

Review on Integration of Big Data in Iot Agriculture System

Sarmila Gaikwad, Jignesh Patil

Abstract: Agriculture is field where different changes are accommodated for quality product. We know that there is different types of irrigation such as old irrigation, sprinkler irrigation and drip irrigation which is integrated or transformed in the IOT but we need to change few things in theirrigation, mostly on crop protection and prevention from the disease. We can save crop from the insect, but we have understood to strength of the crop. Crop strengthis recovered from the critical stage to normal stage, but we must manage the agriculture work at precision. Big data is providing differentalgorithmsuch asMap-Reduce, Recommendation System. In the study we will focus on crop protection.

Keywords: Irrigation, Agriculture, Big Data, Internet of Things, Crop.

I. INTRODUCTION

Indian Agrobusiness is depending on climatic situation and in present situation there is only 2-5% chances of safe agronomy due to imbalance nature. As for each survey 67% agriculture provides strength to economy of India. In India During pandemic situation 35% financial strengthis given by Agrobusiness to Indian finance and in recent situation 52% budget is given by agronomyin India. Hence, we can say almost economy of India is depend on agriculture, if climatic situationis appropriate balanceagriculture is safest occupation in India. Agriculture is tough it requires lots of efforts, agriculturalistsgo through different situation such as bad atmospheric conditions, finance administration and faulty crop seeds in market. We have selected specific area for survey.We know that farming is huge so when go to see different place atmosphere condition, water quality and soil quality is changed. In this study we have selected North Maharashtra zone where the soil is black, average temperature is around 30, crop management is categorizedin two season:

Kharif Crop: Cotton, Pigeon Pea, Green Gram, Black Gram, Bajra, Jowar etc.

Rabi Crop: Wheat, Groundnut, Sunflower, Cicers, Maize, Mustard etc.

II. LITERATURE REVIEW

This literature survey consists of different sections:

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Sharmila Gaikwad*, Assistant professor Rajiv Gandhi Institute of technology, Email: sharmila.gaikwvad@mctrgit.ac.in

Jignesh Patil, Computer Engineering Rajiv Gandhi Institute of technology, Email: jigpatil1999@gmail.com

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1) Machine Learning: Defining the new algorithms for system and repeating the old version algorithm with some update is learning. System is designed by the actual developer with some planning, instructions by the client. We have learned different algorithms in the machine learning such as naive bayes, logistics, k-mean for prediction and for analysis. Analysis gives different outcomes and results for more accuracy and efficiency. Random Forest classifier is used for classification and regression for selection of image data set make quick decisions

2) Big Data:Information is the main component in the organization, for loadinghuge information we need high container. The container is made up of the HDFS(High Distributed File System). We need big data in agriculture for collecting and storing data. As per survey map reduce is use for crop pest analysis and accuracy. Map Reduce works as splitting and mapping data which converted into smaller dataset as simple dataset.

3) IOT Based: Connection of objects is the invention in the field of the husbandry nowadays almost water sprinkling is based on web and embedded technology in other countries and in some regions of India. Use of solar energy for irrigation with IOT is making irrigation very innovative. Monitoring farm from one place is now easily possible for everyone. IOT irrigation is almost successful due to improvement components and deep research.

III. ANALYSIS OF COTTON

We haveChosen Kharif Harvest for paper to riseproduction using big data and different technology:

1) Cotton: North Maharashtra is the zone which is producing high number of cottons in Maharashtra where cotton is cultivated in these region of NM (Jalgaon, Dhule, Nandurbar, Nashik).

a) Duration: End of May to June is the specific period for Planting. It covers almost 120-180 days to cultivate cotton from May to December.

b) Irrigation:

Two Types of Irrigation is used:

1) Old Irrigation 2) Drip Irrigation

Nowadays drip irrigation is most successful 80% - 90% cotton is manufactured then old irrigation.

Advantages of drip irrigation:

1) Less Waste of Water in Field which save cost and time.

2) It gives profit then simple irrigation in terms quality and quantity also.

3) It removes medicine and pesticides spreading effort we can supply it from drip pipes.



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c) Disease: Cotton disease is occurred according to stage way attack, on which stagedisease will impact on crop which is listed below:

1) Aphis gossypii: It impacts on leaf of the cotton and decrease the cotton quality.

2) LeafHopper: It makes the leaf yellowish, in last stages it makes in brownish.

3) White-Flies: It major and badly effects on veins of the leaf which is turn leaf in bad Conditions.

4) Boll Weevil: It is dangerous when female boll weevil places eggs in flowers and fruit, it makes huge impact on cotton production which sometimes almost gives loss tothe farmers.

d) Climate:

1) Flowering Quantity: Decreases when there is heavy rainfall it effects on crops and production.

2) It does not need cloudy climate which gives less production of cottons.

3) Time Managing also impacts more on cotton such asplantation of cotton seeds is not on accurate time, water for crop according to their requirement if there is break between water planningthen it effects on crop leaf.

IV. PROPOSED MODEL

Drone based IOT irrigation using Big Data (Map Reduce and Recommendation System).



Figure 1: Proposed Model

1) Set Algorithm in Drone: For collecting image of cotton we need to set algorithm in drone which will make camera to scan whole crop from top to bottom cover all area of farm. It will store in images in database.(Random Forest and Tree Classifier).

2) Dataset: Dataset which is generated by map reduce will be input for the recommendation system.

