



Autonomous data corruption filter for 3D image reconstruction (20180303)

An autonomous data corruption filter algorithm for recovering 3D structure of an object from 2D images.

IP Status: US Patent Application Filed; **Application #:** 16/366,800

Applications

- Robotics and computer vision
- Virtual reality
- 3D imaging software
- Geographical surveyors, photogrammetric landscape surveys
- Mobile app for high accuracy 3D reconstruction

Overview

Recent outlier-robust methods have been proposed for camera location estimation and as a preprocessing step to improve their subsequent estimator. The state-of-the-art before this disclosure is 1DSfM algorithm. It's convergence to the global minimum, however, is not guaranteed, and it results in low inconsistency scores, producing inaccurate measures of corruption. Other methods such as least unsquared deviations (LUD) algorithm and the ShapeFit algorithm have shown limited ability of removing outliers.

Researchers at the University of Minnesota have developed an autonomous data corruption filter algorithm that significantly improves the accuracy of camera location recovery and 3D reconstruction. The algorithm, which can be applied to common 3D reconstruction pipelines as a preprocessor, detects the corrupted pairwise directions of pairs of cameras whose locations are unknown. This data cleaning procedure significantly removes the uncertainty resulting from the corrupted data. This algorithm does not solve the heuristic optimization problem like 1DSfM, thus it does not suffer from convergence to local minima. Instead, it uses a theoretically-guaranteed statistic to measure the corruption, and it is easier to implement. By removing corrupted data in a reliable and interpretable way, this intellectual property significantly improves the camera location estimation accuracy when combining with methods such as LUD or ShapeFit.

Phase of Development

Algorithm Validated and Software Beta Testing.

Key Benefits & Differentiators

- Autonomous and effective data corruption filter
- Improves camera location estimation
- Generates highly accurate data and better imaging reconstruction
- Easy to implement and can be used with many different reconstruction algorithms
- Significantly improves accuracy of camera location recovery and 3D reconstruction

Technology ID

20180303

Category

Software & IT/Algorithms
Software & IT/Image & Signal
Processing

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Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

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