Mapping Pointclouds to OSM Building Outlines

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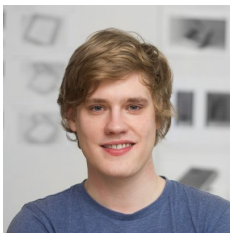

I. Description of the project

The project aims to map pointcloud data of outdoor city environments to *OpenStreetMap*[1] (OSM) building outlines. The pointcloud data is generated by using the Structure-from-Motion technique to extract 3D data from multiple photographs taken from different viewpoints. The photographs are taken by consumer grade cameras and processed by software like VisualSFM.

To enrich the pointcloud data we want to map the facade outlines of the pointcloud to rich data that we get from OpenStreetMaps. This will allow us to identify, for example, shops and to tag different houses which might not work correctly without OSM data.

Furthermore, it is in the scope of the project to automatically extract building heights from the pointcloud data. Once the data is aligned to OSM, it will be possible to get absolute lengths from the pointcloud data. As OSM is a collaborative effort, the software might enable us to contribute back the building height data.

II. Work packages and timeline

The idea for matching the outlines is to break it down to a 2D problem and use the Iterative Closest Point technique to find the best match between the building outlines and the pointcloud. For that, the pointcloud will be reduced to a two dimensional pointcloud and the building outlines will be discretized to a number of points (i.e. a pointcloud will be interpolated from the polygons that are existing in OSM). A state-of-the-art ICP, such as libpointmatcher [1] will then be used to align those two pointclouds.

III. Outcomes and Demonstration

Give detailed information on the expected outcome of your project and the experiments you plan to test your implementation. If applicable, describe the online or offline demo you plan to present at the end of the semester.

Instructions:

- The document should not exceed two pages including the references.
- Please name the document **3DPhoto_Proposal_Surname1_Surname2.pdf** and send it to Yağız in an email titled **[3DPhoto] Project Proposal - Surname1 Surname2**, filling in your surnames.

References

[1] François Pomerleau, Francis Colas, Roland Siegwart, and Stéphane Magnenat. Comparing ICP Variants on Real-World Data Sets. *Autonomous Robots*, 34(3):133–148, February 2013.

[1] osm.org

1947	AT and T Bell Labs develop the idea of cellular phones
1968	Xerox Palo Alto Research Centre envisage the 'Dynabook
1971	Busicom 'Handy-LE' Calculator
1973	First mobile handset invented by Martin Cooper
1978	Parker Bros. Merlin Computer Toy
1981	Osborne 1 Portable Computer
1982	Grid Compass 1100 Clamshell Laptop
1983	TRS-80 Model 100 Portable PC
1984	Psion Organiser Handheld Computer
1991	Psion Series 3 Minicomputer