

Generation of Spatial Information by Digital Photogrammetry Technique Using Objects' Constrains

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Key words: Geoinformation/GI; Photogrammetry; Spatial planning; object constrains; digital correlation matching; digital surface model

SUMMARY

The aim of the research is to analyse the possibilities for creation of Digital Object Model using set of multiple images. The comparison is made between the properties of model created by laser scanning and through automatic generation of model by automatic image matching from set of digital images. The problems of image matching and model creation in situation of invisibility of part of the object or terrain in vicinity of artificial objects in urban scenes are formulated and overcome. The influence of shadows is taken into account too. A complex model of buildings and surrounding terrain is suggested that is suitable for mapping, orthorectification and 3D modelling. The created model consists of DEM of the terrain and Spatial Digital Models of artificial objects on the territory. Different properties of two types of models are defined to produce the parts of the formulated models. The suggested model has hierarchical structure and describes main part of buildings as walls, roofs and subparts like balconies, staircases. The constrains defined by the features of terrain surface and man-made objects are defined and used for proper forming and verification of the complex spatial model. They are applied to separate the images into sub-parts, corresponding to terrain and artificial objects like buildings and civil engineering constructions. The image analyses technique is applied for image understanding based on currently defined complex model. Image matching and correlation technique are used for automatic extraction the model of terrain and artificial objects taking into account objects' constrains. The suggested method enlarges the possibilities for DSM generation and orthorectification with systems for digital photogrammetry for urban areas. The suggested method could be used in procedures for archiving and dynamic visualization of architectural objects too. The produced model is intended for purposes of spatial planning and for creation of digital surface models for digital orthophoto rectification.