Estimate The Crop Yield Using Data Analytics

Literature Survey :

**1. Soil Based Prediction for Crop Yield using Predictive Analytics:**

M. Chandraprabha and R. K. Dhanaraj, "Soil Based Prediction for Crop Yield using Predictive Analytics," 2021 3rd International Conference on Advances in Computing, Communication Control and Networking.  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.

# **2. A Novel Approach using Big Data Analytics to Improve the Crop Yield in Precision Agriculture:**

B. Vandana and S. S. Kumar, "A Novel Approach using Big Data Analytics to Improve the Crop Yield in Precision Agriculture," 2018 3rd IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology. 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.

# **3. Big Data Analytics for Crop Prediction Mode Using Optimization Technique:**

S. Sharma, G. Rathee and H. Saini, "Big Data Analytics for Crop Prediction Mode Using Optimization Technique," 2018 Fifth International Conference on Parallel, Distributed and Grid Computing. 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.

# **4. Predictive Analytics in Agriculture using Geospatial Mapping:**

S. Jonnalagadda, "Predictive Analytics in Agriculture using Geospatial Mapping," 2021 IEEE Integrated STEM Education Conference. Smart farming has become increasingly popular over the past years and has been making great contributions to the agricultural industry. Techniques such as precision farming, predictive analytics, and geospatial visualization are being used in agriculture to help with efficiency, profitability, and optimization. New Jersey is known as the Garden State for its scenic landscapes and agriculture. Some of its staple field crops include corn, wheat, and soybeans. In particular, this project is focused on analyzing the average amount of soybean yields across the different counties of NJ over the past years to make future predictions. The approach is to use predictive analytics (creating linear regression models and using GIS) on current and past USDA New Jersey soybean yield data. This can then help to discover and analyze future trends. Next, using geospatial mapping (utilizing the ArcGIS platform), the findings drawn from the data will be mapped to provide clarity. These conclusions can be used to provide future direction and make further advancements. For example, an app (that displays the analytics and findings) can be created and translated to the farmers to help provide suggestions on future harvesting and allow them to understand their farms better. In addition, the findings could lead to a further and more detailed study involving AI and satellite imagery of NJ soybean farms/acres.

# **5.Crop yield variation trend and distribution pattern in recent ten years:**

S. Bao et al., "Crop yield variation trend and distribution pattern in recent ten years," 2017 IEEE International Geoscience and Remote Sensing Symposium. In recent ten years, a perception exists that the agricultural management and crop cultivars have been improved obviously. But the crop yield variation trend due to above reason remain unknown yet. To evaluate the main food crop (maize, soybean and rice) yield trend from 2007 to 2016, the MODIS product (MCD12Q2) was used to extract the mature date of different crops. A two-band variant of the enhanced vegetation index at mature date was applied to establish empirical yield estimation model, coupling with statistical crop yield data. The validation show the estimated yield had accuracy of 90.9%, 91.7% and 83.3%, respectively. The average maize and soybean yield in study area presented increasing trend, but rice yield presented declining. However, maize yield in 22 cities and soybean yield in 19 cities show decreasing trend actually. Through statistical analysis, the crop yield distribution pattern was proved to be almost fixed. Most cities occupies approximate position on the ranking of relevant crop yield. It was demonstrated that some cities, for example Chifeng city, was suitable to develop specific agriculture economy. This paper can be used to give suggestion for agriculture planning and management.

# **6.Estimating Safety Factor Against Root Lodging Using Sentinel-1 Data:**

S. Chauhan, R. Darvishzadeh, M. Boschetti, S. H. van Delden and A. Nelson, "Estimating Safety Factor Against Root Lodging Using Sentinel-1 Data," 2021 IEEE International Geoscience and Remote Sensing Symposium.  Lodging in wheat is one of the main constraints limiting yield and grain quality. Accurate information about crop lodging susceptibility during the growing season is critical for improving yield estimates and for targeting the expenditure on lodging control. In this context, this study aims to estimate safety factor against root lodging (SFA) as a measure of lodging susceptibility by exploiting Sentinel-1 data using Extreme Gradient Boosting Regression. Through extensive field experiments during a crop season, several crop variables were collected from several plots in multiple visits, and the corresponding metrics were extracted from the Sentinel-1 images. Our results show that the field measured SFA correlated well with the field lodging and the cross-validated regression model could estimate SFA with an R2CV=0.73 and RMSECV=0.59. Thus, the SFA measure constitutes a state-of-the-art approach in the remote sensing community for the assessment of root lodging susceptibility.