International Journal of Innovative Technology and Exploring Engineering (IJITEE)
ISSN: 2278-3075 (Online), Volume-9 Issue-8, June 2020

Smart Agricultural Farm Enhancement with K-Means Learning

Mayur Nikhar, Laxman .P. Thakre

Abstract: ***In the modern learning of Machine has to be emerged in the gather with large data technology and with respective Large to performance computing to indicate. Classing cluster is a grouping of information and its objects that are identical to one another and different to the information objects in another clusters property are added in new opportunities that things for data science for recommendation in recognized the multi-disciplinary or large descriptive way such many Agri-technologies and domain. This paper comprehensive review marginal shows that research to applications and more than of machines and its application learning in agricultural production systems is forward to conduction. Data mining is a specific field of computer and information science with substantial point of view of knowledge discovery from expansive database or dataset. Resulted formation works carried out forming were categorized top to bottom in form crop indication and result Segregation, including used on yield prediction filed, forming disease Mestagestic, detection crop and weed management and quality, and livestock management, species recognition Devises, along with applications on animal welfare and live detection and stock production soil management and water management. Rest of K-means algorithm for examination of fertility of soil Ratio are objective and Resolve the Continuity amount estimating implementation and algorithm's high time complexity. In crop method filtering results obtain classification of various crops the presented paper demonstrates forming how farming will improved with the help machine learning methods are used. In the case of resection K-means algorithm is utilize to cluster and Marathwada town soil nutrient information for Six successive year clustering outcomes show that the precision rate raised ratio is year by year The Remote location applying machine such as GIS and GPS learning to sensor information, field management systems are more accurate to developing into real-time AI authorize plans and sentimental values that supports rich suggestion and awareness for farmer choice action and support. The Resultant of this paper are compared and modern the performance of commonly used classical and analytical k-means clustering procedures as well as parallel k-means clustering to realize formation the advantage of the parallelism of algorithm on agricultural data. The present investigation has been taken up to achieve the above-mentioned goal.***

Keywords : Algorithms Advantages, Clustering, Crop Adverted, Data Driven Farm Management, K means Algorithm, water management.

Revised Manuscript Received on June 30, 2020.

***** Correspondence Author

Mayur Nikhar*, PG Scholar, Department of Electronics Engineering, G H Raisoni College of Engineering, Nagpur, India. Email:nikhar_mayur.ghrcemtechvlsi@raisoni.net

Laxman Thakre, Assistant Professor , Department of Electronics Engineering, G H Raisoni College of Engineering, Nagpur, India. Email:laxman.thakare@raisoni.net.

I. INTRODUCTION

With progress Report present day systems used for scientific information gathering, tremendous measure of data is getting amassed at various databases. The data banks are growing so rapidly that it is has wound up hard to evacuate noteworthy information by using regular database methodology. Agronomy play a Manger role in the global Economy Development. But more load considering one of the agricultural systems will increase or decrease by with the ongoing human population expansion are satisfied. Rapid Cluster is grouping is done input data sets into subsets known as Clusters in which some elements are liner. India has farming as its elementary profession. As indicated by India Brand Equity Foundation 58% of the individuals living in villages in India are reliant on farming. According to the Central Statistics Office second suggested predict, the input of agribusiness to the Gross Value Addition India is Result occurs More around 9% which is very important input on agro. In such a situation, water utilization particularly the mud-water asset by farming will be gigantic and as per the current Day to Day it is evaluated that horticulture utilize 81%-83% of accessible freshwater assets overall and this rate will keep on being prevailing a result of population increment and raised food needs. This calls for strategies and planning to utilize water reasonably by using the Technology. Such a significant number of systems to Up word achieve water savings in different harvests and present day from essential ones to all the more technologically propelled ones Seance is presented.

