Abstract

Estimation of specific crop and acreage plays a vital role in the field of crop planning, monitoring, crop condition, yield forecasting and acreage estimation. There have been several studies conducted to classify the crops at continental to the regional level, but still, work is needed to map small area covered by different crops using Remote Sensing technology. The main objective of the present study is to explore whether the Fuzzy classifier can improve the accuracy of crop classification as compared to other traditional Classifiers, such as Maximum likelihood, Mahalanobis etc. The attempt has been done to classify different crops at a smaller scale. The Landsat time series 8 band OLI data was used to investigate multiple crop phenomena. Two scenes were acquired in Kharif seasons (September 28 and October 30, 2014). Three indices such as NDVI, SAVI, and RVI, were used to know vegetation condition. The Spectral signatures generated from data for the residues of Sugarcane and Maize based on prior knowledge of the field work. Four techniques based on Maximum Likelihood, Mahalanobis Classifier, Knowledge classifier and fuzzy classification techniques were used to
extract the crops information based on the signatures. The resulting overall classification accuracy was calculated using stratified random sampling method. The corresponding performance efficiency of these four methods was found to be 84%, 85%, 87% and 90.67%, respectively, indicating the fuzzy method to be the most efficient as compared with other classification techniques.

References


3. Rajendra, YD; Mehrotra, SC; Kale, KV; Manza, RR; Dhumal, RK; Nagne, AD; Vibhute, AD; 2014 Evaluation of Partially Overlapping 3D Point Cloud's Registration by using ICP variant and CloudCompare. The International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences Copernicus GmbH 891 8 40


8. Tzionas, Panagiotis, Stelios E. Papadakis, and Dimitris Manolakis 2005 "Plant leaves classification based on morphological features and a fuzzy surface selection technique." Fifth International Conference on Technology and Automation, Thessaloniki, Greece.

9. Nagne, Ajay D; Dhumal, Rajesh K; Vibhute, Amol D; Rajendra, Yogesh D; Kale, KV; Mehrotra, SC; 2014 Suitable sites identification for solid waste dumping using RS and GIS approach: A case study of Aurangabad,(MS) India India Conference (INDICON), 2014 Annual IEEE 42887

10. Vibhute, Amol D; Dhumal, Rajesh K; Nagne, Ajay D; Rajendra, Yogesh D; Kale, KV; Mehrotra, SC; 2016 Analysis, Classification, and Estimation of Pattern for Land of Aurangabad Region Using High-Resolution Satellite Image Proceedings of the Second International Conference on Computer and Communication Technologies Springer India 413-427


23. Dhumal, Rajesh K; Vibhute, Amol D; Nagne, Ajay D; Rajendra, Yogesh D; Kale, Karbhari V; Mehrotra, Suresh C; 2015 Advances in Classification of Crops using Remote Sensing Data International Journal of Advanced Remote Sensing and GIS pp. 1410-1418 1 4
24. Rajendra, Yogesh; Thorat, Sandip; Nagne, Ajay; Dhumal, Rajesh; Vibhute, Amol; Varpe, Amarsinh; Kale, KV; 2016 Foundations and Frontiers in Computer, Communication and Electrical Engineering
26. Nagne, Ajay D; Dhumal, Rajesh K; Vibhute, Amol D; Rajendra, Yogesh D; Gaikwad, Sandeep; Kale, KV; Mehrotra, SC; 2017 Performance evaluation of urban areas Land Use classification from Hyperspectral data by using Mahalanobis classifier Intelligent Systems and Control (ISCO), 2017 11th International Conference on IEEE 388-392
27. Dhumal, Rajesh K; Vibhute, Amol D; Nagne, Ajay D; Rajendra, Yogesh D; Kale, Karbhari V; Mehrotra, Suresh C; 2017 Fuzzy convolution tactic for classification of spatial pattern and crop area Intelligent Systems and Control (ISCO), 2017 11th International Conference on IEEE 379-382


36. Varpe, Amarsinh B; Rajendra, Yogesh D; Vibhute, Amol D; Gaikwad, Sandeep V; Kale, KV; 2015 Identification of plant species using non-imaging hyperspectral data Man and Machine Interfacing (MAMI), 2015 International Conference on IEEE 42826

37. Rajendra, Yogesh D; Thorat, Sandip S; Nagne, Ajay D; Vibhute, Amol D; Dhumal, Rajesh K; Varpe, Amarsinh B; Mehrotra, SC; Kale, KV; 2016 Understanding the dynamics of Gautala Autramghat forest: A digital image classification approach Computing, Communication and Automation (ICCCA), 2016 International Conference on IEEE 1166-1169


44. Hussain, M., Chen, D., Cheng, A., Wei, H., & Stanley, D. 2013. Change detection from


46. Wang, Guangxing, and QihaoWeng, eds. 2013, Remote sensing of natural resources.CRC Press,


48. Rajendra, Yogesh D; Thorat, Sandip S; Nagne, Ajay D; Baheti, Manasi R; Dhumal, Rajesh K; Varpe, Amarsinh B; Mehrotra, SC; Kale, KV; 2017 Application of Remote Sensing for Assessing Forest Cover Conditions of Aurangabad,(MS), India Proceedings of International Conference on Communication and Networks Springer, Singapore 313-322.

**Index Terms**

Computer Science Fuzzy Systems

**Keywords**

Crop Classification, Fuzzy Classifier, Knowledge Classifier, Landsat Data, NDVI.