

A Survey on Crop yield prediction using Machine Learning

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ABSTRACT

Machine Learning is an emerging research field in crop yield analysis and crop prediction analysis too. Yield prediction and crop prediction are very important issue in agricultural. India being a farming nation, its economy transcendentally relies upon farming yield development and agroindustry items. Ranchers for the most part have the outlook of planting a similar yield, utilizing more composts and following the public decision. The normal issues the vast majority of the ranchers confronting today is about forecast of harvest and yield. Any farmer will be interested to know which crop to grow, so that it increases its yield production. This paper describes various methods and algorithm's used for crop prediction and crop yield prediction.

Keywords: Climate, Machine Learning, Algorithms, Prediction.

I. INTRODUCTION

The primary objective of agricultural arranging and planning is to accomplish most extreme yield pace of harvests by utilizing set number of land assets. Many AI calculations can help in improving the creation of harvest yield rate. At whatever point there is misfortune in negative conditions. We can apply crop choosing technique and diminish the misfortunes. Also, it tends to be utilized to pick up crop yield rate in ideal conditions. This boosting of yield rate helps in improving nation economy. We have a portion of the elements that impact the crop yield rate. They are seed quality and yield choice. We need to test the nature of the seeds prior to planting. As we realize that great nature of seeds helps in getting more yield rate. Also, determination of harvests relies on two

things that is positive and troublesome conditions. This can likewise be improved by utilizing hybridization techniques. Numerous explores are completed to improve horticultural arranging. The objective is to get the greatest yield of harvests. Numerous order strategies are likewise applied to get most extreme yield of harvests. AI methods can be utilized to improve the yield pace of harvests. The technique for crop determination is applied improve crop creation. The creation of yields may rely upon geological states of the district like stream ground, slope zones or the profundity zones. Climate conditions like dampness, precipitation, temperature, cloud. Soil type might be dirt, sandy, saline or peaty. Soil organization can be copper, potassium, phosphate, nitrogen, manganese, iron, calcium, ph. esteem or carbon and various strategies for gathering. Numerous

boundaries are utilized for various yields to do extraordinary expectations. These expectation models can be concentrated by utilizing explores. These forecasts are named two types. One is traditional measurement technique and other is ML strategies. Traditional technique helps in foreseeing single example spaces. Furthermore, ML techniques helps in anticipating various forecasts. We need not to consider the structure of information models in traditional strategy where as we have to think about the structure of information models in Machine Learning techniques.

AI (ML) is the investigation of computer calculations that improve naturally through experience. It is viewed as a subset of man-made reasoning. AI calculations assemble a model dependent on test information, known as "preparing information", to settle on forecasts or choices without being unequivocally customized to do as such. AI calculations are utilized in a wide assortment of uses, for example, email sifting and PC vision, where it is troublesome or impractical to create traditional calculations to play out the required assignments. A subset of AI is firmly identified with computational insights, which centres around making predictions utilizing computer systems; yet not all AI is measurable learning. The investigation of numerical streamlining conveys strategies, hypothesis and application spaces to the field of AI. Information mining is a connected field of study, zeroing in on exploratory information investigation through unaided learning. In its application across business issues, AI is likewise alluded to as predictive investigation.

II. LITERATURE SURVEY

➤ **Shrikant Kokate** et al. 2020 [1] proposed a crop recommendation system using classifier models. The proposed framework is versatile as it very

well may be utilized to test on various harvests. This project was basically made by taking a particular city into consideration and predicting the suitable crop for the area which falls under that city. The data set used had different modules such as rainfall prediction, weather report and crop section. Soil parameter contained soil type and soil ph value. The weather report was comprised of humidity, temperature, wind and rainfall. Dataset also had the information of crop production in the last 10 years in that particular area. The algorithms and techniques used were k-nearest neighbour and decision tree algorithm. A comparative analysis was made between the two and it was found that accuracy of decision tree algorithm was 76.8% and that of KNN algorithm was 89.4%. Naïve Bayes classifier model was also used which had an average accuracy of 70-75%. The results showed that combination classification algorithm like naïve bayes and decision tree classifier are better performing than use of single classifier model.

