

# Automatic Photo-to-Terrain Alignment for the Annotation of Mountain Pictures

Lionel Baboud, Martin Čadík, Elmar Eisemann, Hans-Peter Seidel

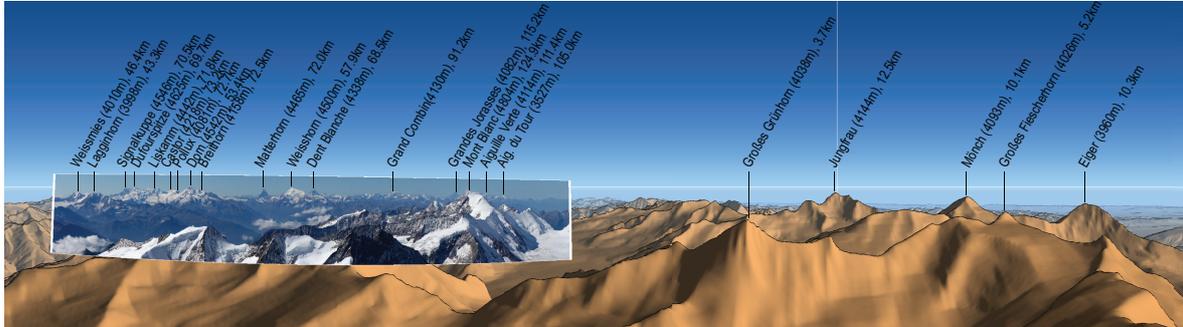


Figure 1: An example of annotated photograph superposed on synthetic panorama.

The researchers of the Max-Planck-Institut für Informatik, in collaboration with Télécom Paris-Tech, finalized their work on automatic alignment that will be presented on the 21st of June at the prestigious CVPR conference. The goal of this method is to register arbitrary mountain pictures and movies from the internet into a Google-Earth-like 3D Model. Such a technique could be used by travelers to transform their pictures into a virtual and realistic 3D experience (like Google Streetview). In particular, the system could also be used to automatically highlight elements in the image, such as the travel path taken, names of mountains, or other landmarks. The work could further be used to augment the realism and level of detail of applications such as Google Earth by transferring the information from photo and movies directly onto the 3D model.

The core of the method is to find an accurate position and orientation of the camera that was used to capture the image. To this extent, the recording position is calculated from an annotated 3D model by finding, in an efficient and robust way, the best match between significant edges (e.g., silhouettes) in both sources. While such an approach seems usually infeasible due to its computational complexity, a careful mathematical reformulation enabled the practicality of the solution.

To validate the approach, many pictures were used from common photo (Flickr) and movie (Youtube) databases. For many of these pictures, localization information is missing or very coarse which makes it difficult to recognize where and what was taken in the picture. Now, in many cases, it becomes possible to derive the missing facts.

The method might even become of interest for space travel because some planets do not allow the use of GPS or a compass (due to a missing magnetic field) which makes it necessary to rely on alternative localization methods, similar to the here-presented one.

You can find photo material and further documents concerning this project for free at:

<http://www.mpi-inf.mpg.de/resources/photo-to-terrain/>

