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Real Estate Monitoring System Based on Remote Sensing and Image Recognition Technologies

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Abstract

Geoinformation are changing fast, therefore a change detection of real estate must be processed in short time. The increasing resolution of sensed geospatial data creates critically important to develop high performance computing solutions to process geospatial information.

The topic of scientific work is the real estate monitoring system based on image recognition and remote sensing technologies. System's practical application is automatic building recognition from LiDAR data using saliency based method, vector map generation and change detection in actual cadastral maps. The scientific work describes high performance computing solution and gives its performance comparison with traditional method.

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1. Introduction

Geographical information systems play essential roles in many fields (e.g. ecology, meteorology, logistic, business and land administration) for solving scientific, business and administration problems improving decision making procedures related with spatial data.

If geographical information systems are tools to visualize, to analyze, to process and to store spatial information, the full life cycle of intelligence is complex process, which can be broken into two stages: data collection and data analysis; where both processes are equivalently important to provide the precise and valuable intelligence results (e.g. meteorological and hydrological forecasting models, strategic plans or analytical reports).

This scientific paper encloses the sphere of the geospatial data acquisition process and the automatic interpretation of collected geodata in land administration field, where the industrial research was aimed to evaluate, verify and validate automatic recognition system from two points of view: processing speed of geospatial data and its recognition accuracy; with a goal to determine the significant improvements for the existing system and applied methodology.

2. Massive cadastral data actualization and its application in land administration domain

The proposed system was developed considering the whole life cycle of geospatial intelligence, which is required to provide the qualitative decision-making process in land administration domain (see Fig. 1). The system is constructed to prepare the automated building recognition process from remote sensing data, that is the most significant step to organize the massive and operative geospatial data actualization.

The geospatial data actualization plays three important roles for land administration process:

- To provide actual and quality information for land administration decisions
- To provide information for new land administration tasks
- To evaluate the previous land administration activities

The system produces the vector layer of buildings, which is intersected with actual cadastral map using the vector overlay analysis with spatial relation “exclusive or” to detect the changes of real estate.

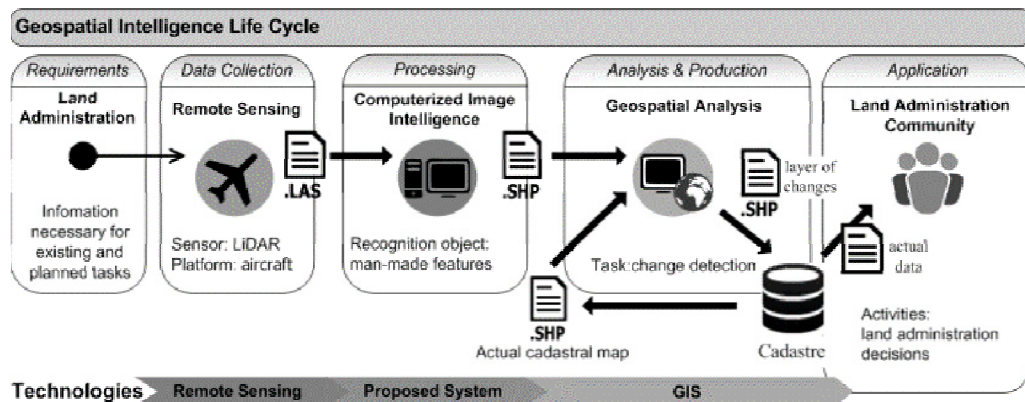


Fig.1. Cadastral data actualization and its application.

3. Requirements for information in land administration processes

Effective land administration should deal with various aspects of real property, including land and buildings and constructions, to cover different needs of land management. It should embrace sectors of interest like land as resource, security of ownership and tenure, support for land and property taxation, security for credit; development

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