But by using some large set of previous data and Machine Learning algorithms we can predict the crop yield. In this project we are going to predict the crop yield by using Machine learning techniques which is useful for the agricultural people. In this mainly there are three phases.

● DATA PREPROCESSING:

In this, the data set is collected from Kaggle Website by using API's. This data set consists of features like Temperature, Humidity, pH, Rainfall, label. This data is kept in .csv format and Anaconda Navigator software is installed. By using Jupyter Notebook tool in

that software we can get access to the dataset and can perform certain operations by importing libraries.

- **FEATURE SELECTION:**

In this Independent and Dependent variables are separated, also the data set is splitted into 2 types. One is considered as training data set and the other is considered as testing data set. If training data set is considered as 70% then testing data set is considered as 30%. If training data set is considered as 90% then testing data set is considered is 10%.

- **DATA EVALUATION:**

In this the training data set is fitted into 3 algorithms namely Logistic Regression, Random Forest Classifier, and SVM and accuracy is calculated. Out of all three algorithms Random Forest Classifier gives more accurate result.

2. EXISTING SYSTEM

It entirely covers Data Mining concepts. Various data mining algorithms are used such as Naive Bayes classifier, K-Mean. It also provided classification of soil based on Naïve Bayers, Genetic algorithm, Association Rule Mining. Eventually, it covers Clustering in soil database. This existing system helped us in understanding and analysis of different data mining algorithms and classification mechanisms. This will prove to be extremely beneficiary while developing project. This system considered the past production of data which will help the farmer to get insight into the demand. This system is covered by maximum types of crops so that the farmer may get to know about the crops that had never been cultivated.

3. PROPOSED SYSTEM

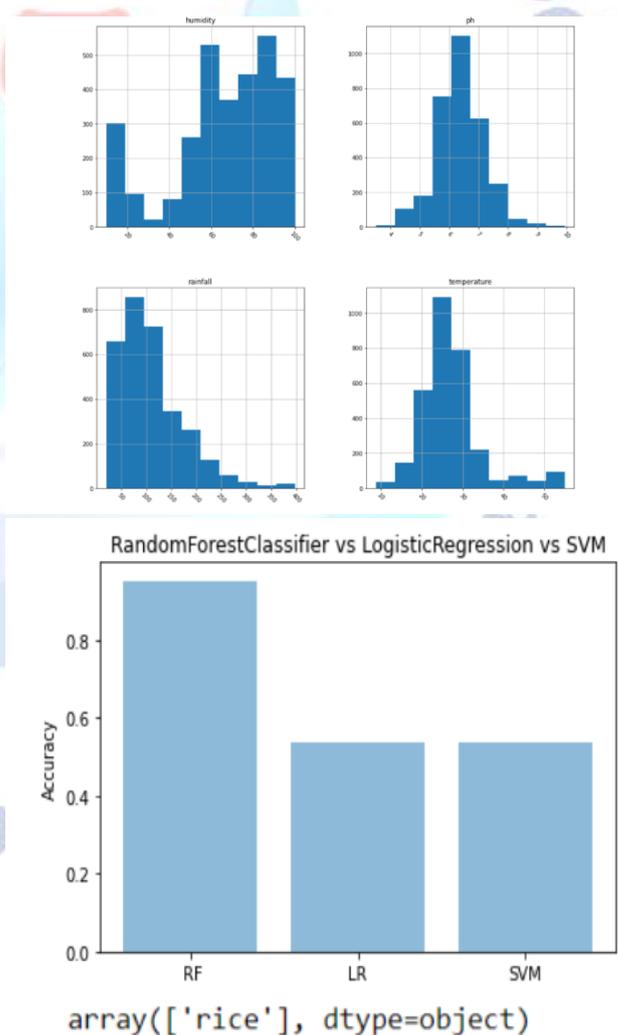
This situation principally concentrates on forecasting, crop yield prediction. These factors facilitate the farmers to cultivate the most effective food crops and lift the proper animals with accordance to environmental elements. Also, the farmers will adapt to climate changes to some extent by shifting planting dates, selecting varieties with completely different growth period, or ever-changing crop rotations. For experimental analysis, the applied math numeric information associated with agriculture is undertaken. Whereas, the agglomeration primarily based techniques and supervised algorithms are utilized for managing the

collected applied math information. Additionally, the suitable classification method like Random Forest algorithm is employed for better classification outcome.

4. IMPLEMENTATION (modules)

Data Preprocessing techniques like collecting the data from the Kaggle Website by using API's. The dataset can be accessed by using Jupyter Notebook tool in Anaconda Navigator software and libraries like Pandas, Numpy, are imported to perform certain operations on the dataset. Matplotlib library gives graphical visualization of data. And in the next step Features are selected and Data evaluation is performed by importing libraries, RandomForest -Classifier, LogisticRegression and svm. After importing RandomForest-Classifier, SVM, LogisticRegression algorithms are applied on the datasets.

SAMPLE SCREENS SHOTS



5. CONCLUSION

This project involves predicting yield of the crop from obtainable historical information like temperature, humidity, rainfall, pH, Label and classification algorithms like SVM, Random Forest and Logistic Regression are applied on the dataset. Out of three algorithms Random Forest algorithm gives accurate result. This project is very helpful for farmers and government to predict the crop before cultivation. This model works efficiently than the existing system and gives the accurate result.

6. FUTURE SCOPE FOR FURTHER DEVELOPMENT

Data Independent System can be applied on this model in further days. This leads to working of the system with same accuracy, whatever be the pattern. Soil details can be integrated which will be an advantage in selecting crops by considering soil as a parameter. Irrigation of crops in a proper manner is also important thing for the crop cultivation. In addition to these by considering rainfall we can know there is any additional water availability is needed or not.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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