HYBRID APPROACH ANN AND FL OF IMAGE CLASSIFICATION USING NATURE TERRAIN FEATURES

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ABSTRACT:- **Image classification is the most important areas in today's world. Image classified using different methods. Artificial Neural network (ANN) is the most important application in the field of classification. In the paper image classification based upon the different approaches Artificial Neural network (ANN) And fuzzylogic and its seen that fuzzy logic system is better classification techniques than Artificial Neural network (ANN) .Many various have a benefited with the use of Artificial Neural network (ANN) based model over a traditional statistical models for their image classification .In this study, Artificial Neural network (ANN) was hybridized with fuzzy logic (FL) and a new technique Hybrid Artificial Neural network (ANN) to extract natural terrain features was proposed.A simulation tools carry out in the MATALB environments.**

KEYWORDS:- **Artificial neural network (ANN) ,Fuzzy logic (FL) . Image classification, soft computing, supervised classification, unsupervised classification.**

1. INTRODUCTION

Remote sensing is a science art of research in which information about an object, area or phenomenon can be obtained that is not in physical contact with that object ,place , area or phenomenon included considered for investigation [1]. Remote sensing image can be the made use a number of applications, surrendering reconnaissance, production of map products for militant and civil applications, evaluation of environmental suffering, growth regulation, following of land use, soil assessment, urban planning, radiation monitoring, and crop yield assessment [2]. The Remote sensing image is a one of the most popular approves for know the various soft computing in nature terrain features . it is well known that a human being perceives all the information about the surrounding world with the help of this five sensing.Rest of the paper is organized as follows: Section 2 describes a image classification and its techniques, Section 3 describes the hybridization concept of the ANN and FL that is used for the classification, Section 4 describes the Consideration of dataset used, Experimental Results and comparison with other swarm based hybrid techniques and Section 5 gives the conclusion of the work done.

2. IMAGE CLASSIFICATION

Image Classification can be defined as the process by which different pixels of the image are consigned to different feature classes as per their identification found. For this, a remotely sensed multi-spectral image is used to assign the pixel values [3][4]. The overall objective of this image classification is to change the digital image into their respective feature class categorization so that further can be manipulated for the real life problem. There exist various spectral patterns which are used as the numerical basis to categorize them into different feature classes. Spectral patterns are the classification procedure taken into account to generate the different terrain visualization [5][6]. Image Classification is of two types: Supervised Learning and Unsupervised Learning. Image Classification techniques can be broadly classified into three categories Statistical Classifiers, Fuzzy Mathematical based approaches and Artificial Intelligence based techniques

2.1 IMAGE CLASSIFICATION TECHNIQUES.

A. SUPERVISED CLASSIFICATION

When there is preceding information about the classes current in the image the method using to classify the image is supervised classification. Some common supervised classification techniques are: Maximum likelihood classifier, parallelepiped classifier.Examples of the supervised classification max likelihood ,min distance , decision tree ,ANN

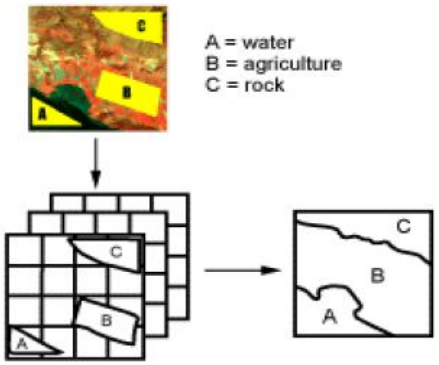

FIG 1 example of supervised classification .

B. UNSUPERVISED CLASSIFICATION

When there is no preceding information about the classes current in the image the method used to classify the image is unsupervised classification. Some of the common unsupervised classification methods are: K Means, Simple one pass clustering, minimum distribution angle, Fuzzy logic..

