

Name of Scholar: Ekta Baranwal

Name of Supervisor: Prof. Shamshad Ahmad

Name of Department: Civil Engineering

Topic of Research: Developing new spectral indices for detection and auto-extraction of built-ups in an urban area using satellite imagery

Keywords: Spectral indices, built-ups, satellite imagery, independent component analysis, urban remote sensing

Findings

Categorization of all existing built-up indices is completed based on different criteria that provided a vast list of spectral indices for different categories which can be useful find suitable one as per the various applications.

Existing indirect built-up indices are explored and validated using Landsat OLI/TIRS images which showed the variation in the result according to the study area and specification of satellite image.

The sensitivity of biophysical components is analyzed using three thematic layers (independent component, soil-adjusted vegetation index, modified normalized difference water index) of the new spectral index via scatter plot, correlation coefficient, and the coefficient of determination in regression analysis. This process helped to find the intensity of the relation between two features, i.e., less correlate, easy to segment or segregate.

A new spectral index for built-up auto-extraction is developed named as Independent component based built-up index (ICBI) considering all urban biophysical components (water, soil, vegetation, and built-ups) by integrating first independent component, and two spectral indices (for vegetation, soil, and water) of the multispectral imagery.

Visual and statistical assessment of the developed spectral index is achieved with various parameters along with the spatiotemporal analysis and the comparative analysis.