*International Journal of Research in Engineering and Science (IJRES)*
*ISSN (Online): 2320-9364, ISSN (Print): 2320-9356*
*www.ijres.org Volume 11 Issue 5 ǁ May 2023 ǁ PP. 339-341*

# Crop Prediction & Recommendation System Using Machine Learning

Sagar SH [*1], Dravya KL[*2], R Chethan Shindhe[*3], Hrishikesh A Savanth[*4], Pavan Kumar K[*5]

[*1234]*Student, Department of Information Science and Engineering, G M Institute of Technology, Davanagere, Karnataka, India.*

[*5]*Asst. Professor, Department of Information Science and Engineering, G M Institute of Technology, Davanagere, Karnataka, India.*

***Abstract***
*Making decisions about which crops to cultivate and what to do while they are in the growing season is made possible thanks to machine learning, a critical decision-support tool for predicting agricultural yields. The use of a number of machine learning algorithms has aided in the research on predicting agricultural productivity. We conducted a Systematic Literature Review (SLR) for this work in order to discover and synthesize the approaches and features that have been used in agricultural yield prediction studies. Based on our search criteria, we are accumulating more relevant databases, from which we have selected 50 papers for further analysis using inclusion and exclusion criteria. We carefully reviewed the selected publications, assessed the methods and characteristics used, and provided suggestions for further research. According to our data, the most often utilized features in these models are temperature, rainfall, and soil type, and the most frequently employed methodology is artificial neural networks. Based on a review of articles employing machine learning, we came to this conclusion, and we then looked through more electronic databases to locate deep learning research. The deep learning algorithms were eventually taken from studies that employed deep learning. This extra investigation demonstrates that in this case, data analysis and prediction are being done using the decision tree technique.*

***Keywords:*** Machine learning, Decision tree algorithm, Crop yield forecast, Temperature, Soil type.

---

Date of Submission: 01-05-2023 Date of acceptance: 10-05-2023

---

## I. INTRODUCTION

Linear The foundation of the Indian economy is agriculture. In India, the weather has a big impact on how productive the land is. For the most part, rain is necessary for rice farming. Farmers want analysis to help them maximize crop yield as well as timely recommendations to forecast future crop output. One of the biggest issues in agriculture is yield prediction. Farmers used to predict their production based on yield data from prior years. Because of this, there are numerous techniques or algorithms for using data analytics to predict crops, and we can predict agricultural yield using these techniques or algorithms. One of the first nations that continue practice agriculture is India. However, in recent years, there has been a considerable change in agricultural practices as a result of globalization. The state of Indian agriculture has been impacted by a variety of causes. Many innovative technologies have been created in the pursuit of improved health. Precision agriculture is one such method. In India, precision agriculture is still in its infancy. Precision agriculture is the "site-specific" farming technology. Today, we benefit from good input, output, and farming decision-making. Despite the improvements that precision agriculture has made, there are still substantial problems. The inputs for various agricultural fields are provided by a number of different systems. Systems give recommendations on crops and even farming methods. In recent years, machine learning has totally altered how farmers forecast crop output. Large volumes of data can be analyzed by machine learning algorithms to find patterns and trends that the human eye might miss. These algorithms can produce precise predictions of crop output by studying data on soil characteristics, weather patterns, and other variables. The supervised machine learning methods are among the most often used for crop forecasting. These algorithms develop models that can predict the yield of a crop depending on input variables like soil quality and weather by using labelled training data to discover trends in the data. As a result, the model may be used to forecast crop production using the input variables for a particular location and time.