In the segment-based clustering algorithm, K-Means algorithm has numerous benefits, for example, easy and fast convergence implementation, simple mathematical ideas. Rate of the available systems utilize consolidating and thermal imaging to observe the plant water irrigation scheduling and status are given in formation. Automatic irrigation systems can be possible by measuring the water level in the soil and control and diplomatic actuators to irrigate as and when required in place of predefining the irrigation calendric thus saving and hence the water us utilize in a much better useful manner. The water consumption moderato or controller utilized formation and sentimental opens a solenoid valve and used bed converter apply watering to material and bedding plants. The problem is occurring in delivered with the assistance of available prediction are to monitoring techniques but there is no ideal answer for the yield recommendation. Some defects are found in the available systems like efficient selection of attributes, combating effective algorithms, lack of adequate nutrient supply,

and the improper analysis every one of these parameters may influence the yield of the harvests. In governing country such as India yearly imports 6-7 lakh tonnes of which 93% is from other country. India yearly produces nearly 5.0-5.7 million tonnes and the production has been immobile in the last 10 years. The reportable CCA in farming from pulses and other material to profitable crops and deficiency of technological modernization to boost yields has hindered the rise handling in output. The bigger producing states are MH, UP, Karnataka and Orissa. Among these, Maharashtra is biggest producer of crops which creates nearly 30% and these four states creates about 60% of total production in the India.

The processing of Large no of volumes information needed to newer hardware and new software stage that have very productive gadgets. Regimental it is value indicating that PA datasets consistently have information, which is connected to crop patterns, the conditions of the environment, crop rotations, soil nutrients, the types of soil, Geographic Information System (GIS) data, soil nutrients, Global Positioning System (GPS) data, farmer detail, agribusiness hardware information accessible. Clustering is standout technique among the most extensively used techniques for exploratory data examination.

II. METHODOLOGY

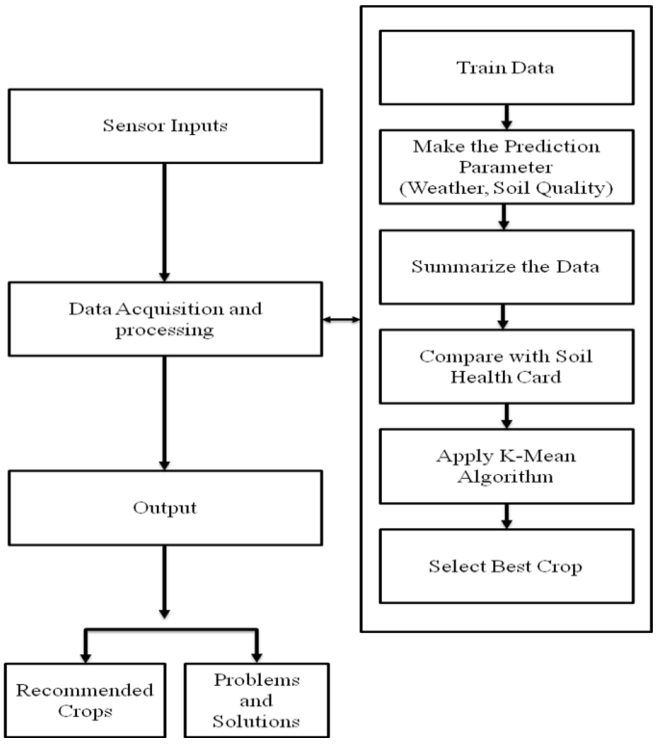

Fig 1: Proposed Block Diagram

In this paper, a study on clustering approach for agriculture to analyze the seed dataset using K-Means, Fuzzy C Means is done by passing different parameters like perimeter, area, length and width of the kernel, asymmetric coefficient, compactness and length of the kernel groove utilizing R programming. The advantage in recent technology develop with the utilization of the Deep Learning and IoT (Internet of Things) has created all things possible. The Internet of Things technique is considerably needful in managing ad real data with real-time information by utilizing sensors. Most important information can be used in a way and emergent are nursery which it can be given to the trained Deep Learning algorithm such as ANN (Artificial Neural Network) for forecast decisions. Result and outcome considerably needful in recommending an appropriate crop to be planted in the specific area. This part explains the preprocessing phase, features, dataset, Deep Neural Network and IoT design.

General Abbreviation:

AUS: - Aircraft Unmanned System
Cad: - Cadmium
FBG: - Fiber Brag Grating
HSV: - Hue Saturation Value Color Space
K: - Potassium
MC: - moisture content
Mg: - magnesium
ML: - Machine Learning
NDVI: - normalized difference vegetation index NIR: - Near Infrared
OC: -organic carbon
Rob: - rubidium
RGB: - red green blue
TN: - total nitrogen
UAV: - unmanned aerial vehicle
VIS-NIR: - Visible-Near Infrared.

