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Various Machine Learning Algorithms in Agricultural Application

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Abstract:
Since the invention of the computer, all available information in every field has been digitized and made available to people who use computer resources. As a result, massive amounts of data are being generated in every domain at an alarming rate. Agriculture is one such area of interest for researchers. Machine learning is the process of extracting useful information from various types of data. The classification of objects is an important area within the field of data mining, and its application extends to a variety of areas, whether or not in the field of science. Although k-Nearest Neighbor classification is a simple and effective technique, it slows down the classification of each object. Furthermore, the classification's effectiveness suffers as a result of the uneven distribution of training data. The purpose of this paper is to look into the applicability of various machine learning techniques in agriculture.
Keywords: Machine Learning, Agriculture, Information Technology and ICT.

1. Introduction

The Indian Council of Agriculture Research (ICAR) is adopting computer science and information technology technique to improve the farming standard. Information Communication and Technology (ICT) plays vital role to grow smart agriculture farming. The almost Indian economy depends upon the agriculture and more that forty percent Indian people depends upon agriculture directly or indirectly. The ICT techniques are useful to assist farmers and prevent the crops from the diseases. The machine learning and artificial intelligence are fields of computer science. This section also focuses on machine learning. It also includes deep learning, artificial intelligence andNeural Networks[1-2]. Many Computational costly and difficult mathematics problems have been solved by deep learning. Image processing used other side to recognize image on different locations. Machine leaning gets accurate and authentic results on the basis of different statistical analysis.
Data mining and machine learning perform statistical analysis. These are performed patterns searching and giving output on the basis of inputs [3-4]. Hence, the machine learning is more powerful toot that combines many deep learning models and gives best results.The whole population depends on agriculture directly or indirectly. Therefore, industries and companies are directly and indirectly connected to agriculture.The country growth depends upon good foundation of agriculture. The agriculture area provides various job opportunities in public sectors. The employment ratio of mostly country depends upon agriculture. Big Farm owner hires additional employees to help in farming, planting and care of animals. The big farmers are used various processing unit to store agricultural goods. This article gives deep review on machine learning algorithms appropriate in agriculture field.This will help future researchers to develop machine learning based solutions for agriculture sector to reduce agriculture waste, water irrigation etc.Other sections are structures as: section 2 represents literature reviews which have been performed in this area. Thesection 3 presents result and discussion. In last, section 4 represents the conclusion.

2. Literature Review

This section highlights literature survey of various machine learning techniques, which are used in different agriculture applications such as smart irrigation, crop disease identification, tracking and monitoring and soil analysis.

2.1. Machine learning techniques

Machine learning(ML) is branch on data mining that improve the correctness of programs in effective ways. The supervised and unsupervised algorithms are used in machine learning. The labeled training data is used in supervised learning and unlabeled data is used in un-supervised learning. The target labels are converted input set into unique set of attributes. The classification techniques are used in various applications such as support vector machines, random forest, artificial neural network, Bayesian classifier and decision tree classifiers.The decision tree is used

to solve classification problems. The decision tree is represented by graphin which perform sorting based on feature values to classify them.

The decision tree has branches and nodes.The nodes are represented by classification instance and each branch has some value that node can carry on. It starts working with root nodes and performs sorting based on feature values. Some time, it is very difficult to analysis the class label for given set of inputs. The training data set matches some of the attribute that's called non-deterministic class variables. The puzzling and noisy data are not selected at the analysis time. The smoking, possibly heredity and alcohol consumption are cause of heart disease in human life-style. To capture such types of disease attributes, the classification model is defined to tackle the accurate information [5-6].

The artificial neural network (ANN)is stimulated by biological neural networks, which helps to design animal brain. It makes communication by interconnected nodes and connected links. The connectionist system is also known ANN. Every connected link has assigned weight and transfer signal charge from one node to another. The received signals are proceed before transfer to other nodes.The ML classification makes based on two techniques.

