Digitizing Real-World Scenes from Images

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Project description

3D computer models are a great way to visualize the real world and more and more applications are created to use these models in for example mobile apps, virtual reality and other applications. The Floriade project in Almere wants to be able to create a lightweight 3D model of their project, that different developers can use to realise all kinds of innotiative applications. To create these 3D models we have developed an open source software called **NARUX3D**, that creates 3D models from 2D images. With NARUX3D the people from Floriade will be able to capture the developement of their project in 3D on different moments in time.

Using images from handheld cameras

Using images from UAS (drones)

Creating point clouds in the computer

Creating efficient 3D computer models

The C/C++ programming language was used for creating the software

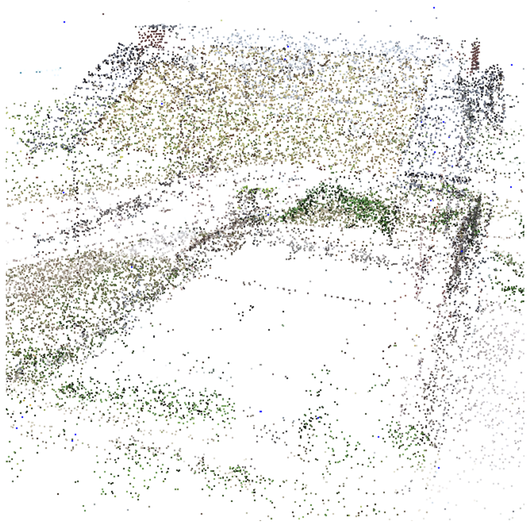
An intuitive graphical user interface

Image Matching

4 matching keypoints (there are many more)

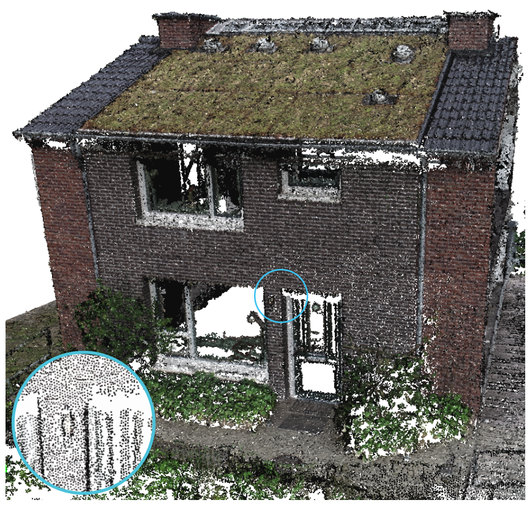
Images that are taken with either a handheld camera or with a UAS (drone) will be matched via the Scale-Invariant Feature Transform (SIFT) algorithm. The result is matching key points between every two images.

Structure from Motion



With the output of the image matching a 3D sparse point cloud can be created. To do this, the Structure from Motion (SfM) method is used.

Multi-View Stereo



From the sparse point cloud, a dense point cloud is created. To do this a multi-view stereopsis (MVS)algorithm is used.

Surface Reconstruction

From the dense point cloud, surfaces are reconstructed. For straight building objects the polyfit method is used to fit planes to the point cloud. For more curved building objects the Poisson reconstruction method is used to create smooth surfaces.

Geomatics Synthesis Project

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