ESTIMATE THE CROP YIELD USING DATA ANALYSTICS

Abstract

Data Analytics is emerging research field in crop yield analysis. Crop Yield prediction is a very important issue in agricultural. Any farmer is interested in knowing how much yield he is about to expect. In the past, yield prediction was performed by considering farmer's experience on particular field and crop. The crop yield prediction is a major issue that remains to be solved based on available data. Data Analytics techniques are the better choice for this purpose. Different Data Analytics techniques are used and evaluated in agriculture for estimating the future year's crop production. This research proposes and implements a system to predict crop yield from previous data. This is achieved by applying association rule analytics on agriculture data. This research focuses on creation of a prediction model which may be used to future prediction of crop yield. This paper presents a brief analysis of crop yield prediction using data Analytics technique based on association rules for the selected region i.e. district of Tamil Nadu in India. The experimental results shows that the proposed work efficiently predict the crop yield production.

INTRODUCTION

From ancient period, agriculture is considered as the main and the foremost culture practiced in India. Ancient people cultivate the crops in their own land and so they have been accommodated to their needs. Therefore, the natural crops are cultivated and have been used by many creatures such as human beings, animals and birds. The greenish goods produced in the land which have been taken by the creature leads to a healthy and welfare life. Since the invention of new innovative technologies and techniques the agriculture field is slowly degrading. Due to these, abundant invention people are been concentrated on cultivating artificial products that is hybrid products where there leads to an unhealthy life. Nowadays, modern people don't have awareness about the cultivation of the crops in a right time and at a right place. Because of these cultivating techniques the seasonal climatic conditions are also being changed against the fundamental assets like soil, water and air which lead to insecurity of food. By analyzing all these issues and problems like weather, temperature and several factors, there is no proper solution and technologies to overcome the situation faced by us. In India there are several ways to increase the economical growth in the field of agriculture. There are multiple ways to increase and improve the crop yield and the quality of the crops. Data Analytics also useful for predicting the crop yield production. Generally, data Analytics is the process of analyzing data from different perspectives and summarizing it into useful information. Data Analytics software is an analytical tool that allows users to analyze data from many different dimensions or angles, categorize, and summarize the relationships identified. Technically, data Analytics mining is the process of finding correlations or patterns among dozens of fields in large relational databases. The patterns, associations, or relationships among all this data can provide information. Information can be converted into knowledge about historical patterns and future trends. For example, summary information about crop production can help the farmers identify the crop losses and prevent it in future. Crop yield prediction is an important agricultural problem. Each and Every farmer is always tries to know, how much yield will get from his expectation. In the past, yield prediction was calculated by analyzing farmer's previous experience on a particular crop. The Agricultural yield is primarily depends on weather conditions, pests and planning of harvest operation. The

proposed method use data mining technique to predict the crop yield production based on the association rule

REVIEW OF LITERATURE METHODS OF CROP YIELD PREDICTION

At present we are at the immense need of another Green revolution to supply the food demand of growing population. With the decrease of available cultivable land globally and the decreased cultivable water resources, it is almost impossible to report higher crop yield. Agricultural based big data analytics is one approach, believed to have a significant 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. With this aim the present paper reviews about the various advances, design models, software tools and algorithms applied in the prediction assessment and estimation of the crop yield. India is basically agriculture based country and approximately 70% our country economics is directly or indirectly related to the agricultural crops. The principle crop which occupies the highest (60-70%) percentage of cultivable land in the Indian soil is the paddy culture and it is the major crop especially in central and south parts of the India. Rice crop cultivation plays an imperative part in sustenance security of India, contributing over 40% to general yield generation. The enhanced yield of the rice crop depends largely on the water availability and climatic conditions. For example, low precipitation or temperature extremes can drastically diminish rice yield. Growing better strategies to foresee yield efficiency in a mixture of climatic conditions can help to understand the role of different principle factors that influence the rice crop yield. Big data analytic methods related to the rice crop yield prediction and estimation will certainly support the farmers to understand the optimum condition of the significant factors for the rice crop yield, hence can achieve higher crop yield.