Abbreviations Used statistical measures and validated of machine learning IOT algorithm

Abbreviation	Measure
APE	Average Prediction Error
MABE	Mean Absolute Bias error
MAE	Mean Absolute Error
MAPE	Mean Absolute Percentage Error
MPE	Mean Percentage Error
NS	Nash-Sutcliffe Coefficient
R	Radius
R 2	Coefficient of Determination
RMSE	Root Mean Squared Error
RMSEP	Root Mean Square Error of Prediction
RPD	Relative Percentage Difference
RRMSE	average relative root mean square error

Step1: Data acquisition

Wheat seeds are vital in cultivating and different varieties of wheat seeds are giving us distinctive yields which must made expanded every year for take care of demand for the general population. The seed dataset gives the names of three distinct seeds as Kama, Rosa, and Canadian. These following wheat seeds give diverse yields in cultivating. The chose data from UCI machine learning repository contains both categorical and continuous characteristic esteems. The dataset contains following properties like Area, Perimeter, compacting radius, Length, Width, asymmetric Coefficient, lk Groove, type wheat seed.

Step 2: Preprocessing

The selected dataset contains no missing values in the table. Identifying the missing values can be done either by eliminating the record or by replacing the missing values by calculating the mean. In this paper utilizing the R programming aids in finding the missing values with the help of na.omit function which returns the object with list wise deletion of missing values.

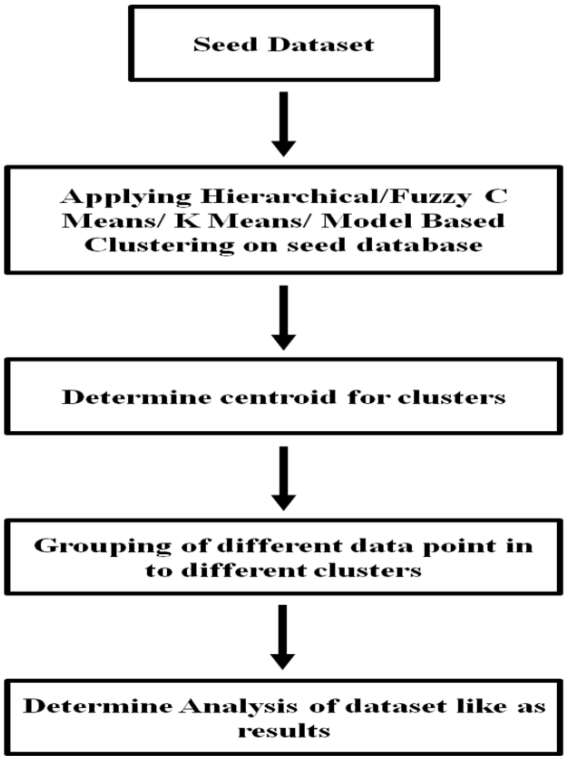

Fig:2 Analyzing different clustering algorithms on seed dataset

Parallel K Means Algorithms

Is Result of K-Means algorithms technique has shown to be effectively in producing good cluster for intimate conclusion for numerous Practical applications are development applications in agro filed. After that the K-Means technique is very familiar for its satisfactorily decent and simple results. The graph direct algorithm of K-Means technique needs consume time proportionate to the product of documents counts of the vectors and cluster counts per iteration for the integration. The K mean method is more consumptive and readable method in data base.

Initialization of Phase

Select More set of K starting points m j k j=1 in Rd.

1.This selection may be done in a random manner or making use of some heuristic.

2. Phase Distance Calculation n, compute its ≤ I ≤ For each data point Xi 1 k and then find ≤ j ≤ Euclidean distance to each cluster m j 1 the closest cluster centroid.

3. Resultant Phase Centric Recalculation k recomputed cluster centroid m j as ≤ j ≤ For each 1 the average of data points assigned to it.

4. This step are Convergence Condition Repeat steps as possible

Overview on Machine Learning: -

1. Online trading applications:

In the Major Maharashtra state Online, drafting applications utilize in the Indian farming sector. It has mostly referred to as India's rice bowl. This mostly shows there is a requirement for appropriate work to be finished with sound computational strategies. Maharashtra has been at the front of innovation arranged and sedemetal change inside the rural division from farmer to Farmer. More ideas to change farming to such an extent that in the ongoing past a portion of the principle specialists have started a smart mobile phone situated application for the diagnosis of plants inside the Marathi region in organization with the Indian crop Management.

