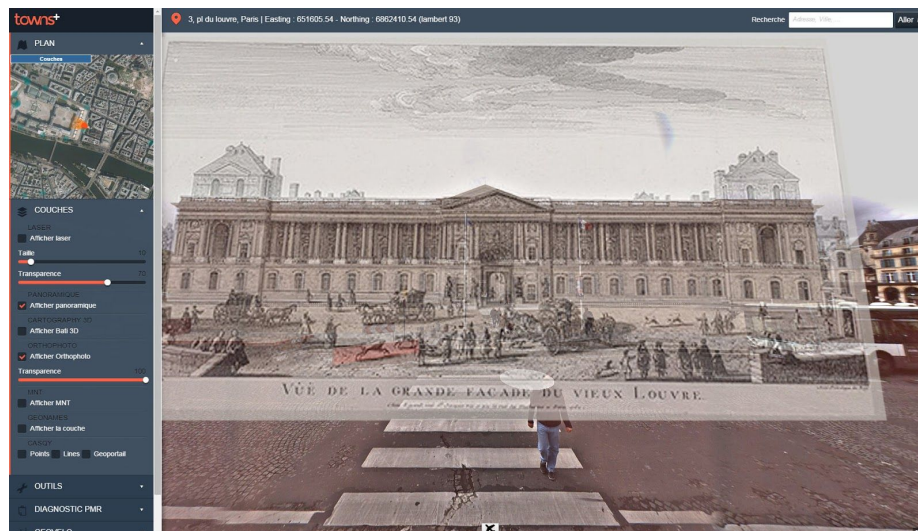# *Interactive image geolocalization in an immersive web application*

Master internship 2018
IGN - LaSTIG Lab - MATIS group

KEYWORDS

Computer Vision, Image Based Rendering, Interaction, 3D, WebGL, Javascript

Interactive registration of an historical postcard relative to recent street level imagery.

CONTEXT

This internship is funded by the French research project (ANR ALEGORIA) which targets the valorization of large national iconographic collections, composed of photographs and postcards from vertical and oblique aerial imagery as well as terrestrial/street-level acquisitions. These collections are very rich in terms of content and span an extended historical period from between-wars to today. The ALEGORIA project focuses on indexing, interlinking and visualizing these datasets.

The target visualization is an immersive 3D web application that enables the discovery and continuous navigation within these interlinked image collections through space and time. This immersive 3D navigation requires the georeferencing (6DOF pose estimation and camera calibration) of all images. Their fully automatic georeferencing may however be challenging if not intractable due to the size and heterogeneity of these collections in terms of content, sensors, image quality, changes of over time... The purpose of this internship is to design and implement an interactive methodology to efficiently and semi-automatically estimate the georeferencing of new images using intuitive interactions in the immersive 3D navigation of already georeferenced datasets. This interactive procedure is also expected to be very useful to more accurately register and georeference images which automatic georeferencing is inaccurate.

SUBJECT

The proposed approach is that for each new image with unavailable or inaccurate georeferencing, the user will navigate immersively in the collection of georeferenced images (rendered using image-based rendering techniques) to a matching, but approximate, viewpoint, possibly aided by preliminary inaccurate pose estimates. Then the user will be able to give interactive hints to refine the pose and calibration of the new image (scaling, perspective, lens distortion, point correspondences with other 2D image points or points from 3D models...). The proposed method should be interactive and should be able to report and propagate the uncertainty of its estimates.

After a review of existing state of the art methods, an approach will be proposed, implemented and evaluated within the open-source web application iTowns which already implements immersive navigation using image based rendering and basic photogrammetric tools (www.itowns-project.org) .

APPLICATION SUBMISSION

Send a **single PDF** to the contacts, **as soon as possible**
- Resume
- Motivation letter
- Transcript of grades from the last two years of study
- A list of courses followed and passed in the last two years
- Links to past realizations (projects, reports…)

ORGANIZATION

Duration : 3 to 6 months.

Location : IGN (the French Mapping Agency), LaSTIG lab, MATIS group. Paris area, Saint Mandé (73 avenue de Paris, métro 1, RER A), France. MATIS is one of four IGN's research groups of the LaSTIG research laboratory of IGN, and hosts over forty researchers working in the field of photogrammetry, computer vision, computer graphics and remote sensing.

PhD Position : the ALEGORIA project is funding a PhD position on the image based rendering of the images georeferenced by this internship, which may be an ideal follow-up after this internship !

SKILLS

Bac+5 in computer science, applied math or geomatics (master or engineering school).
Good knowledge of photogrammetry/computer vision and computer graphics.
Good skills in JS/WebGL programming.

CONTACTS

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REFERENCES

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