

City Modeling Using Low Cost Aerial and Terrestrial Imagery

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Most photogrammetry tools that measure the structure of the earth surface are based on high-precision devices. High-end cameras and LiDAR in conjunction with differential GPS and IMU units capture large areas from airplanes or satellites. On the other side there exist sophisticated devices to obtain similar results from the ground, e.g. vehicles with image, LiDAR, position and orientation sensors as for instance the Google StreetView car are used to obtain the 3D structure from the ground. Both types are similar in that the orientation and position of the captured images can be known to a high precision from external sensors. Images based approaches to find the position and orientation of images are usually not necessary to obtain results with a reasonable accuracy.

When considering low cost solutions, based on UAV's or unordered sets of ground images, computer vision and photogrammetry tools need to be explored to overcome the relatively bad quality of external position and orientation sensors. Furthermore, multi-view stereo techniques can be used to replace expensive LiDAR scans.

This talk will introduce the work of our lab to efficient and scalable approaches that explore the image content to obtain accurate 3D measurements. We show that these techniques can add value to low cost image capturing devices such that they can compete with expensive 3D measurement devices.

For more details on this research please see
<http://cvlab.epfl.ch/~strecha/demos/largescale/>.