**ABSTRACT:**

Satellite image classification process involves grouping the image pixel values into meaningful categories. Several satellite image classification methods and techniques are available. In existing k-means clustering technique is used for clustering the satellite data, with this method not able to cluster accurately all the classes. In our proposed method self-organising maps as a clustering technique is used. Self-organizing maps learn to cluster data based on similarity, topology, with a preference of assigning the same number of instances to each class. Self-organizing maps are used both to cluster data and to reduce the dimensionality of data. They are inspired by the sensory and motor mappings in the mammal brain, which also appear to automatically organizing information topologically. Ensemble Classifiers meld results from many weak learners into one high-quality ensemble model. Our proposed technique is Ensemble clustering with subspace discriminant algorithm for classification of satellite data into water, Agriculture, Barren land, Green Land. The proposed method of self-organising map clustering and ensemble classifier with subspace discriminant is given best result compared to existing ones.

**Proposed Method Flow Chart:**

**INPUT IMAGE:**

The Input Images is land set satellite Image. This image contain green, barren land, crop and water. So we are going to classify 4 classes in that image.

**PRE-PROCESSING:**

The input satellite image is converted to LAB colour space and reshape the image data for applying self-organising map clustering technique.

**SELF-ORGANISING MAP CLUSTERING:**

Self-organizing maps learn to cluster data based on similarity, topology, with a preference of assigning the same number of instances to each class.

Self-organizing maps are used both to cluster data and to reduce the dimensionality of data. They are inspired by the sensory and motor mappings in the mammal brain, which also appear to automatically organizing information topologically.

**ENSEMBLE CLASSIFIER WITH SUBSPACE DISCRIMINANT ALGORITHM:**

Discriminant analysis is a classification method. It assumes that different classes generate data based on different Gaussian distributions.

Use random subspace ensembles (Subspace) to improve the accuracy of discriminant analysis ([ClassificationDiscriminant](http://in.mathworks.com/help/stats/classificationdiscriminant-class.html)). Subspace ensembles also have the advantage of using less memory than ensembles with all predictors, and can handle missing values (NaNs).

The basic random subspace algorithm uses these parameters.

* m is the number of dimensions (variables) to sample in each learner. Set m using the NPredToSample name-value pair.
* d is the number of dimensions in the data, which is the number of columns (predictors) in the data matrix X.
* n is the number of learners in the ensemble. Set n using the NLearn input.

The basic random subspace algorithm performs the following steps:

1. Choose without replacement a random set of m predictors from the d possible values.
2. Train a weak learner using just the m chosen predictors.
3. Repeat steps 1 and 2 until there are n weak learners.
4. Predict by taking an average of the score prediction of the weak learners, and classify the category with the highest average score.

You can choose to create a weak learner for every possible set of m predictors from the d dimensions. To do so, set n, the number of learners, to 'AllPredictorCombinations'. In this case, there are nchoosek(size(X,2),NPredToSample) weak learners in the ensemble.

fitcensemble downweights predictors after choosing them for a learner, so subsequent learners have a lower chance of using a predictor that was previously used. This weighting tends to make predictors more evenly distributed among learners than in uniform weighting.

Reference:

* 1. Guo, Y., T. Hastie, and R. Tibshirani. Regularized linear discriminant analysis and its application in microarrays. Biostatistics, Vol. 8, No. 1, pp. 86–100, 2007.