Implementation of Effective Crop Selection by Using Machine Learning

K.Yamini, G.Bhuvaneswari, K.Novalya Nagalakshmi, B.Supriya, A.Monisha, Assoc.Prof, Dr.A.Nareesh
Department of Computer Science & Engineering, VNITSW, Guntur, AssociateProfessor, Department of
Computer Science & Engineering, VNITSW, Guntur.

Abstract
Agriculture is one of the most important components of our society. Soil is a critical factor for a successful agriculture. Thecomposition of soil differs from soil to soil. The Growth of Crops is affected by these chemical features of soil. Choosing the righttype of crops for that particular type of soil is also important. Machine Learning techniques can be used to predict different types of crops suitable for that soil based on features of soil, particular region and its climatic conditions.
Keywords: Crop production, Machine learning, Random Forests, Weather Conditions

1. Introduction

AgricultureisoneoftheimportantoccupationpracticedinIndia.It is the broadest economic sector and plays a most importantrole in the overall development of the country. More than 60%of the land in the country is used for agriculture in order to suffice the needs of 1.3 billion people Thus adopting new agriculture technologies is very important. This will be leads the farmers of our country towards profit. Prior crop prediction and yield prediction was performed on the basis of farmers experience on a particular location

Soil plays a crucial role in agriculture. Soil consists of nutrients that are used by the plants to grow. There are different types of soils available and each having different properties. The cropyield also depends on the climatic conditions of a particularregion. The possible way to improve productivity is that wechoose a right crop for the right land type. Machine learning is one of the budding technologies in the field of agriculture. Machine learning can be used to improve the productivity and quality of the crops in the agricultural sector.

As, Agriculture is the broadest economic sector and plays a significant role in the overall socio-economic fabric of India.Many researchers are aimed at improving agricultural planning and crop productivity with good quality of crops. So our main goal is to get the maximum yield of crops. There are many Machines learning classification techniques are model to produce crops over a specific time period using different classification methods

Researchers in modern agriculture are testing their theories at greater scale and helping make more accurate, real-time predictions. Modern agriculture has the potential to discover even more ways to conserve water, use nutrients and energy more efficiently, and adapt to climate change. The agriculture factors such as rain, weather, soil type, pesticides and fertilizers are the main responsible to increasethe production. The main reason for agriculture is to grow crops. Crop cultivation depends on the nature and the nutrients of the soil increasing the cultivation of land which brings a loss of supplements present in the soil. In the crop cultivation soil plays an important role. It is important for plants, animal's rocks and living organisms. All of these help in managing the fertility of the soil.

The work completed here for predicting crops of agricultural commodities is helpful for the farmers as they can grow crops depending upon the prediction of suggested crop.

2. Existing System

At the beginning, the traditional methods are used which are costly, long process and also time consuming. Hence, there is a need for new technologies and methods to enhance the existing system in order to get faster and better results. The existing model is proposed for predicting the croptype and suggests a suitable crop that can be cultivated in that's oil based only the features of the soil. The model doesn't consider some other attributes like Climatic conditions temperature, humidity and rainfall.

2.1 Disadvantages
1. As the features are only of soil, there is lack of accuracy.
2. There I slack of integrity.
3. This may lead to wrong diversions for the users.

3. Proposed System
- We proposed a machine learning model that would predict and suggest a crop to the user based on the features of the soil along with the climatic conditions of the region.
- In order to predict we are considering an open source dataset which is obtained from Kaggle which was uploaded by the ICAR(Indian Council For Agriculture Research) named crop suggestion dataset with size 5MB having 2200 rows and 7attributes.
- The dataset attributes are nitrogen percentage, phosphorus percentage, potassium percentage, rainfall, humidity, temperature and pH.
- The dataset is first preprocessed, then trained and then tested.
- The Technique we are using here is the random forest classifier producing an accuracy of 98.93%.
- The algorithm random forest is used to give the best crop yield model by considering least number of models. It is very useful to predict the yield of the crop in agriculture sector.
- Random Forest algorithm has an ability to analyze crop growth related to the current climatic conditions.
- Random Forest classifier was found huge ability to predict crop yield.
- From different outputs, it shows that Random Forest is an efficient learning algorithm to analyze crop at current climatic condition and has a huge exactness in data investigation.
- Hence, the proposed work provides a helping hand to the farmer in the accurate election of the crop for cultivation.

3.1 Advantages
- Accuracy is more.
- Crop yielding is high.
- This will bring exponential gain in the crop productivity which in turn boosts the economy of thecountry.