One technique depends upon training set that call eager learners model. The second model analysis all training example with exact match [7-8]. It indicates data points in D-dimension space follow by nearest neighbor classifier. Here, D represents attributes number. The distance of training set and test example are calculated by given model. The neighbor's class labels classification is based on data point.When data point has multiple classes'labeled neighbor than largest number of class labels is allocated to data point.The value of k's nearest neighbors should be determined exactly. If the value of k is too small, it may misclassify due to the presence of noise in the training data. On the other hand, if the value of k is too large, there is a chance of misclassification because the set of nearest neighbors may contain data points that are located far away from the neighborhood of the test attribute.

A supervised machine learning algorithm has introduced to make multiple decisions for forest trees using random access. The classification difficulties and regression procedures are solved with supervised machine learning algorithm.The result is based on the random number and merges forest with increase degree of forest trees. It also obtained highest accuracy. Therefore, the design process of forest is totally different from design process of trees [8].

The random forest classification makes difference between random forest and decision trees. It helps to find the root node. It is very famous due to its random classification. The decision trees and random forest can be used regression and classification. The method has adequate trees availability and it avoids over-fitting problems. The missing values can easily identified by using random forest classifier. The random forest classifier has applied in e-commerce, stock market, banking and medicine. The costumerproduct approvals are forecasted with the help of random forest classifier. The stock nature is also analyzed by random forest classifier. It also makes difference loyal and fraudulent customers. The exact combination of medicines is analyzed by random forest classifier to the patient's bases on the disease [9-10].

3. Result and Discussion

A data set of 100 images of crops was implemented experimentally. The C 4.5, ID-3 and Support vector machine are experimentally analysis. These algorithms are classified different agricultural crop images. These machine algorithms have capability to identify diseases prediction in crop. These algorithms will be implemented to find crop diseases and reduce crop wastage.

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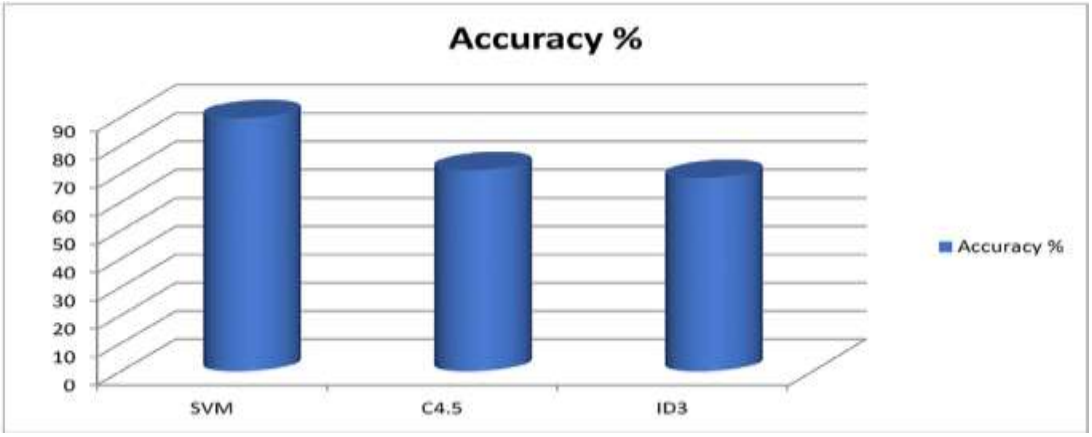

Fig.1.AccuracyofClassifiers

4. Conclusion

The agricultural research has benefited from technological advancements, particularly by incorporating industrial advances into a sustainable agriculture production system. The agricultural research has expended due to technological advancements. The sustainable agriculture production system is promoted by industrial sector. The advance technology has impacted on farming. This is very cost effective technology for advance farming. The machine learning and computational technologies have resolved agricultural issues based on expert system.Therefore, smart agriculture is useful factor to extend the country economy.The agriculture impacts on our country economy. Here, many machine learning techniques that help to identify crop disease and reduce the crop wastage.The C 4.5, ID-3 and Support vector machine are experimentally analysis.A data set of 100 images of crops is implemented experimentally.These proposed algorithms are useful to detect crop disease, soil identification, tracking, monitoring, and intelligent irrigation.

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