Supervised Crop Yield Divination System Using Machine Learning Operating Procedures

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ABSTRACT

Agriculture sector is one of the most important industries in the Indian economy, 60% of Indian population depends upon the agricultural sector for employment. This makes Agri field a critical sector since it contributes 18% of our nation GDP. The current study highlights on data mining methodologies to forecast the production of crops like rice, wheat and maize production using several parameters. Parameters that are involved in dataset are season, crop, district, and area. In this approach, we will be using K-means clustering method for grouping similar records together in a given dataset. Naive Bayes machine learning algorithm will help us to predict the results of the crop productivity which helps farmers to take the decisions based on the prediction.

Keywords: Agriculture sector, population, GDP, data mining, forecast, K-means clustering, dataset, Naïve Bayes.

1. INTRODUCTION

Agriculture sector is backbone of Indian economy since majority of population depends upon this division for occupation and major part of GDP is contributed by this field. Growth of population is directly proportional to the increase in consumption of food. To get rid of situations like shortage of food items farmers, agricultural scientists, and researchers are trying for better crop yield. Data mining is the process of finding patterns in huge amount of data sets which involves different methods at the intersection of machine learning, statistics systems. Data mining techniques helps in effective analysis of crop yield and assists farmers in making brave decisions. The analysed data helps farmers in reducing their investments on crop production and increase the rate of crop yielding. Data mining process includes Extracting, Transforming and Loading Data in a repository and Managing the Data in multidimensional databases. Data mining provide data access to analysts using application software. The analysed data is easily represented using graphs.
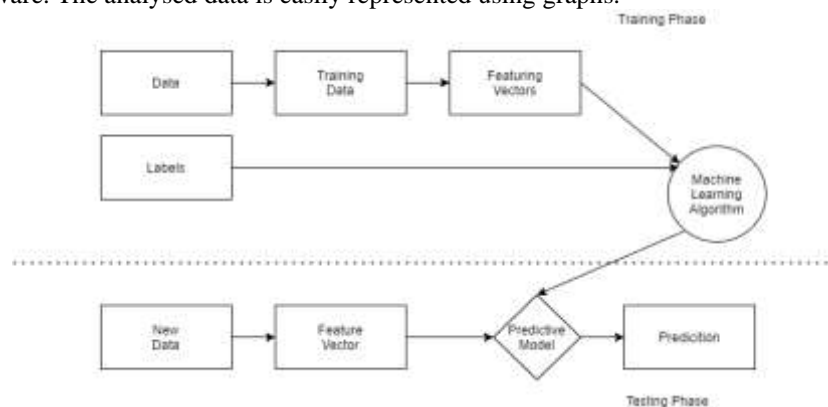

Fig 1: Architecture flow

2. LITERATURE REVIEW

[1] According to authors in this paper they concluded telling that agriculture is the sector which is heart and spine of any country. One of the major issues that every agriculture department around the globe faces is yield prediction of crops and developing a divination model is a best solution. This helps farmers in investing on a particular crop production during certain season in the year.

[2] The authors of this paper suggested methods involved in developing a yield prediction model. First step is to managing datasets, second step is to test datasets, third step is to analyse the datasets. The algorithms they used are naïve bayes and k-nearest neighbour method. They developed java application to check the accuracy of two algorithms.

[3] In India, we as a whole realize that Agriculture is the spine of the nation. This paper predicts the yield of nearly a wide range of harvests that are planted in India. This content makes novel by the use of straightforward

boundaries like State, area, season, region and the client can anticipate the yield of the harvest in which year the person needs to. The paper utilizes progressed relapse methods like Kernel Ridge, Lasso and ENet calculations to anticipate the yield and uses the idea of Stacking Relapse for improving the calculations to give a superior prediction.

[4] This paper solely deals with the yield prediction of rice across velar river basin in Tamilnadu state. Yield outcome is primarily based on certain factors like season, soil, fertilizers and irrigation. However, this paper focuses only on one state's yielding capability, the data this model generates cannot be utilized by other state farmers and this data is limited only to rice production so the model that the author explained in this paper is limited with its properties and cannot be utilized to the fullest.

