

Different Type of Considerations on Soil Classification using Special Classification Techniques

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Abstract:-Data mining techniques are used in different areas. These data mining techniques are used in commercial, industrial and other areas. Agriculture is the soul of our country. Data mining techniques have been applied in agriculture also. Classification is the most suitable technique for characterize the soil using its attribute values. Soil classification is used for characterize the soil using its attribute values. Several data mining techniques are used in soil classification. Hence this studies mainly focusing the various classification techniques. This study is used for compare that soil classification techniques using its accuracy and it are used for find the best soil classification technique.

I. Introduction

The aim of data mining process is to extract information from a data set and transforms it into a good structure for further use. The techniques of data mining are very popular in the area of agriculture. The improvement of agriculture research has been improved by technical advances in computation, automation and data mining. Data mining is being used in vast areas. The products of data mining system and domain specific data mining application software's are available for tailor made use but data mining in agriculture on soil data sets is a relatively a new and useful research domain. The various techniques of data mining is used and compared in this study. The different classification techniques are used in this soil classification study. In this research the following classification techniques are taking for analysis: NB Tree, Navie Bayes, GA Tree, Fuzzy classification, J48, simple cart, JRip, GA Tree and Fuzzy c-means.

II. Soil Attributes:

The soil classification deals with the attributes which are related to the sample soil dataset. Datasets have been collected from different regions and those are classified by various soil classification techniques. Those attributes are,

Table 1. Soil Attributes and its description

Attributes	Description
Ph	pH value of soil
EC	Electrical Conductivity, Decisiemen per Meter
OC	Organic Carbon, %
P	Phosphorous, ppm
K	Potassium, ppm
Fe	Iron, ppm
Zn	Zinc, ppm
Mn	Manganese, ppm
Cu	Copper, ppm
B	Boron

III. Different Classification Techniques used in this study is as follows:

NB Tree

This technique deals with generating a call tree with Navie Bayes classifiers. The advantage of Navie Bayes classifier is that it needs a less quantity of training data sets to estimate the parameters which is necessary for classification.

Simple Cart

Simple cart based on non-parametric call tree learning technique that produces either classification or regression trees, It is looking for whether or not the variable is categorical or numerical stripped-down cost-complexity pruning is implemented by this simple cart.

Navie Bayes

Navie Bayes classifier is based on applying the Bayes theorem. Navie Bayes classifiers can be trained in a supervised learning setting. Navie Bayes classifier required only a less quantity of training data which is necessary for classification. Navie Bayes classifier is a term in Bayesian statistics which have dealing with a classifier based on Baye's theorem.

GA Tree

In Genetic Algorithm the binary decision tree explains the prediction of the soil data category. For generating the decision tree using the dataset takes more time and then the rules are classified using decision tree. Genetic Algorithms are not suitable for managing imprecise or uncertainty in soil data. But Genetic Algorithm can be combined with Decision rules for providing the effective soil classification.

Fuzzy Classification

Fuzzy classification algorithm can be implemented using C language. This classification algorithm generates rules for the defined membership functions of the input attributes and the training datum converted into a fuzzy rule.

Fuzzy C-Means Algorithm

Fuzzy C-Means Algorithm is a partitioning method. It based on unsupervised data with uncertainty. The

main aim of this algorithm is to collect the objects for making it as clusters based on the observable features. Fuzzy C- Means algorithm for soil data which contains texture classes which are going to classified by clustering them. It is also implemented in MATLAB.

J48

J48 is Java implemented version. It performs similarly to ID3 except using the gain ratio to determine the best target attribute. It also can prune the decision tree after creation, which decreases the size of the tree and it saves the

memory. J48 manages discrete attributes, continuous attributes, missing attribute values and attributes of training data. It gives the pruning tree option.

JRip

JRip implements the algorithm using continual progressive pruning to produce Error Reduction (RIPPER). JRip model turned out to be the most sufficient and effective classifier for soil samples. JRip classifier produced most appropriate accuracy in soil classification.

