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### OPTIMISATION OF FUZZY BASED SOFT CLASSIFIERS FOR REMOTE SENSING DATA

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Keywords: Fuzzy *c*-Mean (FCM), Possibilistic *c*-Mean (PCM), Noise clustering (NC), Sub pixel confusion uncertainty matrix (SCM)

Abstract. Classification of satellite images are complex process and accuracy of the output is dependent on classifier parameters. This paper examines the effect of various parameters like weighted exponent "m" for FCM, PCM classifiers and weighted exponent "m" as well as fixed parameter "z" for NC without entropy based algorithm. The prime focus in this work is to select suitable parameters for classification of remotely sensed data which improves the accuracy of classification output. The uncertainty criterion has been estimated from sub-pixel confusion uncertainty matrix (SCM), based on classified and testing outputs. Therefore, these criteria are dependent on the error of the results and sensitive to error variations. So it has also been tried to estimate entropy, based on outputs generated by various classifiers like FCM, PCM and NC without entropy based classifier, hence this computed entropy is sensitive to uncertainty variations. The AWiFS and LISS-III datasets are being used for classification and testing respectively. Soft classified outputs from FCM, PCM and NC without entropy classifiers for AWiFS and LISS-III have been evaluated using SCM, overall accuracy, fuzzy kappa coefficient and entropy. The SCM and fuzzy kappa coefficients are used to major relative accuracies, while entropy is an absolute uncertainty indicator. From resultant aspect, while monitoring entropy of fraction images for different regularizing parameter values, optimum regularizing parameter has been obtained for "m" = 2.0 and "z" = 1, which gives highest accuracy from sub-pixel confusion uncertainty matrix (SCM) i.e. 96.27% and AWiFS entropy has been 0.71 using noise clustering without entropy based classifier.

[Conference Paper](#) (PDF, 895 KB)

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