

ACCURATE POSE ESTIMATION OF UNCALIBRATED CAMERA FOR BUILDING GEOMETRIC MODELING

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ABSTRACT:

Accurate 3D models of buildings in urban area are needed for a variety of applications, such as post-disaster assessment, urban planning, etc. Many methods for extraction of such 3D models from aerial images have been developed in recent years. However, the model extraction from aerial images is a time consuming process and cannot be real-time. On the other hand for aerial images, the walls of buildings are either not visible or seen at a very low resolution. We need to utilize images taken from the ground to obtain accurate façade textures. As we know, in the researches of scene recovery, it is important to obtain the post and location of each view taken by camera (i.e. orientation parameters). This paper presents a method of high-precisely estimating the pose parameters of images from common digital camera. In urban area, there exist abundant geometric feature in the surfaces of buildings, such as horizontal, vertical parallel lines and orthogonal lines, planes. According to these special features, this paper addresses a novel algorithm based on vanishing points of multi-view to accurately solve the interior and exterior orientation parameters of each view. Thus, the pose and location of each image can be recovered. Finally, according to correspondence of lines, the outlines of buildings can be obtained rapidly by using geometric constraint based bundle adjustment. Moreover, based on these parameters, this paper also presents object-space based line matching algorithm. With this algorithm, we can recovery the outlines of buildings in building scene.

TOPIC: Geometric modeling

ALTERNATIVE TOPIC: Image processing and pattern recognition