IV. Various classification techniques and its accuracy:

Table2. Various Classification Techniques used by Various Authors in the Soil Classification

Authors & Year	D.M Tech	Accuracy
Dr. S.Hari Ganesh & Mrs. Jayasudha July 2015 [1]	NB Tree JRip J48	38.65% 90.24% 91.90%
Dr. S.Hari Ganesh & D.Prity Cindrella July 2015 [2]	NB Tree Simple Cart J48	85.51% 91.75% 91.90%
P.Bhargavi & Dr.S.Jyothi July to Aug 2011 [3]	GA Tree Fuzzy Classification Rules Fuzzy C-Means Algorithm	0.46 99% 90.90%
P.Jasmine Sheela & K.Sivaranjani March 2014 [4]	J48 JRip	91.90% 92.53%
Dr.S.Hari Ganesh & Mrs.Jayasudha July 2015 [5]	NB Tree JRip	38.65% 90.24%
Jay Gholap, Anurag Insole, Jayesh Gohil, Shailesh Gargade, Vahida Atter [6]	Navie Bayes JRip J48	38.40% 90.24% 91.90%
Youvraj sinh, Chauhan, Jignesh Vania Nov 2013 [7]	J48	83.74%

Dr. S.Hari Ganesh & Mrs. Jayasudha discussed about JRip, NB Tree and J48 in that J48 gives more accuracy rather than others. Dr. S.Hari Ganesh & D.Prity Cindrella discussed about NB Tree, Simple Cart and J48 in that J48 gives more accuracy compared with that other two classification techniques. P.Bhargavi & Dr.S.Jyothi discussed about GA Tree, Fuzzy Classification Rules, and Fuzzy C-Means Algorithm in that three Fuzzy classification rules gives more accuracy. P.Jasmine Sheela &

K.Sivaranjani discussed about J48 and JRip in that two JRip gives more accuracy. Dr.S.Hari Ganesh & Mrs.Jayasudha discussed about NB Tree and JRip in that two JRip gives more accuracy compared to NB tree. Jay Gholap, Anurag Insole, Jayesh Gohil, Shailesh Gargade and Vahida Atter discussed about Navie Bayes, JRip and J48 in that three J48 gives more accuracy rather than other two. Youvraj sinh, Chauhan, Jignesh Vania discussed about J48.

V. Result and Discussion:

Table 3. Various Classification Techniques used in Soil Classification and Its Accuracy

Classification Techniques	Accuracy
NB Tree	38.65%
JRip	90.24%
J48	91.90%
Simple Cart	91.75%
Navie Bayes	38.40%
GA Tree	59%
Fuzzy Classification	99%
Fuzzy Classification C-Means Algorithm	90.90%

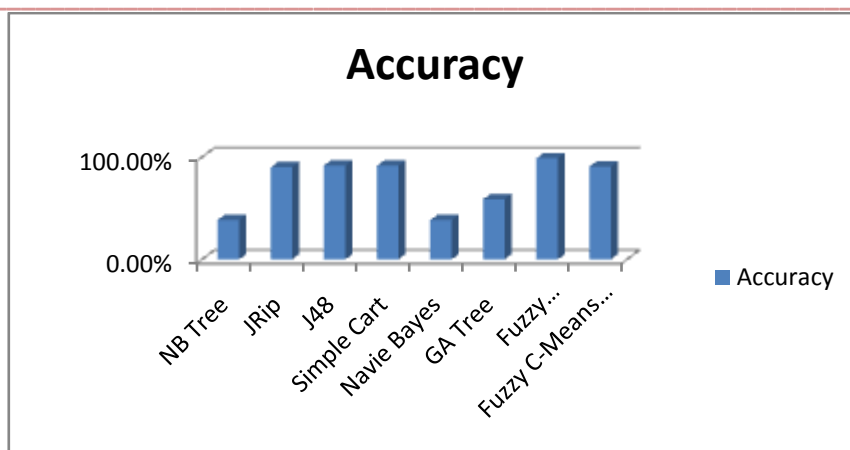


Figure 1: Accuracy of different Classification Techniques used in soil classification

In this graph we are going to examine the different classification techniques NB Tree, JRip, J48, Simple Cart, Navie Bayes, GA Tree, Fuzzy Classification and Fuzzy Classification C-Means Algorithm which gives more accuracy in soil classification. Previous table and chart shows that Fuzzy Classification technique gives more appropriate and accurate values compared with other classification techniques. After that J48, Simple Cart, JRip and Fuzzy classification C-Means Algorithm are tried to produce most appropriate values in this soil classification.

VI. Conclusion

This study conclude that fuzzy classification technique is most suitable for soil classification when it compared with J48, JRip, Navie Bayes, Simple Cart, GA Tree, NB tree and Fuzzy C-Means classification. In Soil classification 100% accuracy to be achieved by merging the two best classification techniques.

VII. Reference:

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