

ESTIMATE THE CROP YIELD USING DATA ANALYTICS

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INTRODUCTION

- Crop production in India is one of the most important sources of income and India is one of the top countries to produce crops. As per this project we will be analyzing some important visualization, creating a dashboard and by going through these we will get most of the insights of Crop production in India.
- Forecasts/estimates for crop production are typically based on two components: area harvested and yield per unit area. In order to determine their product accurately, both harvested area and yield must be estimated accurately. Although the yield part of the equation gets most of the attention, estimating the area can be complicated for many reasons. In order to differentiate early, mid-season (or even prior-to-season) estimation efforts from the end-of-season efforts, timing qualifiers will be associated with the term estimation.
- As estimation evolved as a science, lists of crops were estimated to obtain crop information. Due to the cost of maintaining lists as well as their incompleteness, they are likely to produce biased estimates. An alternative approach is crop estimation; area-defined populations are complete, and their estimates are unbiased. However, they have their own set of costs and problems, including poor estimates for small areas of minor crops and the initial cost of creating the crop estimation framework. Multiple frames estimating, which combines crop and list frames, has some very good qualities and solves some of their problems.
- In the past, estimates have been based on summaries of local crop information, direct expansions of statistically estimated data, crop-specific pixel classifications, error-corrected regressions, and calibration estimations. The estimation of some crops is much more accurate and timelier. The classification outputs provide users with more access to crop-yielding information, such as the timing of crop harvests.

LITERATURE SURVEY

1. **TITLE:** Agriculture Data Analytics in Crop Yield Estimation

AUTHOR: B M Sagar, Cauvery N K

DESCRIPTION: Agriculture is important for human survival because it serves the basic need. A well-known fact that the majority of population ($\geq 55\%$) in India is into agriculture. Due to variations in climatic conditions, there exist bottlenecks for increasing the crop production in India. It has

become challenging task to achieve desired targets in Agri based crop yield. Various factors are to be considered which have direct impact on the production, productivity of the crops. Crop yield prediction is one of the important factors in agriculture practices. Farmers need information regarding crop yield before sowing seeds in their fields to achieve enhanced crop yield. The use of technology in agriculture has increased in recent year and data analytics is one such trend that has penetrated into the agriculture field. The main challenge in using big data in agriculture is identification of effectiveness of big data analytics. Efforts are going on to understand how big data analytics can agriculture productivity. The present study gives insights on various data analytics methods applied to crop yield prediction and also signifies the important lacunae points in the proposed area of research.

2. TITLE: Crop Production using Predictive Analysis

AUTHOR: P S Vijayabaskar, R Sreemathi, E Keertanaa

DESCRIPTION: This work is to construct a model for testing the soil fertility. It also suggests the crop which has to be planted depending upon the value obtained from the sensor. It also provides the regional wise information about the crop in the form of graph. We have farmer chat where the farmers can share and get idea from the expert by registering in this application. It also suggests the fertilizer which has to be added to the soil in order to increase the crop productivity. It helps the farmer to analyze the fertility of their yard and plant the better crop to increase their productivity and profit. It also provides the information about the fertilizer to be added in the soil and also provide the information about the nearby fertilizer shop.

3. TITLE: Data analytics platforms for agricultural systems: A systematic literature review

AUTHOR: NgakanNyoman Kutha Krisnawijaya, BedirTekinerdogan, CagatayCatalRik van derTol

DESCRIPTION: Agriculture is important for human survival because it serves the basic need. A known fact that the majority of population (55%) in India are into the agriculture for their cost of living. Due to changes in climatic conditions, there is a slow down in progress for increasing the crop production in India. It has become challenging task to achieve desired targets in agriculture based crop yield. With the reduction of availability cultivable land around the globe and the decreased cultivable water resources, it is becoming impossible to achieve higher crop yield. Not only water resources but also Various seasonal, economical and environmental factors influence the crop production, drastic changes in these factors lead to a great loss to farmers. These risks can be measured using data analytics and machine learning which are applied on data related to soil, weather and previous yield. With the help of data analytics, crop yield can be predicted by deriving useful insights from these agricultural data that helps farmers to decide the crop they would like to plant for the forthcoming year leading to maximum profit. data analytics is one approach to have a important role and positive impact on the increase of crop yield by providing the optimum condition for the plant growth and decreasing the yield gaps and the crop damage and wastage.

4. TITLE: Contributions of OR to solve agricultural problems

AUTHOR: Antonio Mauttone , Lluís M. Plà-Aragonés

DESCRIPTION: Pre-Processing Dataset: Data Preprocessing is a method that is used to convert the raw data into a clean data set. The data are gathered from different sources, it is collected in raw format which is not feasible for the analysis. By applying different techniques we can

transform data into an understandable format. + Building the prediction model and Analyzing the outcomes. It is used to predict future events or outcomes by analyzing patterns in a given set of input data. This concludes that quick developments in data analytical technologies and ML techniques will result in cost-effective solutions in the agricultural sector.

5. TITLE: Agriculture Analysis Using Data Mining and Machine Learning Techniques

AUTHOR: C.N. Vanitha; N. Archana; R. Sowmiya

DESCRIPTION: Data mining extraction of information from records, is a powerful new technology with immense potential to help companies focus on the significant data in their data warehouse. It predicts trends and performance and allowing businesses to make knowledge driven decisions which help in agriculture.

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

AUTHOR: B Vandana; S Sathish Kumar

DESCRIPTION: 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 proposes 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.

7. TITLE: Soil Based Prediction for Crop Yield using Predictive

AUTHOR: M. Chandrababha; Rajesh Kumar Dhanaraj

DESCRIPTION: 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.

8. TITLE: Crop Yield Prediction Using Data Analytics and Hybrid Approach

AUTHOR: Shreya V. Bhosale; Ruchita A. Thombare; Prasanna G. Dhemey;

DESCRIPTION: 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 enormously. 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.

9. TITLE: Crop Yield Prediction Using Random Forest Algorithm

AUTHOR: Namgiri Suresh; N.V.K. Ramesh; Syed Inthiyaz; P. Poorna Priya;

DESCRIPTION: 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.

10. TITLE: Crop Recommendation and Yield Production using SVM Algorithm

AUTHOR: M. Sai Teja; T. Sai Preetham; L. Sujihelen; Christy; S. Jancy;

DESCRIPTION: 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.

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