2. Agronomy using Big Data:

The Data are given utilize for the yield choosing system is composed from the open source such as website. Which consist of numbers of attributes regarding to the commutation of yield. The dataset is created in a such manner in which it consists of about thirteen parameters like soil types are major role to play, soil moisture, land type, Humidity, Temperature, the area sown, pH, Soil rainfall, class label, production. Among these the parameters like soil type, attributes, land type, the area sown, temperature humidity, pH and soil moisture play an important role in crop recommendation. The crops that are taken for consideration include rice and maize.

3. Agriculture IoT:

There veracity is obtained by assess the datasets. In recommended system the farmer will enter his crop name in the system and when system detect the climate or weather change, then System will automatically predict and advise the farmer that which disease will taint to your crop as well as the system will also give a distinct method to prevention. The support us to conduct the moisture level and where we can use in the Availability easily. The percentage of moisturize is preserve the result of sensor which is present inside the soil and the data will store in the database using mobile application. Confer to that motor will be work automatic and manual. If the moisturizer level is low automatic motor gets switch on if it's up to fill Then it will shut down the motor. Apart of this the farmer will also get disease information by only putting the disease name in the system. This information includes the prevention methods how to cure the disease, which plants can be affected by this disease and on which weather. Soil moisture sensors have general attribute to sense volumetric water. Another class of sensors sense other property of moisture in soils known as water potential. These sensors are commonly reverenced to as soil water potential sensors and incorporate densitometers calculated major blocks.

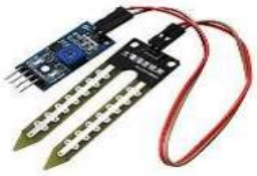

Fig.3 Soil Moisture Calculator

Advantages

1) Maximize the crop yield.
2) The proposed system is helpful in identifying the crops suitable for cultivation in the given environmental conditions.
3) The information related to life cycle of selected crop is provided.

III. RESULT

In the information shows in table Clustering analysis Bifurcation the information into sets and that are useful, meaningful or both gather result. It is also used as an opening point for other objective study of information description. The results are tested on UCI machine learning data repository for Seed data analysis.

The dataset was analysed with different clustering algorithms with the help of R data mining.

	A	B	C	D	E	F	G	H
1	area	perimeter	compactn	length	width	asymmetryCoefficient	lkgroove	wheat
2	15.26	14.84	0.871	5.763	3.312	2.221	5.22	Kama
3	14.88	14.57	0.8811	5.554	3.333	1.018	4.956	Kama
4	14.29	14.09	0.905	5.291	3.337	2.699	4.825	Kama
5	17.63	15.98	0.8673	6.191	3.561	4.076	6.06	Rosa
6	16.84	15.67	0.8623	5.998	3.484	4.675	5.877	Rosa
7	17.26	15.73	0.8763	5.978	3.594	4.539	5.791	Rosa
8	13.07	13.92	0.848	5.472	2.994	5.304	5.395	Canadian
9	13.32	13.94	0.8613	5.541	3.073	7.035	5.44	Canadian
10	13.34	13.95	0.862	5.389	3.074	5.995	5.307	Canadian

Figure 4: Area and perimeter for wheat clustering

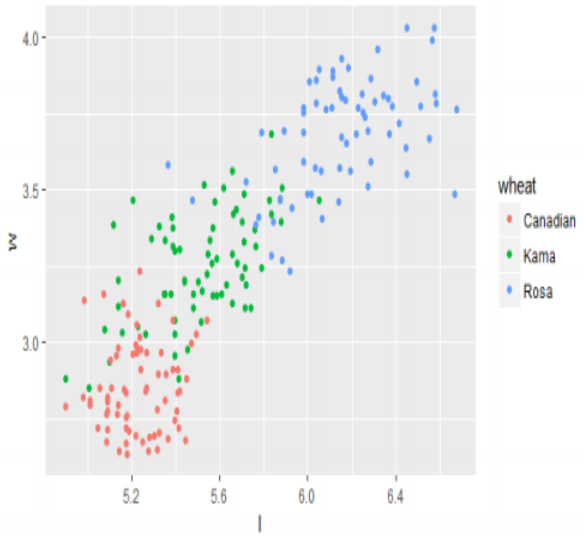

Figure 5: Length, width for wheat clustering

The performance and settlement of the one that k-means algorithms were tested things proved having a better performance and accuracy compared with sequential k-means. Firstly, the number of clusters required is set as two or than two sets are required.