## II. METHODOLOGY

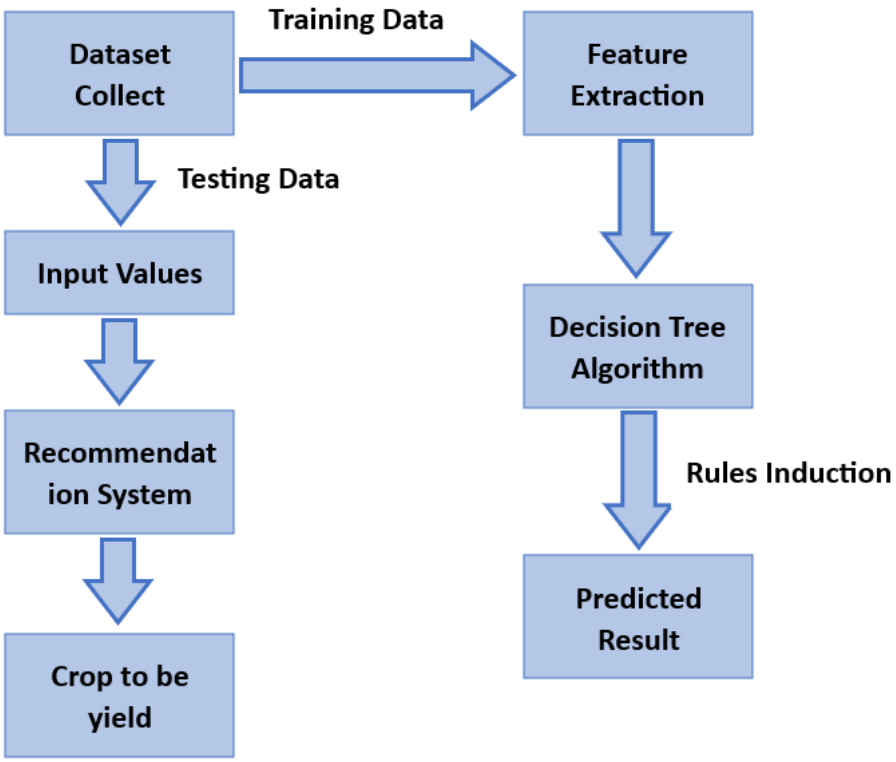


**Fig 1**: System Architecture.

As seen in Fig. 1, when gathering data, information is gathered on a variety of agricultural production-related topics, including soil type, crop type, temperature, and rainfall. During data processing, the data is cleaned and converted to make it ready for additional analysis. The features that are most important for estimating crop yield should be chosen when selecting a feature. Using a decision tree method, you may create a machine learning model that predicts crop yield based on the features you've picked. Using the acquired data to train the selected machine learning model is known as modelling training. evaluating the trained model's performance with new, untested data to ensure sure it is accurate and reliable. when utilized After being tested and validated, the model can be utilized in a production situation to provide farmers with in-the-moment guidance and forecasts.

## III. OBJECTIVES

• Machine learning models are used to forecast crop yields based on a number of variables, such as the weather, soil type, and crop type.
• Making recommendations for the ideal crops to grow based on factors such as the soil, the climate, and consumer demand.
• One strategy to improve agricultural practices is to give farmers suggestions and guidance on how to improve their agricultural practices in light of the data acquired.
• Assisting farmers in selecting the right crops to grow and the ideal seasons for planting and harvesting them.
• Reducing waste and promoting sustainability by providing farmers with the resources they need to utilize resources effectively and reduce their environmental impact. Presented in this section is the utilized material. The table and model must follow the format guidelines.

## IV. WORKING

Numerous details on crops are acquired, such as the climate, the type of soil, and the kind of crop. After gathering the information, it is cleaned up and organized into a manner that will be beneficial for further research. The most important factors that can reliably forecast crop yield are selected. An appropriate machine learning model, such as the Decision Tree Algorithm, is chosen in order to construct a model that can forecast crop production based on the selected features. The acquired data is used to train the selected machine learning model. The trained model's performance is evaluated with brand-new, undiscovered data to make sure it is

trustworthy and accurate. After being tested and validated, the model can be utilized in a production situation to provide farmers with in-the-moment guidance and forecasts. The system assesses the data collected in order to recommend crops and suggests the best crops depending on a number of factors, such as soil type, climate, and market demand. Additionally, the system might offer recommendations and insights on how to improve agricultural practices to increase yield and decrease waste. Overall, a machine learning-powered crop prediction and recommendation system aims to provide farmers with insightful data and recommendations that can help them make decisions, boost profitability, and improve yields while minimizing environmental impact.

## V. SOFTWARE & HARDWARE REQUIREMENTS

HARDWARE REQUIREMENTS: RAM: 4 GB, ROM: 10 GB, Processor: intel i3, Processor Speed: 2.20 GHZ.
SOFTWARE REQUIREMENTS: Operating System: Windows 7, Language: Python, Database: My-SQL, Software Tool: Anaconda Navigator Framework.

## VI. CONCLUSION

Machine learning-based systems for crop prediction and recommendation have enormous potential to transform the agricultural sector and solve issues including rising food demand, resource scarcity, and climate change. Machine learning algorithms can predict agricultural yields and identify the ideal crops for a given region if they have access to detailed data on soil characteristics, weather patterns, and crop genetics. Farmers can now make data-driven decisions and maximize their crops thanks to this. One of the main benefits of these systems is their ability to accurately anticipate crop yields and resource requirements. Farmers may also refrain from using excessive amounts of water and other resources in order to promote more sustainable and effective farming. In addition to enhancing productivity, crop prediction and recommendation systems can assist in addressing issues related to global food security by ensuring an adequate supply and lowering the risk of crop failure. These technologies can assist meet the expanding demand for food while reducing harmful environmental effects by identifying the crops that are most suited for a particular area and maximizing their cultivation.

## REFERENCES

[1] Shilpa Mangesh Pande, Dr. Prem Kumar Ramesh, Anmol, B.R Aishwarya, Karuna Rohilla, Kumar Shaurya (2021), '**Crop Recommender System Using Machine Learning Approach**', Proceedings of the Fifth International Conference on Computing Methodologies and Communication (ICCMC 2021).

[2] Vaishnavi.S, Shobana.M, Sabitha.R, Karthik.S (2021), '**Agricultural Crop Recommendations based on Productivity and Season**', 7th International Conference on Advanced Computing & Communication Systems (ICACCS).

[3] Rakesh Kumar, M.P. Singh, Prabhat Kumar and J.P. Singh (2015), **'Crop Selection Method to Maximize Crop Yield Rate using Machine Learning Technique'**, International Conference on Smart Technologies and Management for Computing, Communication, Controls, Energy and Materials (ICSTM).

[4] Anshal Savla, Parul Dhawan, Himtanaya Bhadada, Nivedita Israni, Alisha Mandholia, Sanya Bhardwaj (2015), **'Survey of classification algorithms for formulating yield prediction accuracy in precision agriculture'**, Innovations in Information, Embedded and Communication systems (ICIIECS).

[5] Aakunuri Manjula, Dr.G.Narsimha (2015), **'XCYPF: A Flexible and Extensible Framework for Agricultural Crop Yield Prediction'** , Conference on Intelligent Systems and Control (ISCO).

[6] Yash Sanghvi, Harsh Gupta, Harmish Doshi, Divya Koli, Amogh Ansh Divya Koli, Umang Gupta (2015), **'Comparison of Self Organizing Maps and Sammon's Mapping on agricultural datasets for precision agriculture'**, International Conference on Innovations in Information, Embedded and Communication systems (ICIIECS).