Estimate The Crop Yield Using Data Analytics

Abstract:

In agriculture sector where farmers and agribusinesses have to make innumerable decisions every day and intricate complexities involves the various factors influencing them. An essential issue for agricultural planning intention is the accurate yield estimation for the numerous crops involved in the planning. Data mining techniques are necessary approach for accomplishing practical and effective solutions for this problem. Agriculture has been an obvious target for big data. Environmental conditions, variability in soil, input levels, combinations and commodity prices have made it all the more relevant for farmers to use information and get help to make critical farming decisions. This paper focuses on the analysis of the agriculture data and finding optimal parameters to maximize the crop production using data mining techniques like PAM, CLARA, DBSCAN and Multiple Linear Regression. Mining the large amount of existing crop, soil and climatic data, and analysing new, non-experimental data optimizes the production and makes agriculture more resilient to climatic change.

literature survey:

1. A Novel Approach using Big Data Analytics to Improve the Crop Yield in Precision Agriculture

Agriculture is the main work field in India. Farming industry adopts less innovative technology compared to other industries. Information and Communication Technologies provides simple and cost effective techniques for farmers to enable precision agriculture. The work propose a state of the art model in agriculture field which will guide the rural farmers to use Information and Communication technologies (ICT) in agriculture fields. Big data analytics is used to improve the crop yield. It can be customized for precision agriculture to improve the quality of crops which improves the overall production rate.

2. Soil Based Prediction for Crop Yield using Predictive Analytics

Soil is the main component and plays a significant role in agriculture. Based on the nutrients and pH value of the soil, crop yielding is determined. Farmers are still using traditional approach to analysis the soil quality. The techniques like Data Mining, Artificial Intelligence, Machine Learning, Deep learning and Predictive Analytics are the emerging technologies in research to improve the agricultural field. Predictive analysis is a technique of machine learning that predicts the future outcomes and analysis is based on the historical or past data. In agriculture, predictive analytics helps to predict or identify the soil nutrients level required for the crops like Paddy, Raagi, Cumbu etc.,. In this paper, the soil based dataset is collected from TNAU website and it has 32 districts of Tamilnadu. The algorithms such as Naïve bayes, Bayes Net, and IbK have been deployed to predict the crop variety suitable for the soil based on the total production and area sown district wise. Also, its accuracy levels are compared. The accuracy is determined using true positive value, false positive value, precision, recall, f-measure and MCC.

3. Crop Yield Prediction Using Data Analytics and Hybrid Approach

Indian Economy has Agriculture as its backbone. In India, agricultural yield is primarily depends on weather conditions. Rice cultivation is majorly depends on rainfall. In this context, timely advice to predict the future crop productivity and an analysis is to be made in order to help the farmers to maximize the crop production of crops [3]. Yield prediction is an important agricultural problem. Earlier Farmers used to predict their yield from past yield experiences. Thus, for such kind of data analytics in crop prediction, there are different techniques or algorithms, and with the help of those algorithms we can predict crop yield [3]. Agricultural data is being produced constantly and enourmosly. As a result, agricultural data has come in the era of big data. Smart technologies contribute in data collection using electronic devices. In our project we are going to analyse and mine this agricultural data to get useful results using technologies like data analytics and machine learning and this result will be given to farmers for better crop yield in terms of efficiency and productivity.

4. Crop Yield Prediction Using Random Forest Algorithm

Most agricultural crops have been badly affected by the effect of global climate change in India. In terms of their output over the past 20 years. It will allow policy

makers and farmers to take effective marketing and storage steps to predict crop yields earlier in their harvest. This project will allow farmers to capture the yield of their crops before cultivation in the field of agriculture and thus help them make the necessary decisions. Implementation of such a method with a web-based graphic software that is simple to use and the machine learning algorithm can then be distributed. The results obtained are granted access to the farmer. And yet there are various methods or protocols for such very data analytics in crop yield prediction, and we are able to predict agricultural productivity with guidance of all those algorithms. It utilizes a Random Forest Algorithm. By researching such problems and issues such as weather, temperature, humidity, rainfall, humidity, there are no adequate solutions and inventions to resolve the situation we face. In countries like India, even in the agricultural sector, as there are many types of increasing economic growth. In addition, the processing is useful for forecasting the production of crop yields.

