IJIREEICE ISSN (O) 2321-2004, ISSN (P) 2321-5526

International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering

ISO 3297:2007 Certified ⁜ Impact Factor 7.047 ⁜ Vol. 10, Issue 7, July 2022

DOI: 10.17148/IJIREEICE.2022.10718

Crop Recommendation using Machine Learning

Nisarga.B[1], K.M. Sowmyashree[2]

PG Scholar (MCA), Dept. of MCA, P.E.S College of Engineering, Mandya, Karnataka, India[1].

Assistant Professor, Dept. of MCA, P.E.S College of Engineering, Mandya, Karnataka, India[2].

Abstract: The agricultural industry is increasingly in peril from climate change and other environmental issues. Machine learning is a key tactic for identifying practical and effective solutions to this problem (ML). The technique of predicting crop involves making projections about the crop's output based on historical information such as weather, soil, and prior crop yields. Due to the agriculture industry's rapid innovation and liberalised market economy, accuracy in crop prediction is necessary (CP). For accurate prediction, machine learning (ML) techniques and the selected attributes are crucial. The performance of any ML algorithm may be improved by employing a special set of features from the same training dataset. This study evaluates the crucial elements of a precise CP.

Keywords: Agriculture, Machine learning, technique, prediction.

I. INTRODUCTION

Machine learning (ML) is used to find a solution when the link between the variables used as input and output is ambiguous or hard to determine. The automated collection of structural descriptions from examples of the described item is referred to in this sense as "learning." Machine learning (ML) does not rely on the validity of the underlying structure of the data model, unlike traditional statistical methods. This trait is particularly useful for simulating complex non-linear behaviours, such as a function for agricultural yield prediction. The best application of ML for predicting agricultural production.

II. EXISTING SYSTEM

Farmers once had the ability to forecast production based on past performance, but this is no longer possible due to unpredictable weather conditions. Therefore, they can use technology to help them forecast agricultural output and decide whether or not to plant the crop. A machine learning algorithm that understands the pattern of the crop and yield depending on various circumstances will anticipate the yield of the area where he plans to grow crops. The challenge is in developing the most accurate model to anticipate crop production, therefore test out a variety of algorithms, compare them all, and choose the one that has the least error and loss before using it to predict crop.

“Machine Learning Regression Techniques for the Silage Maize Yield Prediction Using Time-Series Images of Landsat 8”, by Hossein Aghighi and Mohsen Azadbakht, this study that looked into silage corn yield prediction utilising time series NDVI datasets originating. The paper evaluate the results of developed ML techniques such as boosted regression tree (BRT), random forest regression (RFR), support vector regression (SVR), and Gaussian process regression (GPR) approaches with some proposed traditional regression methods.[1]

“Sugarcane growth prediction based on meteorological parameters using extreme learning machine and artificial neural network”, by Amir Mosavi and Khamaruzaman bin Wan this method of water management, environment protection, as well as cane supply management is defined, regardless of the matter that this research indicates the use of the extreme learning machines (ELM) would have never been researched in this material world.[2]

“Application of Artificial Neural Network for Predicting Maize Production in South Africa”, Abiodun M. Adeola and Abubeker Hassen the method of PET, PRE, TMN, TMX, Land, and SM with two hidden neurons of vector (5,8) was the best for foretelling grain production in the Free State province, while the combination of TMN, TMX, PET, PRE, SM, and Land with vector (5,8) Was the reliable combination for forecasting grain production in Kwzulu .[3]

Drawbacks of existing system

1. They considered only about a particular State and not about all the states and other parameters.
2. Much expensive.
3. Hard to interpret.
4. Relatively slower to build.