Crop Selection and Crop Yield Prediction

To maximize the crop yield, selection of the appropriate crop that will be sown plays a vital role. It depends on various factors like the type of soil and its composition, climate, geography of the region, crop yield, market prices etc. Techniques like Artificial neural networks, K-nearest neighbors and Decision Trees have carved a niche for themselves in the context of crop selection which is based on various factors. Crop selection based on the effect of natural calamities like famines has been done based on machine learning (Washington Okori, 2011). The use of artificial neural networks to choose the crops based on soil and climate has been shown by researchers (Obua, 2011). A plant nutrient management system has been proposed based on machine learning methods to meet the needs of soil, maintain its fertility levels, and hence improve the crop yield (Shivnath Ghosh, 2014). A crop selection method called CSM has been proposed which helps in crop selection based on its yield prediction and other factors (Kumar, 2009)
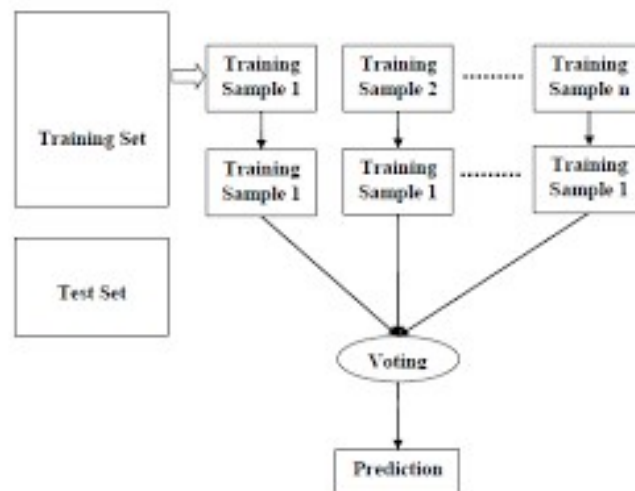
PROPOSED SYSTEM

Weather Forecasting

Indian agriculture mainly relies on seasonal rains for irrigation. Therefore, an accurate forecast of weather can reduce the enormous toil faced by farmers in India including crop selection, watering and harvesting. As the farmers have poor access to the Internet as a result of digital-divide, they have to rely on the little information available regarding weather reports. Up-to-date as well as accurate weather information is still not available as the weather changes dynamically over

time. Researchers have been working on improving the accuracy of weather predictions by using a variety of algorithms. Artificial Neural networks have been adopted extensively for this purpose. Likewise, weather prediction based on machine learning technique called Support Vector Machines had been proposed (M.Shashi,2009). These algorithms have shown better results over the conventional algorithms.

CONCLUSION

As a result of penetration of technology into agriculture field, there is a marginal improvement in the productivity. The innovations have led to new concepts like digital agriculture, smart farming, precision agriculture etc. In the literature, it has been observed that analysis has been done on agriculture soils, hidden patterns discovery using data set related to climatic conditions and crop yields data. The rice crop yield prediction has been done in the state of Maharashtra using data Analytics techniques in one of the works . The challenges and opportunities in the field of Big Data analytics in agriculture has been discussed with a case study of Netherlands.

It can be concluded that the research in the field of agriculture with reference to using IT trends like data analytics is in its infancy. As the food is the basic need of humans, the requirement of getting the maximum yields using optimal resource will become the necessity in near future as a result of growing population. The survey outcomes indicate the need for improved techniques in crop yield analytics. There exists a lot of research scope in this research area.

REFERENCES

[1] Dhivya B H, Manjula R, Siva Bharathi S, Madhumathi R. A Survey on Crop Yield Prediction based on Agricultural Data, International Journal of Innovative Research in Science, Engineering and Technology. 2017; 6(3).

[2] Jharna Majumdar, Sneha Naraseeyappa, Shilpa Ankalaki. Analysis of agriculture data using datamining techniques: application of big data. Journal of Big data. 2017.

[3] Majumdar J, Ankalaki S. Comparison of clustering algorithms using quality metrics with invariant features extracted from plant leaves. International Conference on Computational Science and Engineering. 2016.
[4] D Ramesh, B Vishnu Vardhan. Data Mining Techniques and Applications to Agricultural Yield Data. International Journal of Advanced Research in Computer and Communication Engineering. 2013; 2(9). [5] Swarupa Rani. The Impact of Data Analytics in Crop Management based on Weather Conditions. International Journal of Engineering Technology Science and Research. 2017; 4(5):299-308.

[6] F K Van Evert, S Fountas, D Jakovetic, V Crnojevic, I Travlos, C Kempenaar. Big Data for weed control and crop protection. John Wiley & Sons Ltd on behalf of European Weed Research Society, 2017: 218–233.