Structure from Motion (SfM) Introductory Guide

843 Chris Crosby May 3, 2016 Structure from Motion (SfM) Photogrammetry 4993

Structure from Motion or SfM is a photogrammetric method for creating three-dimensional models of a feature or topography from overlapping two-dimensional photographs taken from many locations and orientations to reconstruct the photographed scene. This technology has existed in various forms since 1979 (Ullman, 1979), but applications were uncommon until the early 2000's (Snavely et al., 2008). The applications of SfM are wide ranging, from many subfields of geoscience (geomorphology, tectonics, structural geology, geodesy, mining) to archaeology, architecture, and agriculture. In addition to ortho-rectified imagery, SfM produces a dense point cloud dataset that is similar in many ways to that produced by airborne or terrestrial lidar.

This guide (attached below) is intended as a resource for using Structure from Motion in research and education applications. It does not detail the algorithms or mathematical background of the methodology, but rather how to use it in practice. The guide was developed as part of a set of resources for educators interested in integrating terrestrial laser scanning (TLS) and structure from motion into geoscience education.

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