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Gaussian Kernel Based Classification Approach for Wheat Identification

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Abstract. Agriculture holds a pivotal role in context to India, which is basically agrarian economy. Crop type identification is a key issue for monitoring agriculture and is the basis for crop acreage and yield estimation. However, it is very challenging to identify a specific crop using single date imagery. Hence, it is highly important to go for multi-temporal analysis approach for specific crop identification. This research work deals with implementation of fuzzy classifier; Possibilistic *c*-Means (PCM) with and without kernel based approach, using temporal data of Landsat 8- OLI (Operational Land Imager) for identification of wheat in Radaur City, Haryana. The multi- temporal dataset covers complete phenological cycle that is from seedling to ripening of wheat crop growth. The experimental results show that inclusion of Gaussian kernel, with Euclidean Norm (ED Norm) in Possibilistic c-Means (KPCM), soft classifier has been more robust in identification of the wheat crop. Also, identification of all the wheat fields is dependent upon appropriate selection of the temporal date. The best combination of temporal data corresponds to tillering, stem extension, heading and ripening stages of wheat crop. Entropy at testing sites of wheat has been used to validate the classified results. The entropy value at testing sites was observed to be low, implying lower uncertainty of existence of any other class at wheat test sites and high certainty of existence of wheat crop.

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