Photogrammetry: an “old new” science, or
What links the renaissance painters and spaceborne imagery?

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Since the invention of cameras human imagination was fascinated by the potential of acquiring spatial information directly from them. Such information can benefit a wide range of applications in a wide variety of domains. Photogrammetry is the scientific discipline handling the conversion of image data into positional information. Primarily it is based on principles of projective geometry. While basic concepts of projective geometry were known already to the great renaissance painters, technological and scientific advances, particularly in recent years, have carried this field into new territories.

Advances in computing power and digital photography have contributed to revolutionizing this field. Nowadays acquired images can be transported directly into computer disks and be further processed there by image processing tools. Nonetheless, so far no system/software that performs autonomously photogrammetric processes has been developed. Such system that can extract spatial information from image sets (acquired by spaceborne, airborne, and terrestrial platforms) poses a great challenge. Among the main challenges are the extraction of conjugate features between images, the computation of the camera pose in space at the time of the image acquisition in an efficient manner, and the reconstruction of the three-dimensional space.

The research discussed in this presentation has made significant progress towards the automation of the photogrammetric process. During the recent International Conference on Computer Vision (ICCV) the system we developed has competed with others that were developed by leading groups in the computer vision community and won the third place. This talk will present the principle underlying concepts of the system as well as potential application for which such system can be found useful.