IJIREEICE ISSN (O) 2321-2004, ISSN (P) 2321-5526

International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering

ISO 3297:2007 Certified ⁜ Impact Factor 7.047 ⁜ Vol. 10, Issue 7, July 2022

DOI: 10.17148/IJIREEICE.2022.10718

III. PROPOSED SYSTEM

In order to maximise crop output and meet the nation's expanding food demand, the suggested model enables selectiong the crop based on environmental and economic relevant factors

The planned structure is unique in that it helps to guide farmers to enhance crop production by also proposing the most valuable crop for the particular region. The recommended method produces forecasts about crop output by taking into account elements like rainfall, temperature, region, humidity, moisture level, etc. The method assists in picking the best time to administer fertilisers.

The goal is to enhance the number of different of crop production throughout the season. The developed scheme would help the farmers in lessening the challenges they are facing when choosing a particular a crop.

The current proposal estimates the crop for such provided region's sets of data. Combining agricultural production and machine learning will help to increase the agricultural production by helping farmers and utilizing resources. The information from previous years is important throughout estimating actual performance.

IV. SYSTEM ARCHITECTURE

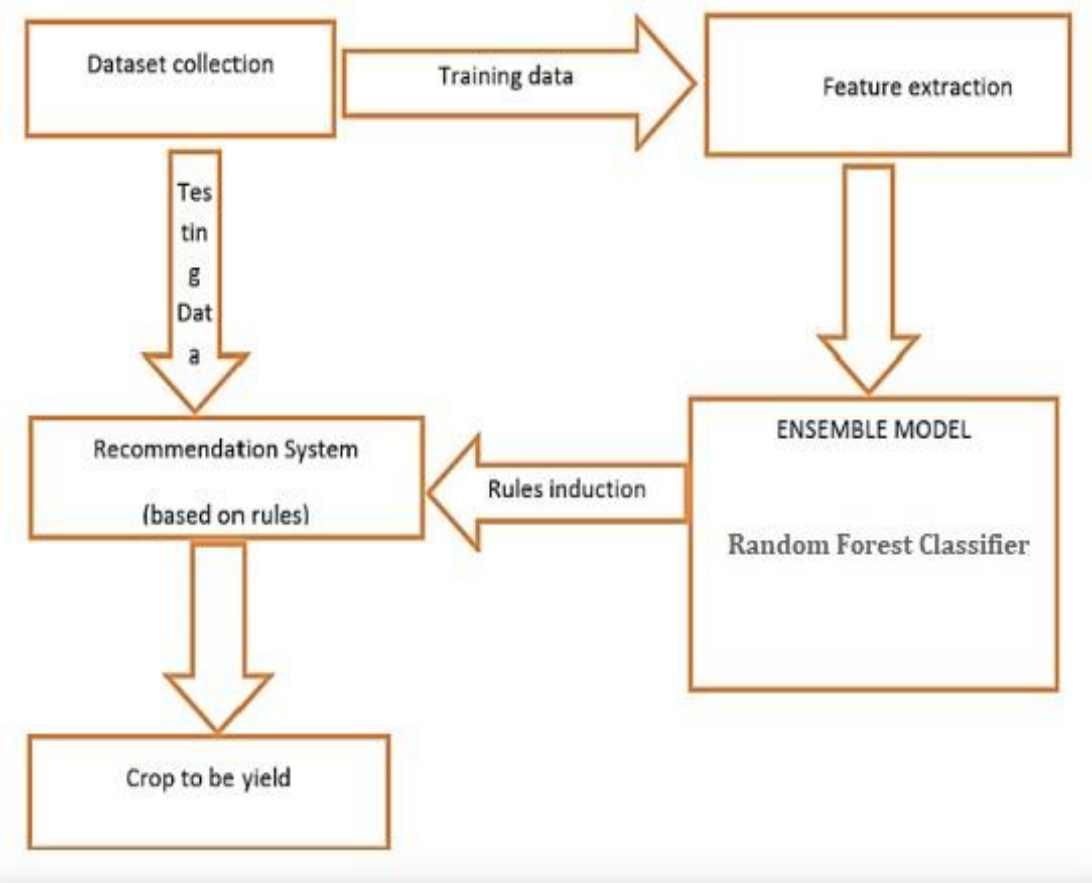

Fig. 1 Architecture of crop recommendation using machine learning

V. MODULES DESCRIPTION

A. Dataset:

Collecting data would be the first real step toward the actual development of a machine learning model. This is an important element that will have a knock-on effect on how good the model is; and the more better data we hold, the nicer our model will operate. There are many other methods for gathering data, such as web scraping, manual approaches, and so on. The data used in this crop recommendation in Karnataka was obtained from another source.

