**Creating and evaluating Digital Elevation Models from Satellite Imagery**

[R. Claesen](https://repository.tudelft.nl/person/Person_1435a03d-4102-4f91-9590-af20f5c8e703)

**Published Date**

16-07-2024

**Abstract**

This study explores the application of advanced photogrammetry techniques to enhance the accuracy of Digital Elevation Models (DEMs) derived from satellite imagery. It focuses on refining and integrating the photogrammetry pipeline to accommodate diverse satellite sources effectively. With recent advancements in photogrammetry and the expanding accessibility of satellite imagery, there is a growing opportunity for precise earth surface modeling. This research adapts a traditional photogrammetry pipeline to include state-of-the-art computer vision algorithms, specifically the DISK algorithm for feature detection and LightGlue for feature matching. These enhancements are complemented by tailored adjustments to camera models and projection matrices to suit the unique characteristics of satellite data.

The methodology emphasizes the modification of existing pipelines to optimize the handling of satellite images, incorporating sophisticated feature detection and matching technologies. The performance of these adaptations is rigorously evaluated through extensive analysis using satellite imagery across varied resolutions and environmental conditions. Results from the study indicate marked improvements in the fidelity and accuracy of the generated DEMs, which are substantiated by validation against high-resolution LiDAR ground truth data.

The refined pipeline effectively manages multi-source satellite images and produces terrain models of significantly higher quality, vital for robust geospatial analysis. This work not only bridges the gap between remote sensing and computer vision but also lays the groundwork for future research aimed at improving DEM generation from satellite imagery. This study proposes potential transformative practices in geospatial analysis and supports continued progress in fields such as environmental monitoring, urban planning, and disaster management.