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Image Geocoding as a Service

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Abstract

Driven by the ambition of a global geocoding solution, in this paper we present the architecture of an image geocoding service. It takes advantage of the ubiquity of cameras, that are present in almost all smartphones. It is an inexpensive sensor yet powerful, that can be used to provide precise location and orientation.

This geocoding service provides an API similar to existing ones for place names and addresses, like Google Geocoding API. Instead of a text based query, images can be submitted to estimate the location and orientation of the user. Developers can use this new API, keeping almost all the existing code already used for other geocoding APIs.

Behind the scenes, image features are extracted from the submitted photograph, and compared against a huge database of georeferenced models. These models were constructed using structure from motion (SFM) techniques, and heavily reduced to a representative set of all information using Synthetic Views. Our preliminary results shows that the pose estimation of the majority of the images submitted to our geocoding was successfully computed (more than 60%) with the mean positional error around 2 meters.

With this service, an inexpensive outdoor/indoor location service can be provided, for example, for urban environments, where GPS fails.

Academic Discipline and Sub-Disciplines : Computer Vision; Geocoding

Keywords : Structure from Motion; Geocoding