ABSTRACT

Remote sensing (RS) is the technique of finding and understanding information from a long distance or remote location using sensors. Land use and land cover mapping are fundamental tasks for planning and management. Identification of land cover and measurement of area under cultivation for various land use land cover is a very important task. However, techniques available for the above mention purpose are labor incentives, time-consuming, and costly. Remote sensing plays an important role in the mappings and classification of land cover features. Remote sensing provides very significant and sensed information. The deep neural network was used to perform the study. This study shows the semantic segmentation of LISS-III multispectral image using a fully convolutional network (FCN): U-net, Tiramisu, and Deeplabv3+. A multispectral image captures image data within specific wavelength ranges across the electromagnetic spectrum (EM). It has more than 100 nm resolution and less the 10 bands. Semantic Segmentation aims at a pixel-level classification of remote sensing images where every pixel is allotted to an individual class.

We present an innovative dataset, based on these LISS-III images that contained 4 different spectral bands (Band – 2 (Blue), Band-3 (Green), Band-4(Red), and Band-5 (Nearly Infrared), the false color composite (FCC) images and the ground truth mask images to classify total 4 classes (Water Bodies, Vegetation, Uncultivated Land, and Residential areas). U-Net, Tiramisu, and DeepLabv3+ were used to perform classification on 3 datasets of different sizes and seasons (Dataset – 1:1470 images, Dataset – 2:13500 images Dataset – 3: 940 images). A total of 4 classes were successfully identified in the present study (Water Bodies, Vegetation, Uncultivated Land, and Residential areas). The experiment showed that the U-Net algorithm has a very good capability for the classification of LISS -III images for land use land cover class detection. U-Net performs better than DeeplabV3+. U-net achieved an accuracy of 81 % for dataset-1, 84% for dataset-2, and 77% for dataset-3 respectively, Deeplabv3+ achieved an accuracy of 31% for dataset-1, and 26% for dataset -2 and 25% for dataset-3 whereas Tiramisu achieved 51% for dataset-1, 37 % for dataset-2 and 33% for dataset -3.