➤ **S.Bhanumati** et al. 2019 [2] proposed a model which predicted the crop yield production and efficient use of fertilizers. The proposed system predicted the result which will be helpful for farmers to know its overall yield of various crops so that he can choose the crop which will be giving highest yield. The system also tells the efficient use of fertilizer so that he can use only the required amount of fertilizer for the required field. The dataset contained parameters such as state name, district name, crop, area, season, etc. A comparative analysis was done between random forest algorithm and back propagation model. Random forest algorithm showed good results. Even the fertilizer data was trained using back propagation algorithm. As suggested a web application can be made to deploy the model in the future and make it user friendly.

- **Suvidha Jambekar** et al 2018 [3] have proposed a system of prediction of crop production in India using data mining techniques. The dataset used was collected from the public ally available records of the Indian government for the duration of 64 years from 1950-2013. It consists of monthly rainfall, monthly mean temperature, area under irrigation, production. Regression analysis was used for prediction of crop production. Namely three regression algorithms like random forest, multiple regression and multivariate adaptive regression spline were used. The concluded results showed that the performance of multivariate adaptive regression splines was better as compared to multiple linear regression and random forest algorithm.
- **Niketa** et al 2016 [4] have shown that the yield of the crop relies upon the occasional atmosphere. In India, atmosphere conditions shift unequivocally. In the hour of dry season, ranchers face major issues. So this mulled over they utilized some machine learning calculations to help the ranchers to recommend the harvest for the better yield. They take different information from the earlier years to assess future information. They utilized some SMO classifiers in WEKA to arrange the outcomes. The fundamental calculates that take thought are least temperature, greatest temperature, normal temperature, and earlier year's harvest data and yield data. Utilizing SMO device they arranged the past information into two classes that are high return and low yield. The acquired outcome for the crop yield expectation utilizing SMO classifier gives less exactness when contrasted with guileless Bayes, multilayer perceptron and Bayesian organization.
- **Eswari** et al 2018 [5] have shown that yield of the harvest relies upon the discernment, normal, least and greatest temperature. Separated, from that, they have taken one more quality named crop evapotranspiration. The yield evapotranspiration is an element of both the climate and development phase of the plant. This trait is taken into thought to get a decent choice on the yield of the gatherings. They all gathered the dataset with these qualities and send as contribution to the Bayesian organize and group into the two classes named valid and bogus classes and contrasted and the watched orders in the model with a disarray network and bring the precision. At last, they presumed that harvest yield expectation with Naïve Bayes and Bayesian organization give high precision when contrasted with SMO classifier and gauging the harvest yield expectation in various atmosphere and trimming situations will be valuable.
- **Parul Agarwal** et al 2019 [6] proposed a model for prediction crop yield prediction using machine learning algorithms. The main aim of the built system was to help choose the right crop to the farmer. The dataset used was collected online from official website of Indian government. The dataset comprised of temperature, rainfall and production of previous years. Various machine learning algorithms such as random forest algorithm, XG Boost classifier, logistic regression and KNN classifier were used. The results showed that Random forest algorithm had the highest accuracy.
- **J.P. Singh** et al 2015 [7] have proposed a system in their paper which helps in improving the yield pace of harvests by applying grouping strategies and contrasting the boundaries. We can likewise do breaking down and expectation of harvests utilizing baysian calculations. The calculations utilized are Bayesian calculation, K-implies Calculation, Clustering Algorithm, Support Vector Machine.
- **Aditi Kharde** et al 2018 [8] have inferred that the paper helps in foreseeing crop arrangements and

augmenting yield rates and making advantages to the ranchers. Additionally, Using Machine Learning applications with farming in anticipating crop sicknesses, examining crop re-enactments, distinctive water system designs. IOT devices are used for temperature sensing, humidity sensing. An android application is built for displaying the required information. The calculations utilized are K-means Clustering.

III.CONCLUSION

This paper represents analysis of existing use of Machine Learning algorithms and Deep Learning algorithms for helping the farmer in choosing an efficient crop for his land. This paper describes various methods and algorithm's used for crop prediction and crop yield prediction. By analysing the above algorithms, use of efficient algorithms like KNN Algorithm, SVM, and Decision Tree achieves the precision. According to survey, efficient algorithms and accurate dataset lead to proper prediction of yield and crop.

IV. REFERENCES

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