4. System Architecture
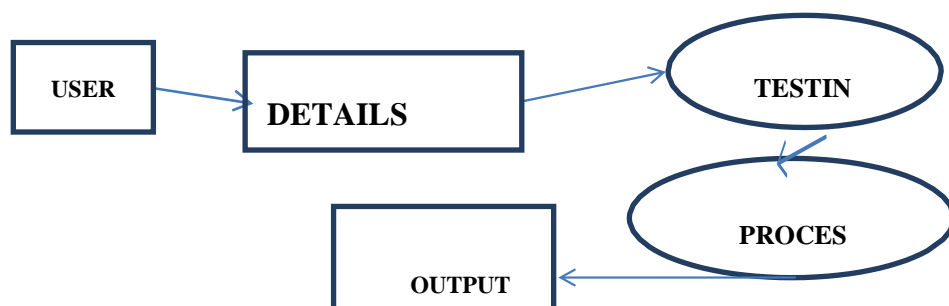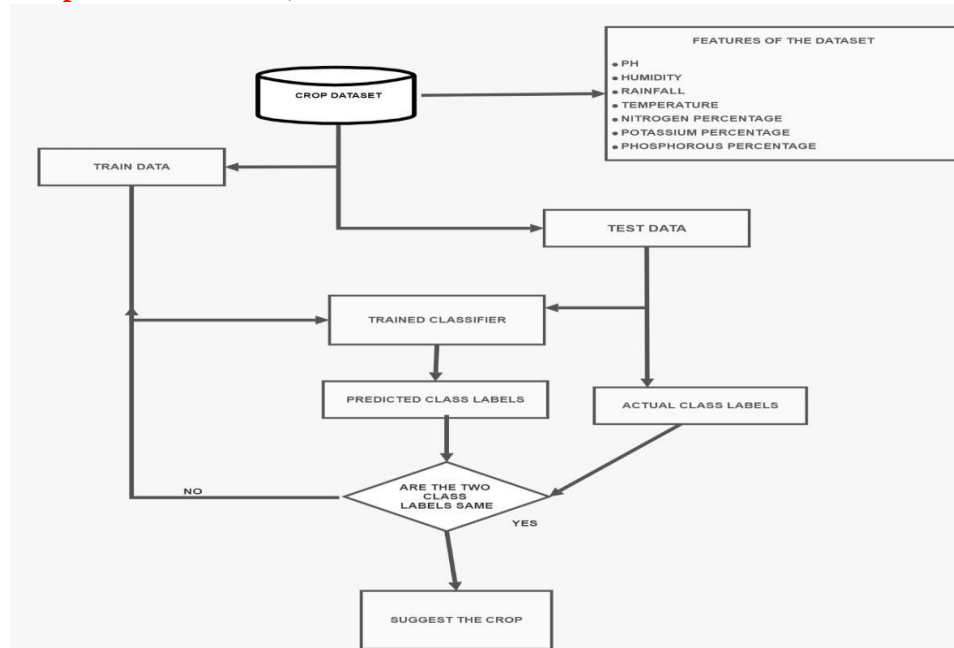The diagrammatic representation of our proposed system as follows:

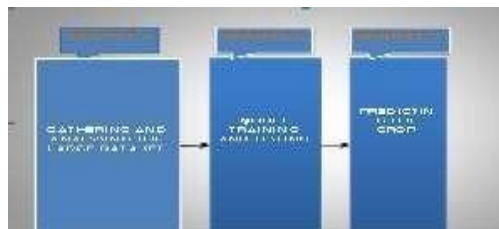Figure (1): Diagrammatic representation of our proposed system.

Figure(2):Architecture

5. Project Modules

5.1 Module–I: Gathering and Analyzing Data

The large dataset has been collected from various sources on crops and their climatic and soil requirement and analyzed.

Figure(3):ModuleDescription

5.2 Module–II: Data Clustering Using C-Means

Random Forest model are trained and tested to produce a high defined accuracy in crop selection.

5.3 Module–III Predicting the Crop

- After testing, then next step is predicting the crop.
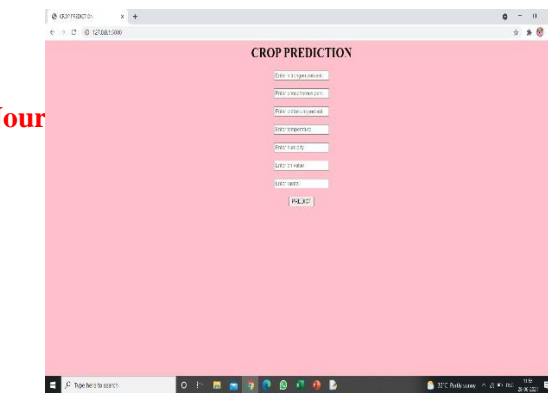- The user knows the exact crop to be deployed for the current geographical status.

6. Screenshots

Our proposed system is categorized into three modules. They are represented as follows:

Figure(4):output

Figure(5): output

THE CROP SUGGESTED FOR YOU IS KIDNEY BEANS
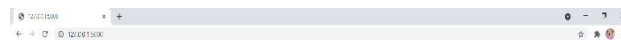
Figure(6):output

Please, Enter valid details

Figure(7):output

7. Methods

- Random forest : Random forest is a basically supervised learning algorithm that is used for both classifications as well as regression.
- Random forest algorithm creates decision trees on different data samples and then predicts the data from each subset and then by voting gives betters the solution for the system.
- Forgetting high accuracy we used the Random Forest algorithm which gives accuracy which predicate by model and actual outcome of predication in the dataset.
- In the random forest which crates the decision tree from a sample of data and trees gives the prediction from each family and selects the best solution by voting which gives better accuracy for the model. It gives optimum results for the system.