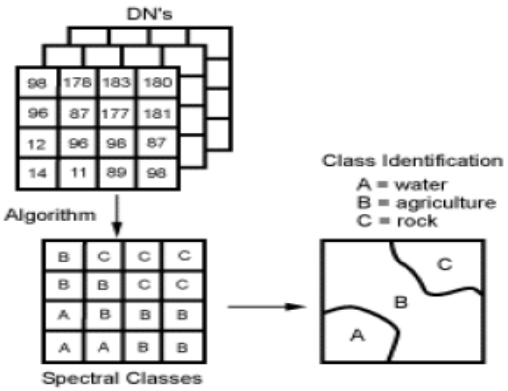

FIG 2 example of unsupervised classification .

3. OVERVIEW ARTIFICAL NEURAL NETWORK (ANN) AND FUZZY LOGIC (FL)

3.1 ARTIFICAL NEURAL NETWORK (ANN)

A artificial neural network (ANN) is the most important tool in a classification artificial neural network .classified in the non – parametric and therefore may be used in the robust when they are distribution .During the training of a network in a cable of form the decision boundaries of the feature space. Knowledge about the distributedreparation of a neuron networkand the knowledge of training of the priorsamplemaking the neuron network difficult and itsis nonlinear checking intelligencea known of the land coverhieratic classified changes the degrees of a coarse to the suitable degree.A artificial neural network (ANN) is mostly can give the high accuracy of a out coming and have being generally used to the land course and land use of the image classification An ANN model is used to make a simulate of a biological nervous human brain system [7].its a experienced ,not programmed such as the rule based upon the FLC, and to learn by the examples of the set s a input and output of the data training .the artificial neural network results in the form of inter connection of neurons network via weights act like gain. The non linearactivation function are given in a non linear components of neuron network .which is the patent of a non linear to the input and the outputmapping of a neuronsnetwork (NN).

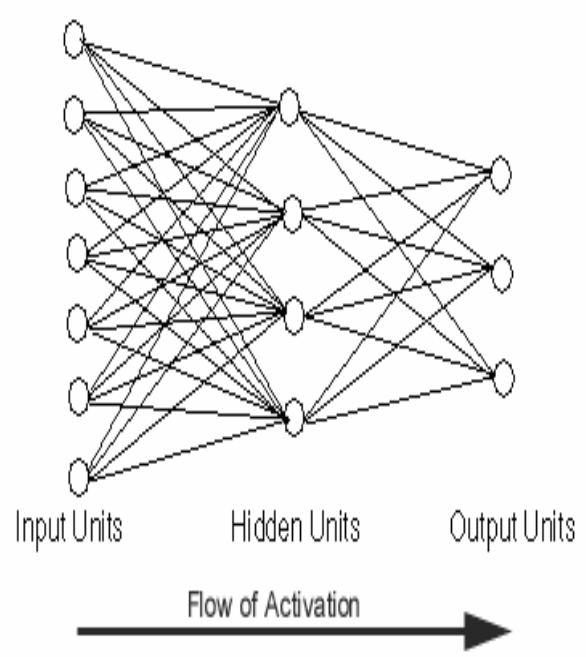

Fig 3 Artificial neural network (ANN)

3.2 ADAPTIVE NEURO FUZZY INFERENCE SYSTEM (ANFIS)

A fuzzy inference system (FIS) acts like the white box andmeans they are rule to designers ailing understanding how they are control show a solutions. On the other hand, the NN can learn, but acts of a black box as the how its had reached to the particular solution. A applying neural networkaccess to a develops of the parameter the fuzzy inference system and the FIS is given to a ability to study for a data set training like artificial neural network (ANN).

3.3 ARTIFICAL NEURAL NETWORK (ANN) PARAMETER OPTIMZATION

Artificial neural network (ANN)is a componentmodel and it's a predictionaccuracy can be improved by optimizing itsparameters. The parameters that can be optimized inan ANN can be a grouped in the following division.

