3D Indoor Building Environment Reconstruction using calibration of Range finder Data - DTU Orbit (11/01/2019)

3D Indoor Building Environment Reconstruction using calibration of Range finder Data

Nowadays, municipalities intend to have 3D city models for facility management, disaster management and architectural planning. 3D data acquisition can be done by laser scanning for indoor environment which is a costly and time consuming process. Currently, for indoor surveying, Electronic Distance Measurement (EDM) and Terrestrial Laser Scanner (TLS) are mostly used. In this paper, several techniques for indoor 3D building data acquisition have been investigated. For reducing the time and cost of indoor building data acquisition process, the Trimble LaserAce 1000 range finder is used. The accuracy of the rangefinder is evaluated and a simple spatial model is reconstructed from real data. This technique is rapid (it requires a shorter time as compared to others), but the results show inconsistencies in horizontal angles for short distances in indoor environments. The range finder was calibrated using a least square adjustment algorithm. To control the uncertainty of the calibration and of the reconstruction of the building from the measurements, interval analysis and homotopy continuation are used.

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