Comparison of 3D SLAM for Quadrupedal Robot-based Scanning

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ABSTRACT

The rapid development of advanced robotic scanning and navigation technologies such as Simultaneous Localization and Mapping (SLAM) enables a more automated building scanning process. To enable a more efficient robot-based scanning, more evidence on advantages and limitations of different SLAM methods is needed. In this paper, we present the findings of a comparison study on the performance of two SLAM methods, including the depth camera-based SLAM and 3D LiDAR-based SLAM, on a quadrupedal ground robot. The SLAM navigational effectiveness and computing cost were compared and analyzed. The result shows that 3D LiDAR SLAM outperforms depth camera-based SLAM in point cloud modeling quality. More detailed spatial information is provided by the 3D point cloud model. On the other hand, depth camera SLAM completes modeling faster with relatively lower quality, which fits more in time-urgent tasks with lower model quality requirements.