

DEVELOPMENT OF URBAN GREEN SPACE MONITORING TECHNIQUE WITH REMOTE SENSING AND ITS APPLICATION

Goal of the project

City is the important area of earth's surface material, energy, and information exchanging; also it is the center in national, regional political, economic, scientific and cultural aspects. Remote sensing imagery enables rapid and efficient quantification urban eco-environment and it gives a new insight for urban environmental research. A wide range of urban remote sensing applications is available.

With the availability of super high resolution remotely sensed imageries and multi-source remote sensing data, there is a great need to transform remote sensing data into useful information that we need for urban studies. High resolution remote sensing data make a clear potential to help humans to make a better understanding of their living places, to measure the biophysical parameters of urban vegetation, to model the environmental process in urban areas, to map the urban features quickly, to update the urban land covers, etc.

Short description of the project

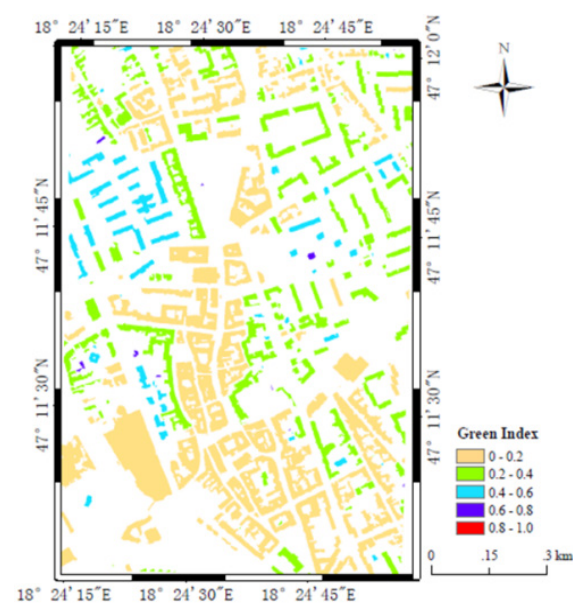
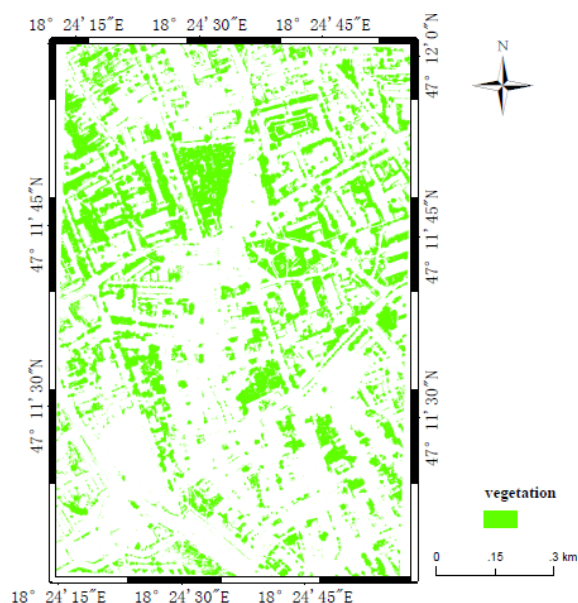
In the scientific literature, there are studies on the urban green space monitoring based on modeling the proximity of buildings to green space with remote sensing using multi-source satellite images. The study achievement would provide reference for the measurements of green space, serve the urban eco-environment quality monitoring. At the same time, it was of great theory and practical significance to improve utility efficiency of satellite data and eco-environment monitoring precision. The project would build up stable demonstration for scientific and technology cooperation and exchanging between Romania and China, and make cooperation deeper and more durative.

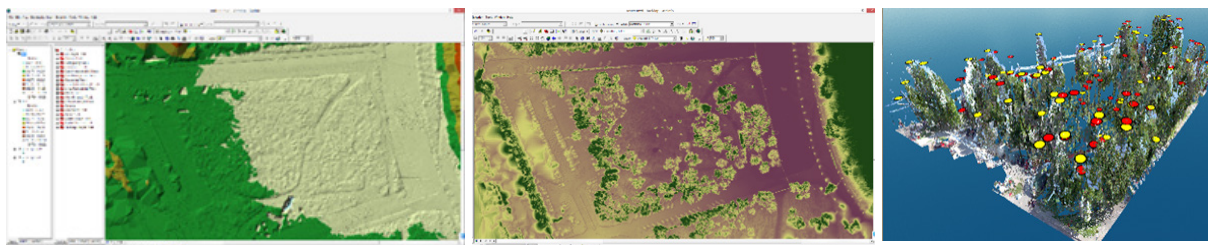
Project implemented by

- Chinese Academy of Science, Institute of Remote Sensing and Digital Earth, Prof. Meng Quinyan
- Politehnica University of Timisoara, Faculty of Civil Engineering, Assoc. Prof Sorin Herban

Implementation period

October 2016 – December 2017





Main activities

- Techniques for multi-source remotely sensed data fusion;
- Development of new classification algorithms for urban mapping using high resolution remotely sensed data;
- 3D modeling of urban features based on high resolution remotely sensed data;
- Development of an urban green space evaluation model;
- Studying the urban green space parameters quantitative retrieval technology;
- Generation of the Normalized Height Model (NHM);
- Collection of LiDAR data on urban areas;
- Collection of DEM (Digital Elevation Model) on urban areas;
- Generation of DSM (Digital Surface Model) from LiDAR data;
- Generation of the Normalized Height Model by subtracting the DEM from the DSM;
- Image segmentation algorithms;
- Design of a robust segmentation algorithm for urban feature segmentation;
- Segmentation accuracy assessment;
- Extraction of Urban Buildings;
- Building mapping;
- Generation of Building Height model;
- 3D modeling of urban trees using LiDAR;
- Urban green mapping;
- Tree detection and the 3D modeling of the urban trees;
- Urban green mapping using Multi-spectral images;
- Machine learning techniques for classification of urban green;
- Shadow detection and removal;
- Accuracy assessment.

Results

Develop an evaluating system for measuring the quality of the urban environment using remote sensing technology.

Probe the relations between green space and other environmental elements based on the space-time multi-scale urban green space model.

Demonstrate the urban green space monitoring technology among different cities.

Applicability and transferability of the results

The project is expected to exchange the GIS & RS technologies in evaluating urban eco-environment of both countries to validate that the established urban eco-environmental model can be suitable for both countries.

The expected results will provide the local governments with the change direction of local urban ecological environment, and be benefit for the environmental management or policies. It will help the sustainable urban development works.

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