

Building 3D Digital Models For Cities in Large Topographic scales in GIS *

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Abstract

3D GIS can be realized as an actual building platform of the urban space. This research develops automated 3D urban models that fit large-scale digital photogrammetry. Originally, modeling used manual or semi-manual techniques, and there is a need to for a development of an approach that automates the transformation of vector linear data, optimized by digital photogrammetry stations to create the 3D volume model in 3D GIS. This approach consists of three main phases: roof modeling, wall modeling and volume structuring. During the first phase, local and conditional "Delaunay Triangulation" method is used to deal with the majority of roof types regardless of its geometry. The second phase is completely automated to create the walls by the vertical projection (Top-Down) of the outer line of the roof into the Digital Terrain Model (DTM), and then by the selection of the bottom base level as the default level. Finally, different elements of the structure can be aggregated using spatial relationships (many-to-many) already supported by GIS software. The new approach is created and completely automated. It doesn't require roof geometric-types library, which asserts the GIS is a valid platform to build, to view and to store 3D urban models.

Keywords:

3D Digital Model, Digital Aerial Photogrammetry, Stereoscopic Viewing, LIDAR, GIS, CAD, RDBMS, Vector, Delaunay Triangulation.

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