3) Upload Dataset: Dataset will be uploaded in drone using machine learning algorithm for scanning the crop.

4) Image Processing: Health of crop, water and soil management and requirement of pesticides.

How much number of pesticides is 5) Analysis: requiring according to the disease on crop.

It will give particulars 6) Report Generation: information about farm such as how much area is covered by the drone, soil moisture, crop health and future work.

7) Analysis for next round: Changing algorithm for future purpose, pesticides which are not efficient will remove from the system, integrating new algorithm for future purpose.

V. ARCHITECTURE



Figure 2: Architecture of Drone Based IOT Irrigation

Drone is the first component in which it does job of the rotating, scanning images of crop, storing images in database.

Algorithm use for Crop detection and Disease will be done by Machine learning.(Support Vector Machine, ANN etc).

(Hadoop Image ProcessingInterface) HIPI is an image processing library for apache Hadoop. It delivers resolution huge image store in the device. It will help scheme when the disease category is occurred on the crop, huge dataset will be generated. When monitoring is started of the crop n numbers of the crops images are taken by camera which is stored in the database.Images of the crop are taken is divided in different category as mentioned in the analysis of cotton, Map does the jobs of breaking the images huge dataset in some categories, shuffle transfers the output of the map to the reduce phase. Reduce phase makes the categories in small and in readable, easy format.

We know what Recommendation System does in the big data forexample website e-commerce shopping here the developers target customer history for sale product with some offers. We will use recommender system for recommending water management(is there is any need of water to soil), pesticides(which type of medicine is needed according to crop disease), soil(quality of the soil is bad or good).

Visualization will produce the record of the farm and will make report which will be submitted to the user.

VI. RESULTS

Table 1: Analysis of cotton with different parameters and yoar

and year	
2010 to 2014	2015 to 2021
10%	30%
50%	75%
0%	50%
20%	40%
30%	90%
	2010 to 2014 10% 50% 0% 20% 30%



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As per analysis of authors, data which is collected and shown in the above table.

- 1. Effect from Boll weevil insect 2010 to 2014 is 10% and from 2015 to 2021 is 30%.
- 2. Climate plays vital role in agriculture almost production is depended on climate. According to reports from few years' climate is impacting on production. Sometimes crop health is degrading to bad condition due to heavy rainfall. If there is less rainfall, then cotton height is reduced or crop is dead.
- 3. Water Management is change day by day due to several irrigation types such as: old irrigation, drip irrigation, sprinkle irrigation and IOT irrigation.
- 4. Soil: Management of soil is depending on condition of soil, when soil quality is examining by soil quality tester he allows you to make use natural and chemical fertilizer to improve production.
- 5. Faulty Seed: From 2018 to 2020 faulty seed is rise by 90% due to improper calculation and measurement while manufacturing seeds.

As per research 40 IOT Agro startup is in progress which openhanded strength to agriculture and make easier farming.



Figure 3: Cotton Crop with Flower



Figure 4: Cotton Crop with Fruit



Figure 5: Cotton Crop with Boll weevil insect in cotton fruit

VII. CONCLUSION

We can conclude that this system will make more the efficient output then other the system. Integration of three technology in one system is making system for stronger than other. Image processing and Big data will vital role in the system for analysis of cotton. Prediction of map reduce will help the total count of the disease crop and safe crop.Today's generation is moving towards IOT so we have integrated some concepts of IOT, Big Data to make powerful system which will make profit of the agriculture system. Not only for cotton production we can change system for all crop but we need that much of time and research on working field as well as in technology. Day by Day Technology is changing from one level to another level with using new technology we can make some change in agriculture system. Today we are using BG Cotton 2nd Generation in India were as America is using 7th Generation BT Cotton for production, we have also changed the seed for better production and chemical fertilizer to save agriculture. As per research in 2020 Cotton production reduce due to the faulty seed cotton and Boll Weevil. (We can save cotton from these insect but in first stage, second stage else in last stage it almost harms the cotton).

REFERENCES

- Big data Analysis: Recommendation System with Hadoop framework, Jai Prakash Verma, Bakim Patel, Atul-Patel, IEEE, 2015, pg (92-97) 10.1109/CICT.2015.86
- Hadoop and Its role in Modern Image Processing, Seyed-MojtabaBanaei, Hossein Kardan Moghaddam, OJMS,2014,pg(240-244), 10.4236/ojms.2014.44022
- Plant Disease Detection Using Machine Learning, ShinaRamesh,RamchandraHebbar,InternationalConferenceonDesign Innovationsfor3CsComputeCommunicationControl,pg(41-45),10.1109/ICDI3C.2018.00017
- Classifying Agricultural Crop Pest Data Using Hadoop MapReduceBasedC5.0Algorithm,RevathyRathinasamy,SBalamurali ,LawranceRaj,2019,

Pg(394-411),10.13052/jcsm2245-1439.835

- 5. Big Data and its impact on agriculture, Pal Ribaries, Ecocycles,pg(33-34),10.19040/ecpcycles.v2i154
- Smart Irrigation System Using Internet of things, Alak Roy, Jayanta Pal,2020,pg(119-129),10.1007/978-981-156198-6-11 [CrossRef]
- Big Data Analytics for Crop Preduction Mode using Optimization technique, Shivi Sharma, GeetanjaliRathee,HemrajSaini,2018,pg(760-763),





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