Extraction of urban parameters from 3D Point-Cloud within GRASS

C.Rebelo\(^{(1)}\), A. I Rodrigues\(^{(1)}\), B. Neves\(^{(1)}\), J.António Tenedório\(^{(1)}\), J.Alberto Gonçalves\(^{(2)}\)

\(^{(1)}\) e-GEO Research Centre for Geography and Regional Planning, Faculdade de Ciências Sociais e Humanas FCSH, Universidade Nova de Lisboa, Avenida de Berna 26-C, P 1069-061, Lisboa, crebelo@fcsh.unl.pt, brunomaneves@fcsh.unl.pt, amrodrigues@fcsh.unl.pt,

\(^{(2)}\)Faculdade de Ciências, Universidade do Porto, jagoncal@fc.up.pt

ABSTRACT

Nowadays, efficient technologies like airborne systems with active or passive sensors, required robust and optimized geoprocessing models to acquire geographical information of urban areas, such as the urban parameters associated to buildings. The multiple stereo matching processing of aerial images captured by Unmanned Airborne Systems (UAS) enables the acquisition of dense georeferenced 3D point-cloud. This technology has revealed a great potential for a variety of applications. However, it lacks the evaluation in extraction of urban parameters that involved a third dimension.

This work addresses the use of UAS 3D point-cloud in a small urban area of the Lisbon region for the extraction of urban parameter - building façade height. The development of one methodology to the extraction and evaluation of building facade height parameter was performed using free and open source software. Two important tasks were performed: i) the creation of a geoprocessing model within graphical modeler of GRASS 6.4.2. GIS (Geographic Information Systems) to the extraction of UAS points that will define the building façade height; and ii) statistical evaluation of this urban parameter in R software. The use of specific filtering algorithms implemented on GRASS LiDAR library were very useful in the processing of UAS point cloud data for the extraction of urban parameter building façade height.

Key words: UAS, Building Façade Height, Urban Parameter, Evaluation, Buildings