**Assessing the performance of feature selection approach for urban Land Use/Cover Classification in Kolkata Metropolitan Area, India**

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**Abstract**

Feature selection is crucial in machine learning for land use and land cover classification. The increased level of features in image classification significantly impacts the possibility of classification accuracy. Since the advent of big data, the digital image has expanded, and a significant amount of earth observation data has become freely accessible. Therefore, feature selection is not just about dealing with a vast volume of developing big data; it's also about knowing which features to extract and which are more valuable. Feature selection (FS) seeks to determine the smallest possible number of attributes needed to maintain the class probability distribution as close to the original distribution of all features as is practical. The rigorous feature selection method plays a significant role in reducing the processing time and storage space while it is producing higher accuracy than the initial datasets. The main objective of this study is to examine state-of-the-art feature selection approaches to improve pixel and object-based image classification accuracy. In addition, Planetscope high resolution satellite datasets and a robust Support vector machine (SVM) will be employed for pixel and object-based LULC classification of the Kolkata metropolitan area. The novel feature selection algorithms, e.g., Gain Ratio, information gain, correlation, Fisher's criterion (F-score), Relief will be examined based on accuracy assessment indices, e.g., overall accuracy, kappa, precision, recall, etc. Several spectral (mean and standard deviation of image pixel value), textural (Grey level co-occurrence matrix), and morphological features (area, compactness, density, etc.) will be extracted and fed into the features selection algorithms to obtain the robust features. The best features will be used for pixel and object-based LULC classification pipelines to achieve the best accuracy. This study could be a novel guideline to address the robust feature selection algorithm and best features to map essential urban land use and land cover for urban policy improvement.

**Keywords:** Feature selection, Pixel-based classification, Object-based classification, Support vector machine