International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 05 Issue: 06 | June 2018 www.irjet.net p-ISSN: 2395-0072

PRECISION FARMING AND BIG DATA

Sajitha N[1] , Ranjana S Chakrasali[2]

[1,2]Dept. of CSE, BNM Institute of Technology, Bengaluru, India

---

Abstract - Agriculture is major source of economy in today's world. Growth of countries like India which has major population, depends on farmers and Agricultural products. But what happens now-days, because of lack of information available regarding cultivation of crops, many farmers are falling to large loss, and later into financial troubles. Many suicidal attempts of farmers can be avoided if they get proper information regarding, what crops to be cultivated, what pesticides to be used and when, how to increase the yield of crops etc. Today it is the era of smart phones. Mobiles have become best friend of a man. Why can't we use it for improving our agriculture sector and later to country's economy? Before farmers used to wait for "clouds" to get rain, nowadays they are extracting data from cloud using cloud computing technology.

Keywords: Precision farming, agriculture, data mining, crops

1. INTRODUCTION

Agriculture is the major livelihood for India. Agriculture has different sectors like Crops, Floriculture, Fertilizers and pesticides, Soil and water consumption, Fisheries, Weather forecast etc. India has more than 60% of its population depends on agriculture and its allied sectors. The growth in the agriculture field is directly proportional to country's economy and vice-versa.

Technologies regarding agriculture are not reaching to farmers as most of them are illiterate or unaware to use it. Making them educate with technologies plays an important role. Introducing technologies for agriculture development in rural India may need necessary IT infrastructure setup.

Agricultural lands are shrinking, as most of its parts are used for other infrastructure developments. Today's concern is to making more yields from lesser area. Rice is the main food of more than half of the population. It has potential to increase crop production ' First Hybrid Rice was cultivated in China in 1976. India started concentrated efforts on hybrid Rice development in 1989. There are several hybrids, from Public and Private sector available for cultivation. The private sector is the dominant player.

Sensors capturing images or sounds are used in agricultural and industrial sectors for monitoring or for performing different tasks. Collection of images of apples can be used to select good apples for marketing purposes; set of animal sounds recorded can be used to identify bad environment condition or present deceases.

2. RELATED STUDY

The Agricultural yield depends on weather conditions, diseases and pests, planning of harvest operation and seeds quality.

From the research article "Data mining of agricultural yield Data: A comparison of regression models" George RuB express that large amount of data which is collected and stored for analysis. Making appropriate use of these data often leads to considerable gains in efficiency and therefore economic advantage. This paper deals with appropriate regression techniques on selected agriculture data.

"Classification of agricultural land soils: A data mining approach" In this research paper V. Ramesh and K. Ram explains comparison of different classifiers and the outcome of this research could improve the management and systems of soil uses throughout a large fields that include agriculture, horticulture, environmental and land use management.

"Data Mining: An effective tool for yield estimation in the agricultural sector" in this paper Raorane A.A. and , Kulkarni R.V. explain different data mining techniques which can be applied in today's world.

"Risk in Agriculture: A study of crop yield distribution and crop insurance" by Narsi Reddy Gayam in his research study examines the assumption of normality of crop yields using data collected from INDIA involving sugarcane and Soybean.

"Application of Data Mining in Agriculture" **discusses** assistance to the farmers in analyzing crop diseases, getting required suggestions and finding appropriate fertilizers during cultivation at minimum cost from experts at research stations or from Government officials in Agriculture departments in a easily understandable natural languages.

3. DATA MINING TECHNIQUES

Data mining techniques are mainly divided in two groups, classification and clustering techniques.

3.1 Classification

Classification is a data mining function that assigns items in a collection to target categories or classes. The goal of classification is to accurately predict the target class for each case in the data. Classification consists of predicting a certain outcome based on a given input. In order to predict the outcome, the algorithm processes a training set containing a set of attributes and the respective outcome, usually called goal or prediction attribute. The algorithm tries to discover relationships between the attributes that would make it possible to predict the outcome. Next the algorithm is given a data set not seen before, called prediction set, which contains the same set of attributes, except for the prediction attribute – not yet known. The algorithm analyses the input and produces a prediction.

3.2 Clustering

Clustering analysis finds clusters of data objects that are similar in some sense to one another. The members of a cluster are more like each other than they are like members of other clusters. The goal of clustering analysis is to find high-quality clusters such that the inter-cluster similarity is low and the intra-cluster similarity is high.

Clustering, like classification, is used to segment the data. Unlike classification, clustering models segment data into groups that were not previously defined. Classification models segment data by assigning it to previously-defined classes, which are specified in a target. Clustering models do not use a target.

Clustering is useful for exploring data. If there are many cases and no obvious groupings, clustering algorithms can be used to find natural groupings. Clustering can also serve as a useful data-preprocessing step to identify homogeneous groups on which to build supervised models.

Clustering can also be used for anomaly detection. Once the data has been segmented into clusters, you might find that some cases do not fit well into any clusters. These cases are anomalies or outliers.

4. APPLICATIONS

It enhances the easy access monitoring system to reduce the human stress in agriculture. The results obtained, through GSM and GPRS daily alert SMS can send to the farmer in the event of emergency, he can able to view the statistical survey report by irrespective of location and motor has been ON automatically if the water level is decreased.
Precision agriculture aids farmers in tailored and effective water management, helping in production, improving economic efficiency and minimizing waste and environmental impact. Recent progress in Big Data and advanced analytics capabilities and agri-robotics such as aerial imagery, sensors, and sophisticated local weather forecasts can truly transform the agri-scape and thus holds promise for increasing global agricultural productivity over the next few decades.

You can view data on soil and crop condition in near real-time; and where your machines can make sure your crops are fed and watered without your intervention.

Predictive analytics can be used to anticipate demand for seeds, fertilizers and animal feed and enable the agribusiness supplier to take appropriate steps to match production to demand. New pricing programs can be established to help manage demand consistent with available supply. For example, demand for some products is often strongly connected to commodity pricing. The ability to better predict pricing changes could be used for proactive allocation of supplies and determination of the effect on storage distribution across regions.

5. CONCLUSIONS

Having insight and understanding the correlations and effects of even minor weather patterns on the supply and demand could be used to influence major business decisions. Higher yield and reduced support costs are central to driving profitability and better customer experience or any major agribusiness. Big data

technologies can enable improved analysis of yield and quality data, supplier's quality data, and other critical measures for a rich and thorough root-cause analysis resulting in actions for enhanced quality and reduced overall cost. Data related to throughput, capacity utilization, and overall equipment effectiveness, can be combined for further analysis for improved quality.

REFERENCES

[1]. Regression Models for Spatial Data: An Example from Precision Agriculture" George RuB ICDM 2010, LNAI 6171, pp. 450–463, 2010. Springer-Verlag Berlin Heidelberg 2010

[2]. "Classification of agricultural land soils: A data mining approach" International Journal on Computer Science and Engineering (IJCSE) ISSN : 0975-3397 Vol. 3 No. 1 Jan 2011

[3]. "Data Mining: An effective tool for yield estimation in the agricultural sector" International Journal of Emerging Trends & Technology in Computer Science (IJETTCS), Volume 1, Issue 2, July – August 2012

[4]. Application of Data Mining in Agriculture Bulgarian Journal of Agricultural Science, 21 (No 1) 2015, 26-34 Agricultural Academy.