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LEGION SEMENTATION FOR BUILDING EXTRACTION FROM LIDAR BASED DSM DATA

C. Liu[1,2], B. Shi[1,3], X. Yang[1], and N. Li[1]
[1]Department of Survey and Geo-Informatics, Tongji University, Shanghai, China
[2]Key Laboratory of Advanced Engineerig Surveying of NASMG, Shanghai, China
[3]Urban Information Research Center, Shanghai Normal University, Shanghai, China

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Abstract. Recently, a neural oscillator network based on biologically framework named LEGION (Locally Excitatory Globally Inhibitory Oscillator Network), which each oscillator has excitatory lateral connections to the oscillators in its local neighbourhood as well as a connection with a global inhibitor, has been applied to segmentation field. The extended LEGION approach is constructed to extract buildings digital surface model (DSM) generated from LiDAR data. This approach is with no assumption about the underlying structures in DSM data and no prior knowledge regarding the number of regions. Instead of using lateral potential to find a major oscillator block in original way, Gray Level Co-occurence Matrix (GLCM) homogeneity measuring DSM height texture is applied to distinguish buildings from trees and assist to find LEGION leaders in building targets. Alongside the DSM height texture attribure, extended LEGION can extract buildings close to trees automatically. Then a solution of least squares with perpendicularity constraints is put forward to determine regularized rectilinear building boundaries, after tracing and connection the rough building boundaries. In general, the paper presents the concept, algorithms and procedures of the approach. It also gives experimental result of Vaihingen A2 region by the ISPRS text project and another result based on a DSM data of suburban area. The experiment result showed that the proposed method can effectively produce more accurate buildings boundary extraction.

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