

ABSTRACT

Land Use / Land Cover classification is one of the important processes in remote sensing application and it is performed using deep learning algorithms. This classification reveals lot of useful information which can be used for managing environments, road construction, urban planning and so on. Because of the growing population, planning of any LULC becomes a tedious process. To solve the above issues, a LULC classification has been proposed in this thesis work. Various LULC classification systems have been proposed for LISS IV images in the literature. Most of the existing methods leave certain limitations out of consideration like missing the boundary information and possessing limited training samples for certain classes. In order to overcome the above limitations and to produce efficient classification, it is necessary to have efficient features. Feature extraction as well as Feature selection has become a research interest for the classification of remote sensing images. The main aim of the proposed system is to obtain the most important / optimal feature which can be used for improving the classification accuracy.

The proposed system works by extracting features from the RS image and then, the most relevant features are selected for classification. The feature extraction is mainly done using the Convolutional Neural Network (CNN). The first work is proposed for the feature extraction and the process is done using Ensemble of Object based Textural Features and Deep Features (EOTFDF). The object segmentation is performed and then, the textural features are extracted. The extracted textural features are combined with deep features and then, they are sent for later stage of classification. The second work is proposed using Two Stage Textural Feature method for feature extraction using CNN (TSTF-CNN). The system has proposed two feature extraction methods

and they are experimentally analysed to find the best method. The experimental results have revealed that the TSTF-CNN outperforms the results of EOTFDF and thus, the features extracted through TSTF-CNN are sent for feature selection process. In the third work, the optimal features are selected. The system has proposed two feature selection methods and they are experimentally analysed to find the best feature selection method. They are (1) Enhanced Selective Deep Feature Basket-based Firefly (ESDFBF) Algorithm and (2) Wrapper-based Random Search strategy with Mutual Information (WRSMI) method. The experimental results have revealed that the ESDFBF outperforms the results of WRSMI method. The performances are evaluated in terms of user accuracy, producer accuracy, overall accuracy and kappa coefficient. The obtained results have proved that the proposed approach has achieved better performance than the various existing systems.