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A REVIEW ON CROP YIELD AND DEMAND PREDICTIVE USING MACHINE LEARNING

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ABSTRACT

In most developing countries like India, agriculture plays a significant role in the nation's economy. Agriculture is the one which gave birth to civilization. India is an agrarian country and its economy largely based upon crop productivity. Hence increasing agricultural productivity and eliminating unwanted middlemen is important in order to reduce poverty. Machine learning is a crucial perspective for acquiring real-world and operative solution for crop yield issue. This paper focuses on proposed model of predicting the yield of the crop by applying various machine learning techniques . Data mining is likewise helpful for anticipating crop yield creation. By and large, data mining is the way toward breaking down data from a different perspective and summing up it into essential data. The prediction made by machine learning algorithm will help the farmers to decide which crop to grow to get the maximum yield by considering factors like crop name, temperature, soil quality, rainfall etc. From a given set of predictors, machine learning can predict a target/outcome.

Keywords- *Crop yield prediction, Data mining, Indian agriculture, Machine learning, Supervised algorithm*

I. INTRODUCTION

India is a country where agriculture and agriculture related industries are the major source of living for the people. It also contributes a large portion of employment. The productivity of agriculture depends on geographical conditions and season. 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. Nowadays, modern people don't have awareness about the cultivation of the crop in a right time and a right place. Because of these cultivating techniques the seasonal climatic conditions are also being changed against fundamental assets like soil, water, and air which lead to insecurity of food.

To overcome this challenge, an end-to-end supply chain system is presented factored in with the help of machine learning algorithms which not only promises a fair price to farmers for their produce before sowing but also provides supply of yield insights to the smart recommendation for the consumers. Predicting a crop well in advance requires a systematic study of huge data coming from various variables like temperature, humidity, rainfall, crop name soil quality, pH etc. As Prediction of crop deals with large set of database thus making this prediction system a perfect candidate for application of machine learning model. Through machine learning we extract the knowledge from the huge size of data. Many classification methods are also applied to get maximum yield of crops. Machine learning algorithms can help in improving the production of crop yield rate. The aim of the project is to result to increase the yield and profits for producers.

II. LITERATURE SURVEY

In [1] M.R Bendre, R.C Thool, V.R Thool concluded how the old farming data can be utilized to depict the future expectation of harvests and yield. It likewise proposes the ranchers about what kind of yield can be developed utilizing the climate station data and gives the appropriate data to incline toward the precise season for greatness cultivating.

In [2] Monali Paul, Ashok verma concluded the forecast of yield utilizing IOT with the reasonable climatic conditions and the potential outcomes of progress and its application. They have utilized the Hadoop record framework. To manufacture an expectation framework for crops and to distinguish the nuisances the characterization, investigation and forecast calculation is utilized.

In [3] N. Heemageetha concluded the diverse mining procedures to consider crops that are quantitative and relationship them for inter season development. Grouping enormous information is a test, so k implies calculation is utilized to oversee huge information. Proper calculation is utilized to decide the harvests are chosen as incessant thing set. What's more, they centre around the administration strategies and the trimming practices of edges.

In [4] Y. Jeevan Nagendra Kumar, Dr. T.V.Rajini Kanth concluded the different components that associated with ecological parameters which impact Annual Rainfall, and Food Price Index and set up the relationship among these parameters. The curse on the harvest yield is broke down by utilizing different ecological elements and Regression Analysis (RA), Linear Regression (LR) Algorithm.

In [5] B Sankara Babu, A Suneetha concluded by utilizing the various data mining strategies how to improve the harvest production. And the procedures they have utilized for order, for example, ANN, SVM and k implies and so on.

In [6] D Ramesh, B Vishnu Vardhan compared statistical model Multiple Linear Regression over the Data Mining Density-based clustering technique. He concluded that comparison of the crop yield prediction can be made with the entire set of existing available data and will be dedicated to suitable approaches for improving the efficiency of the proposed technique.

In [7] M.C.S.Geetha concluded that data mining plays a crucial role for decision making on several issues related to agriculture field. She also discusses on different data mining applications in solving the different agricultural problems.

In [8] Konstantinos G. Liakos, Patrizia Busato, Dimitrios Moshou concluded that, we present a comprehensive review of research dedicated to the application of machine learning in agricultural production systems. Machine learning (ML) has emerged together with big data technologies, techniques, methods and high-performance computing to generate new opportunities to unravel, quantify, and analyse data intensive processes in agricultural operational sectors. By using Support Vector Machines (SVM) the Paper is Implemented.

In [9] Narayanan Balkrishnan and Dr. Govindarajan Muthukumarasamy concluded that Crop production Ensemble Machine Learning model for prediction. International Journal of Computer Science and Software Engineering (IJCSSE). In this paper, AdaNaive and AdaSVM are the proposed ensemble model used to project the crop production over a time period. Implementation done using Ada SVM and Ada Naive. Ada Boost increases efficiency of SVM and Naive Bayes algorithm.

III. PROPOSED METHODOLOGY

Data is a very important part of any machine learning system. To implement the system, we decided to focus on India to predict the crop yield well in advance to get maximum profit. As the climate changes from place to place, it was necessary to get data at district level. Historical data about the crop and the climate of a particular region was needed to implement the system. This data was gathered from different websites. The parameters which affect the crop the most are crop name, temperature, humidity, rainfall, soil quality and etc.

After creating the dataset we can apply supervised machine learning algorithm which is a regression and classification algorithm on dataset to train the model. To improve the performance of the model we use k-means algorithm. To predict the demand which can leads to the price prediction which are dependent to each other these demand can be based on current raining data and atmospheric which leads to generation of crop and generates demand. Applying Decision Tree, Random Forest on past history data and current weather condition prediction of price can also be done. The output of these model is a crop yield prediction with some recommendation.