3. PROBLEM STATEMENT

Predicting crop yield using manual methods doesn't help farmers in overcoming loss and less production of crops. The amount of information related to crop yield is increasing day by day in rapid pace. Analysing these data by performing manual calculations makes things complex, critical and consumption of time is huge.

4. PROPOSED MODEL

The proposed model helps in overcoming the problem that exists in the current system using machine learning techniques that assists farmers in predicting crop yielding. To analyze data extracted, we used some of the common data mining techniques in the field of agriculture sector. Some of the techniques are k-means, Naive Bayes algorithm is discussed as it is one of the important techniques used in agriculture sector which will help farmers to predict the effects of drought and various climatic conditions.

4.1 Advantages of Proposed Model

• Introduces efficient agriculture practices. • Reduces losses in agriculture field.
• Rise in rate of crop yield.
• Decrease in the number of farmers suicidal activities.
• Better crop management.

4.2 Flow of Mechanism

Pre-processing and clustering of data is performed on the dataset that is generated. Later, the dataset is divided into training and testing which is an important part of evaluating data mining models. Once the dataset is divided into test and train dataset, the model gets trained using training dataset. The data supplied by end user will be validated if it meets the criteria of the model then the predicted result gets displayed.
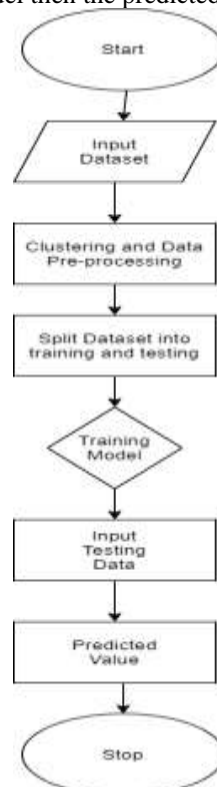
4.3 SYSTEM REQUIREMENTS

4.3.1 Hardware Requirements:

- System   :   Core i3 processors.
- Hard Disk   :   500 GB.
- RAM   :   8 GB / 12 GB

4.3.2 Software Requirements:

- Operating system   :   Windows 8 / 10 (64 bits OS)
- Programming Language :   Python
- Framework   :   Anaconda
- Libraries   :   Pandas, Numpy, Mat plot, seaborn
- IDE   :   Jupyter Notebook

5. ALGORITHM

Naive Bayes is a sort of classifier which utilizes the Bayes Theorem. It predicts enrolment probabilities for each class, for example, the likelihood that given record or information point has a place with a specific class. The class with the most elevated likelihood is considered as the most probable class.

6. IMPLEMENTATION

Data acquisition and pre-processing: This phase deals with data gathering about crop yield from different sources and combining them together in order proceed further with the development of model.

Data preparation and model construction: This is a critical phase in the development of model since we are going to clean the acquired data according to our use and we utilise the data that helps in developing the model.

Model training: The final phase of model development deals with training the model in order to provide accurate results of crop yield. Which is the main motto of our model there should be no much difference in the data predicted with the actual data. This makes the developed model a efficient and useful one to its users in this case farmers.

7. CONCLUSION

Hence, the proposed model assists farmers in guiding them in predicting the crop yielding excellency based on the parameters they choose. The parameters include season, state, crop and expected yield. Therefore, we can conclude that the developed model helps farmers in decreasing the loss.

8. FUTURE ENHANCEMENT

The Future enhancement of this crop yield prediction system is to predict the crop yield using the techniques which will be useful for making crop decisions for farmers and government organizations. In Future, the Artificial Neural Networks (ANN) and Neural Networks (NN) classification approach can be used for the better classification and improve the classification performance of the crop yield prediction. It could be understanding of the high dimensional between complex yearly and seasonal climatic patterns which determine crop yield helps both farmers and other decision makers to be able to predict the effects of drought and other climatic conditions.

9. REFERENCES

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