Image classification by using BP, RBF, SVD

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I.   INTRODUCTION

Remote sensing can be defined as any process whereby information is gathered about anobject, area or phenomenon without being in contact with it. Our eyes are an excellentexample of a remote sensing device. The term remote sensing has come to be associated.more specifically with the gauging of interactions between earth surface materials andelectromagnetic energy. In order to gather and interpret geo-spatial data, remote sensingtechnology that employs different radiation spectra is used. This technology is applicablein developing information about features, objects, and classes for the earths land surface,oceans, and the atmosphere. With the recent advances in remote sensing high resolution data are available at short time

- Back propagation (BP) network

It is a multilayer feed forward neural network trainingfeedback algorithm as shown in Fig.1. It firstly uses thesample data to train the network, and then the trainednetwork is used in image processing and patternrecognition. Low computation complexity of BP neuralnetwork, it has been widely used in many fields.The learning process of a BP network structure consistsof two parts positive dissemination and propagation. Inthe BP network the error correction with weight andthreshold of each layer.
Network Initialization: According to the system inputand output sequence (X, Y) the number of nodes n in thenetwork layer, 1 in hidden layer and m in output layersare determined. Connection weights Wij and Wjk betweenthe input layer, hidden layer and output layer neurons are initialized.

Radial basis function

RBF are a two layer feed forward neural network. Sucha network is characterized by a set of inputs and a set of outputs .In between inputs and outputs there is a layer of processing unit called hidden units. In order to use RBF network we need to specify the hidden unit activation function, the number of processing unit a criteria for modeling a given task and trainin**g al gorithm. If we have at hand set of inputs and outputs pairs called training set, we optimize the network parameter in order to fit the network outputs to the given inputs.

II.   SINGULAR VALUE DECOMPOSITION-

Singular value decomposition (SVD) is a stable and effective method to split the network into a set of linearly independent components and each of them having own energy contribution. Singular value decomposition (SVD) is a numerical technique used to diagonalize matrices in numerical analysis Main advantages of SVD in which maximum energy which is usually used in compression ability to manipulate the image in base of two distinctive subspaces data and noise subspaces which is usually uses in noise filtering and also was utilized in watermarking applications. The purpose of singular value decomposition is to reduce a dataset containing a large number of values to a datase containing significantly fewer values, but which still contains a large fraction of the variability present in the original data .SVD properties are highly advantageous for images such as, its maximum energy packing, solving of least squares problem, computing pseudo inverse of a matrix and multivariate analysis. A key property of SVD is its relation to the rank of a matrix and its ability to approximate matrices of a given rank. Digital images are often represented by low rank matrices and therefore, able to be described by a sum of a relatively small set of eigen images.
Literature-
➢   in 1991 Mulder and Spreuwers described to use of neural nets for RSD Classification report relatively limited or even poor classification ability
➢   In year 2004 Farid Melgani and Lorenzo Bruzzone proposed Classification of Hyperspectral

Remote Sensing image wit support vector machines.

➤ In year 2010, Jayanta kumar Basu ,Debnath Bhattacharyya , Tai hoon Kim use of artifical network in pattern recongition.

➤ Singular Value Decomposition (SVD) algorithm has been used to increase the compactness of color distribution relative to each cluster Mousssa Jlassi in 2008. The achieved survey is accompained by some experimental result in sport field.

III. CONCLUSION

The comparison can be done in between BP,RBF and SVD .the BP network, RBF network are compared with SVD .the result obtained from RBF network provide accuracy of 94% which are stable and less consumption of time while compare with BP network for image classification.

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