LITERATURE SURVEY

ON

ESTIMATE THE CROP YIELD USING DATA ANALYTICS

The team sat down together to take a survey on the existing literature present in the said topic. The literature survey is as follows.

Agriculture Data Analytics in Crop Yield Estimation: A Critical Review

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Agriculture is important for human survival because it serves the basic need. A well-known fact that the majority of population (≥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.

How data analytics is transforming agriculture

XuanPham MartinStack

Two discussions about the interaction between data analytics and competitive analysis have been taking place in the past decade: one focusing on micro-level firm capabilities and the other on macro-level industry competitiveness. We seek to integrate the micro- and macro-level analyses via the lenses of firms in agricultural input markets. Agriculture is undergoing a tremendous transformation in the collection and use of data to inform smarter farming decisions. Precision agriculture has brought a heightened degree of competition for input supply firms, forcing greater interactions among friends and foes.

Data analytics platforms for agricultural systems: A systematic literature review

Ngakan Nyoman Kutha Krisnawijaya BedirTekinerdogan CagatayCatal Rik van derTol

With the rapid developments in ICT, the current agriculture businesses have become increasingly data-driven and are supported by advanced data analytics techniques. In this context, several studies have investigated the adopted data analytics platforms in the agricultural sector. However, the main characteristics and overall findings on these platforms are scattered over the various studies, and to the best of our knowledge, there has been no attempt yet to systematically synthesize the features and obstacles of the adopted data analytics platforms. This article presents the results of an in-depth systematic literature review (SLR) that has explicitly focused on the domains of the platforms, the stakeholders, the objectives, the adopted technologies, the data properties and the obstacles. According to the year-wise analysis, it is found that no relevant primary study between 2010 and 2013 was found. This implies that the research of data analytics in agricultural sectors is a popular topic from recent years, so the results from before 2010 are likely less relevant. In total, 535 papers published from 2010 to 2020 were retrieved using both automatic and manual search strategies, among which 45 journal articles were selected for further analysis. From these primary studies, 33 features and 34 different obstacles were identified. The identified features and obstacles help characterize the different data analytics platforms and pave the way for further research.

The Impact of Data Analytics in Digital Agriculture: A Review

N. Chergui, M. -T. Kechadi and M. McDonnell, "The Impact of Data Analytics in Digital Agriculture: A Review," 2020 International Multi-Conference on: "Organization of Knowledge and Advanced Technologies" (OCTA), 2020, pp. 1-13, doi: 10.1109/OCTA49274.2020.9151851.

The advanced development in Information and Communication Technologies (ICT) and its adoption in the agriculture area open the field to the appearance of Digital Agriculture; which created new processes for making farming more productive, efficient, controllable while respecting the environment. Data science (and machine learning) is among key of information technology used in Digital Agriculture for their ability to analyse a vast amount of data to extract new knowledge and to help agriculture understand better the farming tasks and make better decisions. Big data in its turn offers a support to farmers to extract new insights from their data and to make more accurate decision. This work presents a systematic review of methods and techniques of (data & big data) mining and their applications to Digital Agriculture from the big data view point. In this study, we will focus on crop yield. We first introduce the crop yield management process and its components, and then we focus on the crop yield monitoring. We then present a classification of data mining techniques applied for the crop yield monitoring tasks. This is followed by discussing each category of the classification throughout a panoply of existing works and show their used techniques, then we provided a general discussion on the applicability of big data analytics into the field of digital agriculture.

Crop Yield Prediction Using Deep Reinforcement Learning Model for Sustainable Agrarian Applications

D. Elavarasan and P. M. D. Vincent, "Crop Yield Prediction Using Deep Reinforcement Learning Model for Sustainable Agrarian Applications," in IEEE Access, vol. 8, pp. 86886-86901, 2020, doi: 10.1109/ACCESS.2020.2992480.

Predicting crop yield based on the environmental, soil, water and crop parameters has been a potential research topic. Deep-learning-based models are broadly used to extract significant crop features for prediction. Though these methods could resolve the yield prediction problem there exist the following inadequacies: Unable to create a direct non-linear or linear mapping between the raw data and crop yield values; and the performance of those models highly relies on the quality of the extracted features. Deep reinforcement learning provides direction and motivation for the aforementioned shortcomings. Combining the intelligence of reinforcement learning and deep learning, deep reinforcement learning builds a complete crop yield prediction framework that can map the raw data to the crop prediction values. The proposed work constructs a Deep Recurrent Q-Network model which is a Recurrent Neural Network deep learning algorithm over the Q-Learning reinforcement learning algorithm to forecast the crop yield. The sequentially stacked layers of Recurrent Neural network is fed by the data parameters. The Q- learning network constructs a crop yield prediction environment based on the input parameters. A linear layer maps the Recurrent Neural Network output values to the Q-values. The reinforcement learning agent incorporates a combination of parametric features with the threshold that assist in predicting crop yield. Finally, the agent receives an aggregate score for the actions performed by minimizing the error and maximizing the forecast accuracy. The proposed model efficiently predicts the crop yield outperforming existing models by preserving the original data distribution with an accuracy of 93.7%