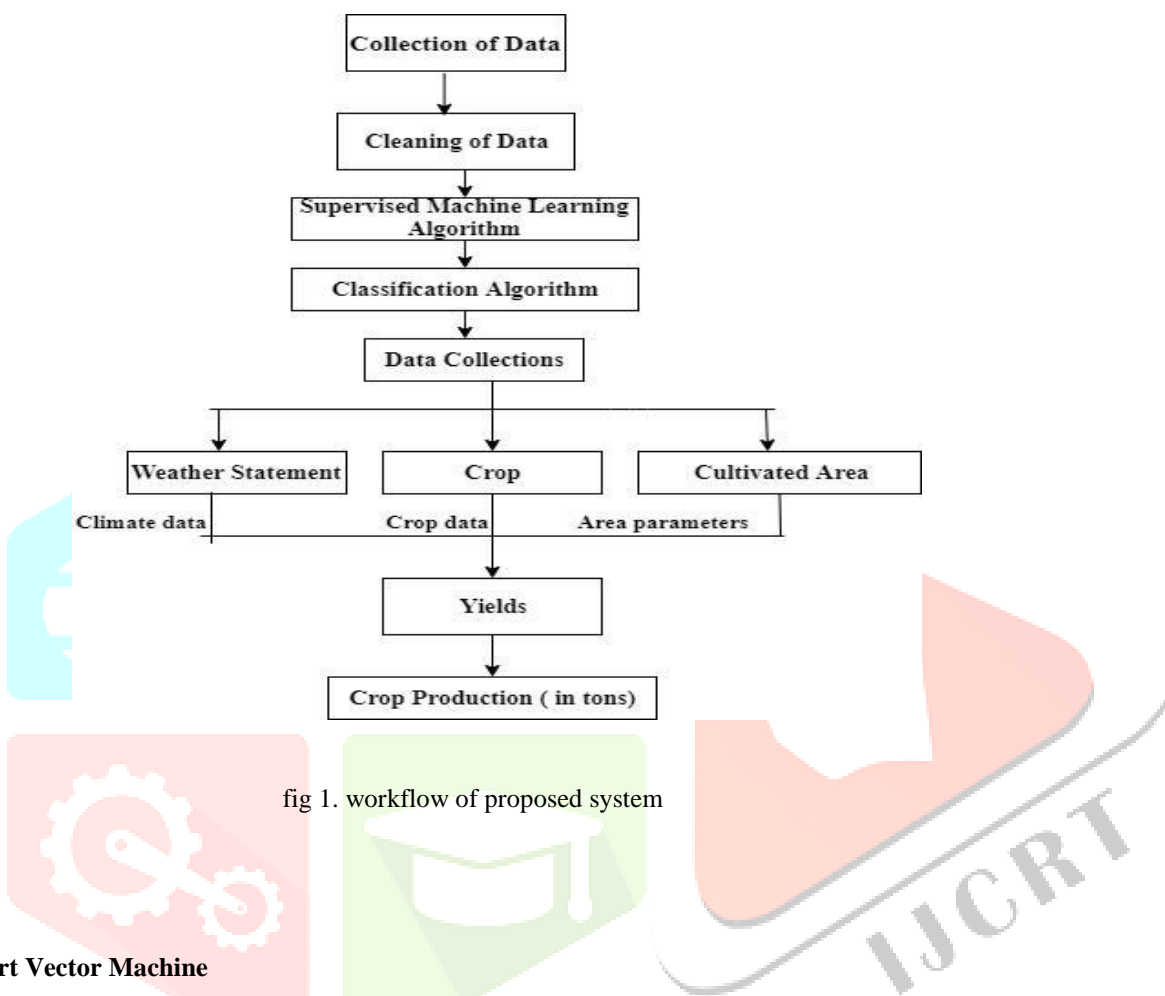


fig 1. workflow of proposed system

A. Support Vector Machine

Support vector machine(SVM) algorithm is also a supervised machine learning algorithm which is used for both classification and regression problems. SVM are binary classifiers that will classify data samples in two disjoint classes. It is a technique in which two classes are linearly separable which is from a simplified case. The SVM takes a set of input data and predicts for each given input which of two possible classes forms the input making the SVM a non probabilistic binary linear classifier.

B. K-Nearest Neighbor

K-Nearest Neighbor is a supervised machine learning. It learns by analogy. It is a simple but a powerful approach for making predictions. K-Nearest Neighbor is a classification technique in which it is assumed that samples that are similar will have similar classification. The number of similar known samples used for assigning a classification to an unknown sample defines the parameter K.

C. Datasets

The dataset consists of factors like temperature, rainfall, humidity, ph, crop name, soil quality, agricultural statistics. The datasets have been obtained from the Kaggle website and other different websites.

The data set has instance or data that have taken from the past historic data. It includes 6 parameters or features like the temperature, soil quality, humidity, crop name, rainfall and agricultural statistics.

IV. CONCLUSION

Agriculture is the field which helps in economic growth of our country. But this is lacking behind in using new technologies of machine learning. Hence our farmers should know all the new technologies of machine learning and other new techniques. These techniques help in getting maximum yield of crops. Many techniques of machine learning are applied on agriculture to improve yield rate of crops. We can also get the accuracy of yield by checking for different methods. Hence we can improve the performance by checking the accuracy between different crops. This paper helps in getting maximum yield rate of the crops and understand the proposed model of crop yield prediction. Also helps in selecting proper crop for their selected land and selected season. This will help in improving the economic growth of our country.

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