The gathered dataset is at first classify into training and testing dataset. The training dataset is then given to ANN system for producing yield recommendation forecast model. During model generation, the initiation work and the hidden layers are cautiously picked to obtain the best outcomes.

IV. CONCLUSION

Farming are bit by bit being supplanted and improved by progressively refined and exact digital and electronic gadget. The maximum percentage of farming revenue us effort settlement is lost to power loss, wrong procedure of practicing. This decreased with the utilization of smart sensors. Redirecting is to perform the farming in smart and more effective way that the build and segmental analysis of K mean value for agriculture. In addition, this process advises to use the IoT. IoT need enabled the farming worker yield checking not difficult Also proficient should improve those benefit of the crop and henceforth benefits to the rancher. Sensors for distinctive sorts are used to gather information the majority of the data of crop states and Ecological transforms and this data will be transmitted through organize of the farmer/devices that initiate restorative activities. Farmers are associated and mindful of the states of the agriculture field in anytime and anyplace in the world.

REFERENCE

1. .BarsheP.S.B and P.D.K. Chitre, “AgricultureSystem based on OntologyAgroSearch”,(IJETAE) International Journal of Emerging Technology and Advanced Engineering, vol. 2, no. 8, 2012.
2. Braun, R. Wichert, A. Kuijper, and D. W. Fellner, “A benchmarking model for sensors in smart environments,” inAmbient Intelligence: European Conference, (AmI '14), Eindhoven, The Netherlands, November 2014. Revised Selected Papers, E. Aarts, B. de Ruyter, P. Markopoulos et al., Eds., pp. 242–257, 2014
3. FarooqM.U, “A Review on Internet ofThings (IoT)”, Muhammad Waseem, SadiaMazhar, International Journal of Computer Applications Volume 113 -No. 1, March 2015.
4. InfantialRubala. J, D. Anitha, “Agriculture Field Monitoring using Wireless Sensor Networks to Improving Crop Production” International Journal of Engineering Science and Computing, March 2017.
5. Jianfa Xia, Zhengzhou Tang, Xiaoqiu Shi, Lei Fan, Huaizhong Li,"An environment monitoring for precise agriculture, based on wireless sensors Network", IEEE, 2011 8. S.ShyamSundarB.Balan, “Sensor BasedSmart Agriculture Using IOT”, International Journal of MC Square Scientific Research, 2017 .
6. M.Soundarya, R.Balakrishnan,” Survey on Classification Techniques in Data mining”, International Journal of Advanced Research in Computerand Communication Engineering Vol. 3, Issue 7, July 2014.
7. Askar Choudhury, Illinois State University James Jones, Illinois State University Crop yield prediction using time series models
8. Debasish Basak, et al., “Support Vector Regression,” Neural Information Processing – Letters and Reviews, Vol. 11, No. 10, 2007.
9. EkataGhadage, VibhavariKharate, Parnika Mane, SamruddhiPimpale,” Smart Irrigation and Crop Planning System:usingArduino Microcontroller”, International Journal of Advanced Research in Computer and Communication Engineering, Vol. 6, Issue 1, January 2017,DOI 10.17148/IJARCCE.2017.6186.

AUTHORS PROFILE

Mayur Nikhar, is pursuing Mtech from G H Raisoni College of Enginnering in VLSI stream.

Dr. Laxman P Thakre, has completed his Ph. D. in Electronics Engineering from RTMNU Nagpur. He is Gold Medalist in M.Tech. He has total 19 years of teaching and research experience. He is member of technical societies like IEEE, ISTE and IETE. Presently, he is working as Assistant Professor of Electronics Engineering at G.H. Raisoni College of Engineering, Nagpur and IEEE SB Counsellor. His research area includes Wireless Communication Systems, Signal Processing, VLSI. Under IEEE he has won IEEE Best Student branch award in2017. Also, under IEEE won IEEE Regional Exemplary Student Branch Award (2019) Region 10 G H Raisoni College of Engineering Nagpur, Bombay section. He has published 40 plus research papers in the reputed international conferences and Journals.

.