B. Data Pre-Processing:

Gather and prepare data for training. Clean anything that may need it (remove duplicates, correct errors, deal with missing values, normalization, data type conversions, etc. Randomize data to remove the effects of the order in which we

DOI: 10.17148/IJIREEICE.2022.10718

collected and/or otherwise prepared our data. Visualize data to aid in the detection of relevant relationships between variables or class imbalances (bias alert!), or conduct other exploratory analysis.

C. Random Forest Classifier:

Random Forest is a very well machine learning algorithm from of the supervised learning technique. This is built on the principle of ensemble learning. Random Forest is indeed a classifier that uses a number of decision trees on different subsets of a given dataset and averages them to continue improving the predictive accuracy of that dataset. The greater the number of trees in the forest, the higher the accuracy and also the lower the risk of overfitting.

VI. CONCLUSION

This approach is recommended as a way to stop the rising rate of farmer suicides and to help them advance financially. The Crop Recommender system assists farmers in choosing which crop to grow and forecasts for specific crops. It also gives the customer instructions on when to apply the fertiliser. Relevant datasets were gathered, analysed, and trained using machine learning algorithms.

VII. FUTURE ENHANCEMENT

At the next level, the Automation part can be added as the response system to the feedback. This can be modified to control the humidity, water level, etc. according to the need of the farmer.

REFERENCES

[1] Prof. D.S. Zingade ,Omkar Buchade ,Nilesh Mehta ,Shubham Ghodekar ,Chandan Mehta “Crop Prediction System using Machine Learning”.
[2] Ashwani kumar Kushwaha, Swetabhattachrya “crop yield prediction using agro algorithm in hatoop”.
[3] Girish L, Gangadhar S, Bharath T R, Balaji K S, Abhishek K T “Crop Yield and Rainfall Prediction in Tumakuru District using Machine Learning”.
[4] Rahul Katarya, Ashutosh Raturi, Abhinav Mehndiratta, Abhinav Thapper “Impact of Machine Learning Techniques in Precision Agriculture”.
[5] Pijush Samui, Venkata Ravibabu Mandla, Arun Krishna and Tarun Teja “Prediction of Rainfall Using Support Vector Machine and Relevance Vector Machine”.
[6] Himani Sharma, Sunil Kumar “A Survey on Decision Tree Algorithms of Classification in Data Mining”.
[7] Pavan Patil, Virendra Panpatil, Prof. Shrikant Kokate “Crop Prediction System using Machine Learning Algorithm. [8] Vikas Kumar, Vishal Dave (2013), “KrishiMantra: Agricultural Recommendation System”, Proceedings of the 3rd ACM Symposium on Computing for Development, January.
[9] Savae Latu (2009), ”Sustainable Development : The Role Of Gis And Visualisation”, The Electronic Journal on Information Systems in Developing Countries, EJISDC 38, 5, 1-17.
[10] Nasrin Fathima.G (2014), “Agriculture Crop Pattern Using Data Mining Techniques”, International Journal of Advanced Research in Computer Science and Software Engineering, Volume 4, May.
[11] Ramesh A.Medar (2014), ”A Survey on Data Mining Techniques for Crop Yield Prediction”, International Journal of Advance Research in Computer Science and Management Studies, Volume 2, Issue 9, September.
[12] Shakil Ahamed.A.T.M, Navid Tanzeem Mahmood (2015),” Applying data mining techniques to predict annual yield of major crops and recommend planting different crops in different districts in Bangladesh”, ACIS 16th International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (SNPD),IEEE,June.