8. Conclusion

This project is employed to search out the gain the knowledge about the crop that can be deployed to make an efficient and useful harvesting. While the existing system, lags a bit in accuracy in prediction. The ultimate result that was foretold wasn't that accurate with the original. To overcome this drawback, we have a proposed a project to replacement technique with random forest. It takes only less time for its processes and the accuracy of the prediction is high.

9. Suggested Future Work

In future, by using upcoming software's and latest technology, the processing time can be reduced. Efficiency of our module will be increased. Similarly, the same method can be implemented using advanced machine learning algorithm, if it is introduced in near future.

References

1. RakeshKumar1, M.P.Singh2,PrabhatKumar3and J.P. Singh4, "Crop Selection Method to Maximize Crop Yield Rate using Machine Learning Technique", 2015 International Conference on Smart Technologies and Management for Computing, Communication, Controls, Energy and Materials(ICSTM),VelTech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology, Chennai, T.N., India. 6-8 May 2015, pp.138-145.
2. Evaluation of random forest method for agricultural crop classification, Asli Ozdarici Ok, Ozlem Akar & Oguz Gung or European Journal of Remote Sensing, 439-450.
3. S.Pudumalar*, E.Ramanujam*, R.HarineRajashreeń, C.Kavyań, T.Kiruthikań, J.Nishań,2016. Crop Recommendation System for Precision Agriculture.
4. Kiran, Siripuri, et al. "Internet of things integrated smart agriculture for weather predictions and preventive mechanism." Materials Today: Proceedings (2021).
5. Kanumalli, S.S., Chinta, A.,ChandraMurty, P.S.R. (2019). Isolation of wormhole attackers in IOV using WPWP packet. Revue d'Intelligence Artificielle, Vol. 33, No. 1, pp. 9-13. https://doi.org/10.18280/ria.330102
6. Narayana, Vejendla Lakshman, et al. "Secure Data Uploading and Accessing Sensitive Data Using Time Level Locked Encryption to Provide an Efficient Cloud Framework." Ingénieriedes
7. Systèmesd' Information 25.4 (2020).
8. Kotamraju, Siva Kumar, et al. "Implementation patterns of secured internet of things environment using advanced blockchain technologies." Materials Today: Proceedings (2021).
9. Krishna, Komanduri Venkata Sesha Sai Rama, et al. "Classification of Glaucoma Optical Coherence Tomography (OCT) Images Based on Blood Vessel Identification Using CNN and Firefly Optimization." Traitement du Signal 38.1 (2021).
10. Satya Sandeep Kanumalli, Anuradha Ch and Patanala Sri Rama Chandra Murty, "Secure V2V Communication in IOV using IBE and PKI based Hybrid Approach" International Journal of Advanced Computer Science and Applications (IJACSA), 11(1), 2020. http://dx.doi.org/10.14569/IJACSA.2020.0110157
11. CHALLA, RAMAIAH, et al. "Advanced Patient's Medication Monitoring System with Ardunio UNO and NODEMCU." 2020 4th International Conference on Electronics, Communication and Aerospace Technology (ICECA). IEEE, 2020.
12. Kanumalli, Satya Sandeep, Anuradha Ch, and Patanala Sri Rama Chandra Murty. "Advances in Modelling and Analysis B." Journal homepage: http://iieta. org/Journals/AMA/AMA_B 61.1 (2018): 5-8.
13. Venkatramulu, S., et al. "Implementation of Grafana as open source visualization and query processing platform for data scientists and researchers." Materials Today: Proceedings (2021).
14. Sandeep, Kanumalli Satya, Anuradha Chinta, and PatanalaMurty. "Isolation of Wormhole Attackers in IOV Using WPWP Packet." Rev. d'Intelligence Artif. 33.1 (2019): 9-13.
15. Yamparala, Rajesh, and Balamurugan Perumal. "EFFICIENT MALICIOUS NODE IDENTIFICATION METHOD FOR IMPROVING PACKET DELIVERY RATE IN MOBILE AD HOC NETWORKS WITH SECURED ROUTE." Journal of Critical Reviews 7.7 (2020): 1011-1017.
16. Devi, S. Pramela, et al. "Likelihood based Node Fitness Evaluation Method for Data Authentication in MANET." International Journal of Advanced Science and Technology 29.3 (2020): 5835-5842.

17. Yamparala, Rajesh, and Balamurugan Perumal. "Secure Data Transmission with Effective Routing Method Using Group Key Management Techniques-A Survey Secure Data Transmission with Effective Routing Method Using Group Key Management Techniques-A Survey."