

Structure from Motion - Quantitative Evaluation of structure from motion software for the 3D-reconstruction of traffic accidents

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SUMMARY

In case of severe traffic accidents, German Police is required to provide a sketch of the accident location. Therefore, police authorities need tools helping them to measure the affected scene in a short period of time to reduce the traffic obstructions while maintaining the demanded statutory accuracy. With the progress in the fields of computer vision and digital photogrammetry new and simple low-cost methods can be established for accurate data acquisition.

In an ongoing research project at the University of Applied Sciences Dresden structure from motion techniques are used to generate a 3D-reconstruction of the accident location as a first step. Afterwards the information contained in the gained dense point cloud has to be extracted and converted into a 2-dimensional vector-based map or 3-dimensional model that can be used in court. This requires that distinctive objects for the mapping of the traffic scene can be located with a high accuracy and on the spatially correct location.

This paper examines a series of structure from motion (sfm) packages regarding their capability to extract relevant information for the mapping of traffic accident locations. These packages include proprietary software as well as open source tools. Predefined criteria are applied to assess to which extend important scene features such as cars, traffic signs and traffic lights or curbs are reconstructed by the specific software package.

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