I. ARCHITECTURE

a. Number of the input neurons network.
b. Number of hidden layers and hidden
Neurons
c. Number of output neurons network

II.TRAINING

A. Weights
B. Training algorithm
C. Training epochs

III. TRANSFER FUNCTION

IV. DATA

a. Selection
b. Pre-processing
c. Quantity and quality

3.4 FUZZY LOGIC (FL)

Fuzzy logic (FZ) is the vastest range of the problem domain. Fuzzy logic set of the elements havingdegree of the member ships .The elements of the fuzzy logic a set and partial membership values which can be assigned the elements is no longer close and just the two values ,but its can be 0 and 1 or any other value in between and the mathematical function of defines the degrees of any membership elements of a fuzzy set function which is knownas member ship function.The main advantages of a this theory is a intelligence to the describe the problem of linguistic naturally in the teams rather than in the teams a fuzzy logic and on the other hand they representation classification decision finally in the form of fuzzy logic "if then " rules .Fuzzy logic is a set the are allow the assignment of multiple value membership and partial function information to simpler generate more model suitable that can be easy to handle the familiar human thinking. The main source of the expert human in a fuzzy logic rules that its is possible to improve the performance function of the system and to adding the new rules or updates existing rules in the form knowledge base . The knowledgebase is a specially in a fine truing of the fuzzy logic aparameters set of yhe rules a fuzzy logic in a expert system .[9]

4. FUZZY LOGIC CLAFFICATION

4.1 MATLAB TOOLBOX FUZZY LOGIC

In the absence of the precise numerical model in which is a define the behavior of a system, Fuzzy logic (FL) Toolbox is a good ' WEAPON" TO the solving the problem: it allows using *logic if then rules* to define a system behavior .

This toolbox joining the function builds on the

MATLAB is a numeric computing function of the environments and providestools for creating and editing fuzzy inference systemswithin theframework of MATLAB.

There are 3 type of provide toolbox categories

1. Comments the function line
2. Graphical interactive tools
3. A stimulant blocks and examples

The Fuzzy Logic Toolbox provides a number of interactivetools that allow accessing many of the functions through agraphical user interface (GUI). Fuzzy Logic

Toolbox allowsbuilding the two types of system:

1. Fuzzy interference system (FIS)
2. Adaptive neuron fuzzy inference systems (ANFIS)

4.2 FUZZY INTERFERENCESSYSTEM (FIS)

Fuzzyinference system (FIS) is the process to define a checking (mapping) to a given input and output using the fuzzy logic (FL). The process offuzzy inference involves: membership functions, fuzzy logicoperators and if-then rules.The are two types of the fuzzy inference system in the mat lab fuzzy logicimplementation [9]

Toolbox

1. MAMDANI TYPE
2. SUGENO TYPE

4.3 MEMBERSHIPS FUNCTION.

Membership function can be define as the mathematical function of the degrees of a membership elements of a fuzzy set. A fuzzy logic Toolbox includes 11 built-in membershipfunction types. These function used to the several function builds.[10]

1. Piecewise linear functions,
2. The Gaussian distribution function,
3. The sigmoid curve
4.Quadratic and cubic polynomial curve.

4.4 FUZZY LOGIC OPERATION

The most important thing to realize about fuzzy logicalreasoning is the fact that it is a superset of standard Booleanlogic. In other words, if the fuzzy values are kept at theirextremes of 1 (completely true) and 0 (completely false),standard logical operations will hold. That is, A AND Moperator is replaced with minimum - *min* (A, M) operator, A OR
M with maximum - *max* (A, M) and NOT M with 1-M.

5. CONCLUSIONS.

The suggested algorithm is processed with MATLAB [11].artificial neural network (ANN) and fuzzy logic (FL) models also being applied in the few studies when the better than a other image classification. Both ANN and FL system they have advantages and they an used for remote sensing. The improvement ANN-FL image classification is based upon the system in synergismbetween the fuzzy logic (FL) and artificial neural network (ANN).Its is the in corporate the best of the both techniques and the components for the shortcoming of each. So along with the hard techniques we can be adopt soft classification techniques for a better output.

ACKNOWLEDGEMENT

This work is supported and guided by my Research guide Er. Harish Kundra, HOD, Computer Science Engineering, Rayat Institute of Engineering and IT. I am thankful to him for his continuous guidance and support. I fail with my words, if I fail to thank my parents, my family, and god who made it possible.

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