ISPRS Technical Commission I Symposium, Sustaining Land Imaging: UAVs to Satellites
17 – 20 November 2014, Denver, Colorado, USA, MTSTC1-222

Automatic building-based map updating using classification-based change detection and snake algorithm.

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Keywords: Automatic map updating, Change detection, Classification, Google Earth imagery, Snake algorithm.

As the earth features and subsequently their locations become interested as many aspects in various science fields that are related with the earth features and their positions, the necessity of the mapping for earth increased. Access to these maps makes it possible to monitor the objects and their relative earth coordinates at certain time that they are mapped. With rapid developments of the society, the requirements to monitor the timely mapped data increase. Therefore, updating the maps that illustrate the changes in the map objects is needed.

In this study, we proposed a novel automatic building-based map updating method through change detection using an automatic supervised classification. We used the new high resolution Google Earth image to update the building maps. Our proposed method has three main steps: 1- Find the old building regions in the up-to-date high resolution Google earth image to collect the training areas for starting the fuzzy C-means supervised classification algorithm using the old vector map data. 2- Detect changes using simple subtracting operations to find the newly constructed building regions. 3- Extract the final building boundaries using GVF snake after conducting simple morphological operations to remove the noises. The GVF snake has been seeded using the initial boundaries which resulted in pervious steps, and the edges of the high resolution Google Earth image is used as external forces to deform the active contours toward exact building boundaries.

The experiments are performed on set of high resolution Google Earth images which are acquired from various urban and sub-urban areas of the Ankara, Turkey. Preliminary results illustrated that this method is efficient in extracting and updating building maps and gave above 70 percent overall accuracy in detecting buildings with over 90 percent overall shape accuracy in extracting detected buildings.