5. Crop Recommendation and Yield Production using SVM Algorithm

Different soil parameters affect agriculture growth, namely Nitrogen, Phosphorous, Potassium, Crop Rotation, Soil Moisture, pH, surface temperature, and weather factors such as temperature, rainfall, etc. With the help of technology, farm yields will improve due to increased crop productivity. Smart Agriculture is provided by the proposed work via the monitoring of the agricultural field. As a result, it can greatly increase farmers' output. This research work present a website to employ Machine Learning [ML] algorithms combined with historical weather information to determine the most profitable crop under the current weather conditions. Using weather parameters, soil parameters and historic yields, this system can also predict crop yields. The proposed work aims at creating a system that integrates data from multiple sources, data analytics, and forecast analysis that can enhance crop yield productivity and make farmers more profitable in the long run.

6. An Investigation on Crop Yield Prediction Using Machine Learning

For the existence of humans, agriculture is vitally crucial. For a big population of the globe, agriculture provides a living. It also provides the locals with a large number of

work openings. Many farmers desire to use old-fashioned farming techniques, which provide poor income. Critical to the economy's long-term development and advancement are agriculture and the related industries. Decision making, crop selection and supporting systems for increased crop output are the primary problems for agricultural production. The prediction of agriculture depends on parameters such as temperature, soil fertility, amount of water, water quality and seasons, crop price, etc. Machine learning plays an important role in crop yield prediction on the basis of geography, climate details, and season. It helps farmers in growing most appropriate crop for their farm land. This paper presents a machine learning based framework for prediction of crop yield. For experimental set up, a data set is created for crop details. Machine learning algorithms SVM, random forest and ID3 are used for investigation.

7. Big Data Analytics for Crop Prediction Mode Using Optimization Technique

Agriculture is considered as the backbone of our country's economy. Big data analysis is used to discover novel solutions, which act as means for analyzing bulky data set, so that it plays a significant role for decision making in specific field such as agriculture. In this work, soil and environment features i.e. average temperature, average humidity, total rainfall and production yield are used in predicting two classes namely: good yield and bad yield. For this purpose, a hybrid classifier model is used in optimizing the feature and the proposed approach is divided into three phase's viz pre-processing, feature selection and SVM_GWO i.e grey wolf optimizer along with Support Vector machine (SVM) classification is used to improve the accuracy, precision, recall and F-measure. The result shows that SVM_GWO approach better as compared to typical SVMs classification algorithm.

Reference:

1.2018 3rd IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT) - Author:B Vandana; S Sathish Kumar https://ieeexplore.ieee.org/document/9012549

2.2021 3rd International Conference on Advances in Computing, Communication Control and Networking (ICAC3N) -Author:M. Chandraprabha; Rajesh Kumar Dhanaraj https://ieeexplore.ieee.org/document/9725758

3.2018 Fourth International Conference on Computing Communication Control and Automation (ICCUBEA) -Author:Shreya V. Bhosale; Ruchita A. Thombare

https://ieeexplore.ieee.org/document/8697806

4.2021 7th International Conference on Advanced Computing and Communication Systems (ICACCS) Author:Namgiri Suresh; N.V.K. Ramesh; Syed Inthiyaz; P. Poorna Priya https://ieeexplore.ieee.org/document/9441871

5.2022 6th International Conference on Intelligent Computing and Control Systems (ICICCS) Author:M. Sai Teja; T. Sai Preetham; L. Sujihelen; Christy; S. Jancy https://ieeexplore.ieee.org/document/9788274

6.2021 Third International Conference on Inventive Research in Computing Applications (ICIRCA) Author: Guna Sekhar Sajja; Subhesh Saurabh Jha; Hicham Mhamdi; https://ieeexplore.ieee.org/document/9544815

7.2018 Fifth International Conference on Parallel, Distributed and Grid Computing (PDGC) Author:Shivi Sharma; Geetanjali Rathee; Hemraj Saini https://ieeexplore.ieee.org/document/8746001