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Geo-Localization of Street Views with Aerial Image Databases

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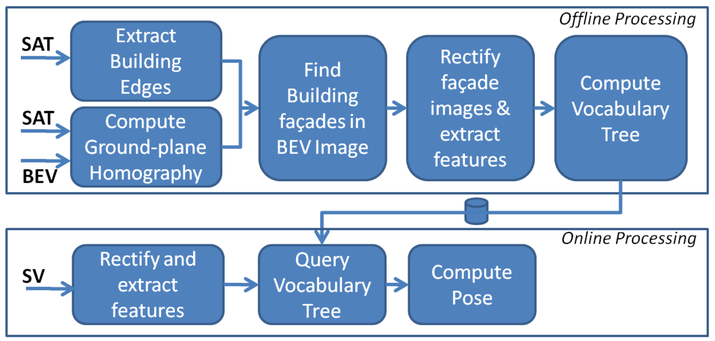
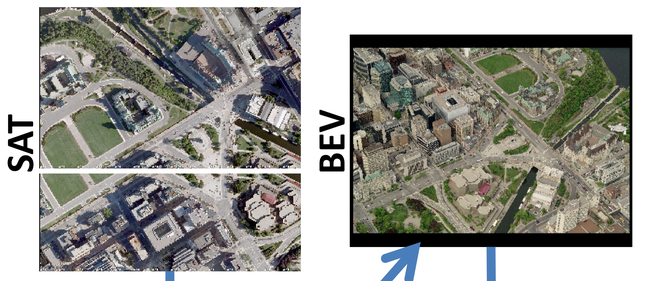
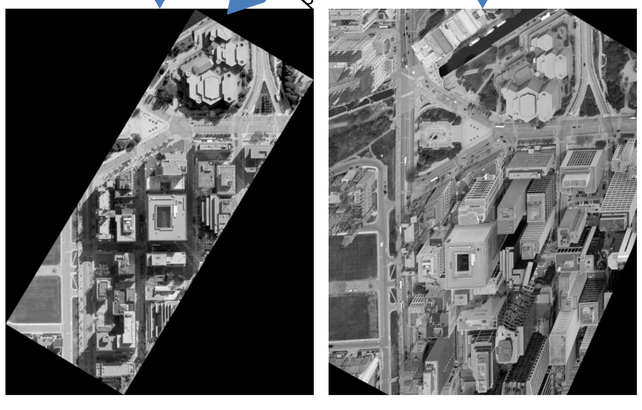
Overall System



SAT-BEV Alignment





Ground-aligned SAT-BEV

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Geo-localize *ground-level* images in urban areas using geo-referenced *satellite (SAT)* and *oblique aerial (Bird's-Eye-View, BEV)* images.

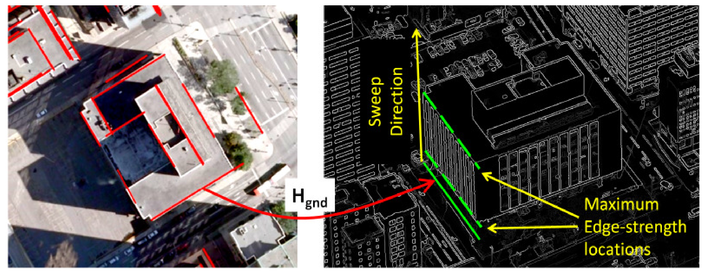
Key insights:

1. Correspondences between satellite and oblique aerial images are used to extract building facades, and
2. Building facades are matched between oblique aerial and ground images for geo-localization.

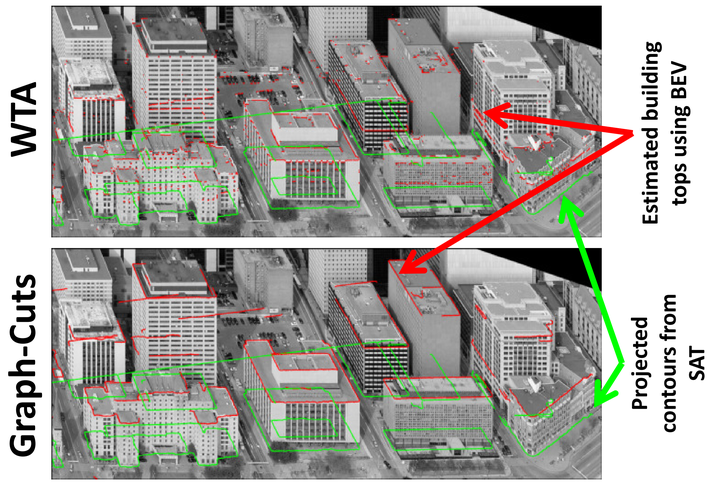
Key contributions:

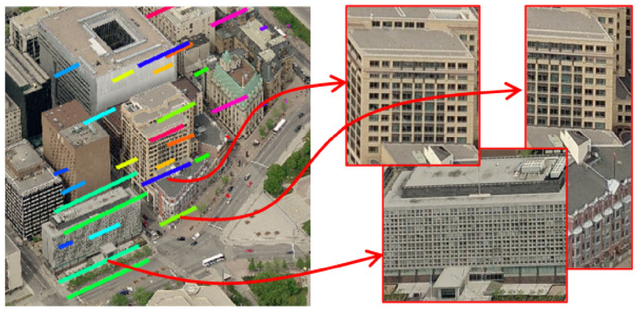
1. A novel method for extracting building facades using building outlines;
2. Correspondence of building facades between oblique aerial and ground images without direct matching; and
3. Position and orientation estimation of ground images.

Façade Extraction

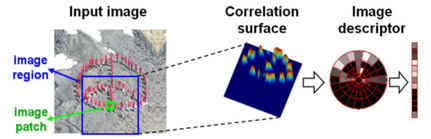


Building contours in SAT **Canny edges in BEV**



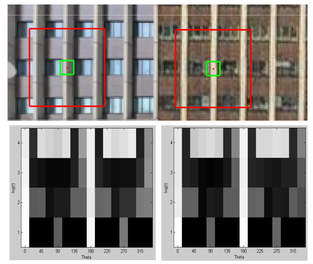


Feature Detection & Matching

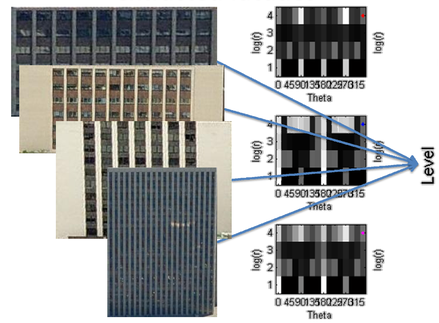


Self-similarity descriptor computation

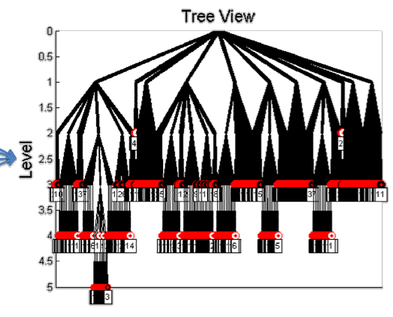
[E. Shechtman and M. Irani. Matching local self-similarities across images and videos. In CVPR, 2007]



S-Sim Descriptors from extracted facades



Adaptive Vocabulary Tree data-structure



Query Processing & Pose Estimation

Compute F using 7-point correspondence