STSM:

3D Modelling and Semantic Enrichment in Cultural Heritage

REFERENCE: Short Term Scientific Mission, COST TD1201
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Abstract

The purpose of the STSM was to gain experience in the usage of different software tools in the field of photogrammetry. Apero/MicMac is one of them. It is an open source tool for Structure from Motion (SfM) developed at the Institut Géographique National Paris which I compared with the proprietary software Agisoft Photoscan we are using at our institute (i3mainz). The other one is Aioli, whose purpose is the extraction of point clouds from single parts of an object by using MicMac as basis.

I tested the tools by data sets produced by my home institute (Roman arch, which was formerly part of a portico, recorded with a TLS and a DSLR for photogrammetry (SfM) (Fig.1). My own experience on 3D data acquisition and processing is the basis to understand the tool and evaluate which tool provides the best results by comparing the generated data sets.
A comparison of both point clouds shows that MicMac provides very good results in details of the CH object. It is supposed that having more options to choose the parameters for the processing steps on your own within MicMac leads to this good results. For example you can choose the way the Tie Point detection or the alignment of the images should be executed. This is not possible within Agisoft.

All in all, the comparison of Agisoft Photoscan and Apero MicMac shows that Apero MicMac is a good alternative to Agisoft. It illustrates what is possible with open source tools and that it is a good alternative to proprietary tools which is important especially for projects with limited budget. Guideline in English were produced helping to get familiar with the tool also for non-experts. Furthermore, the understanding about the processes and algorithms used within SfM techniques will be integrated into the CHOSCH^{KR} ontology.

Additionally, I was able to use the software Aioli. This tool allows the visualization of a selected point cloud out of the entire point cloud(Fig.2). The selected point cloud can be used for example to do further analysis on details.
I chose two specific building stones from the inner part of the arc for testing. To achieve a single point cloud (e.g of a single building stone) it is necessary to select this part (i.e. the building stone) with a polygon in one photo so that aioli can start to

detect this part in all other photos. When it is detected in all photos it is possible to export this part as a point cloud in the annotated colour or in RGB.
Related to COSCH tasks of WG 5 the output of the tool Aioli would be very useful for visualisation of 3D point clouds. With its ability to extract single parts of point clouds and to name and color them it can be very helpful for visualisation tasks e.g. related to 3D reconstructions .

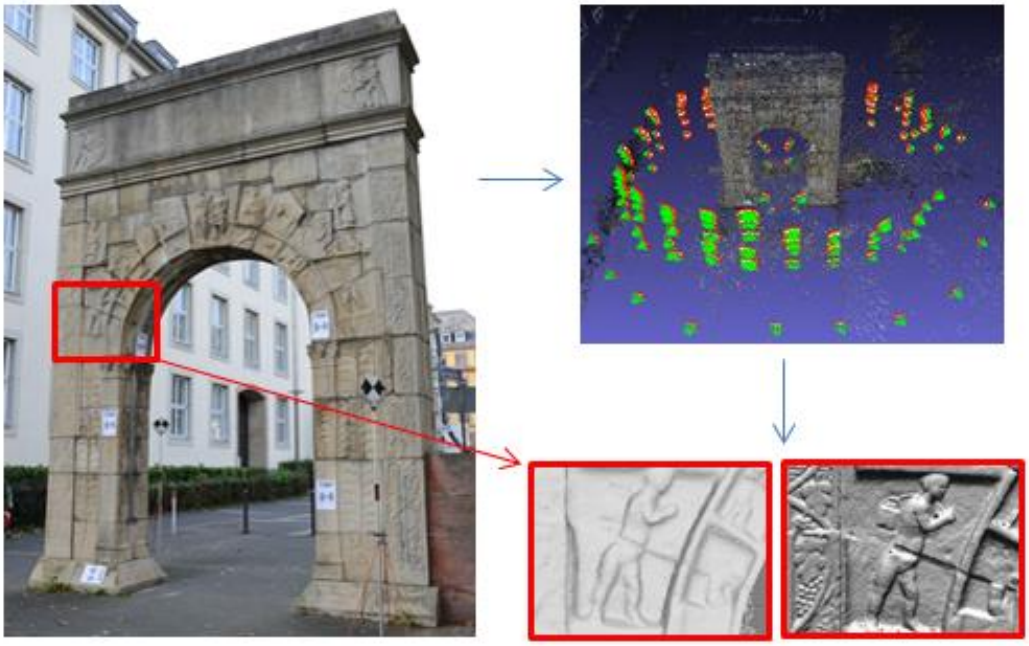

Figure 1: Dativius-Victor-Arch (Mainz, DE) as case study for the comparison of Agisoft Photoscan (left red box) and Apero MicMac (right red box).

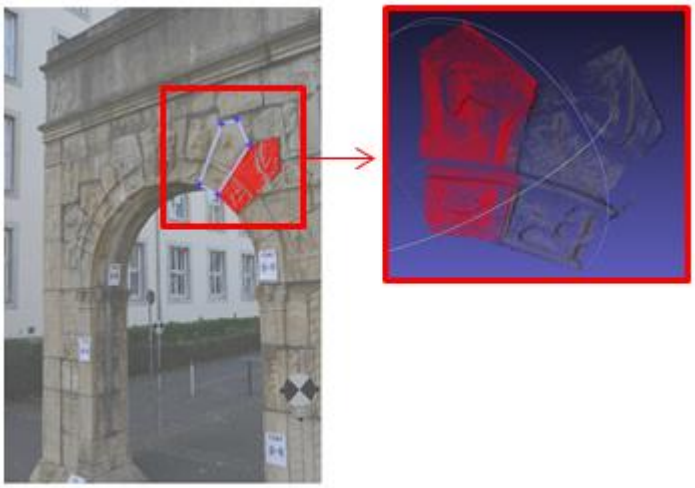

Figure 2: Extracted point cloud as result of using Aioli.