Technological Educational Institute of Athens

School of Technological Applications

Department of Surveying

Comparison and evaluation of feature points detection algorithms on images

Gerasimos Matidis

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Abstract

The transition of Photogrammetry in the digital period, was the first essential step for the automation of the photogrammetric procedures. Since then, the research in this field, but also in the relative field of computer vision, is highly oriented towards issues of image processing and particularly the procedure of image matching. This is very reasonable if someone considers that the issue of establishment of image correspondences arises in almost every photogrammetric application between two or more images.

Already from the early '80s, algorithms for automatic feature points detection have started to appear. Over the years, improved algorithms have been developed, trying to be more resistant to geometric changes, like existence of rotation, scale difference, as well as changes in illumination, or existence of noise on the images. The purpose of this diploma thesis is to examine some of these and to compare especially the algorithms of SIFT and SURF, which are being used widely in applications of image matching, because of their efficiency and reliability. In the literature, there are numerous references about this comparison, but they are mostly focused on the performance of the algorithms regarding the number and the precision of matched points. In this contribution, an additional aspect of great photogrammetric importance is included in the comparison, this of evaluation of the distribution of points on the images.