Super Ray based Updates for Occupancy Maps

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Source Code: http://sglab.kaist.ac.kr/projects/SuperRay

Abstract

We present a novel approach, Super Ray, for efficiently updating map representations such as grids and octrees with point clouds. In this paper, we define a super ray for points as a representative ray to them that traverse the same cells. As a result, we achieve 2.5 times on average (up to 3.5 times) performance improvement over the state-of-the-art update method without degrading the representation accuracy.

state-of-the-art   ours
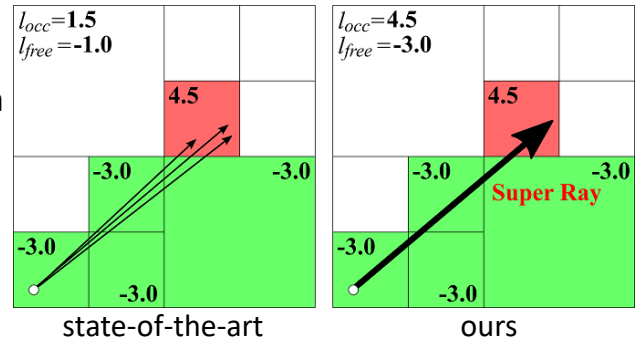
Main Contribution

- Key observation: traversal patterns of rays differ along the grid points
- Super ray is a representative ray for set of points that traverse the same cells
- Segments of mapping line are associated to the traversal patterns
- Our method is available in both 2-D and 3-D case
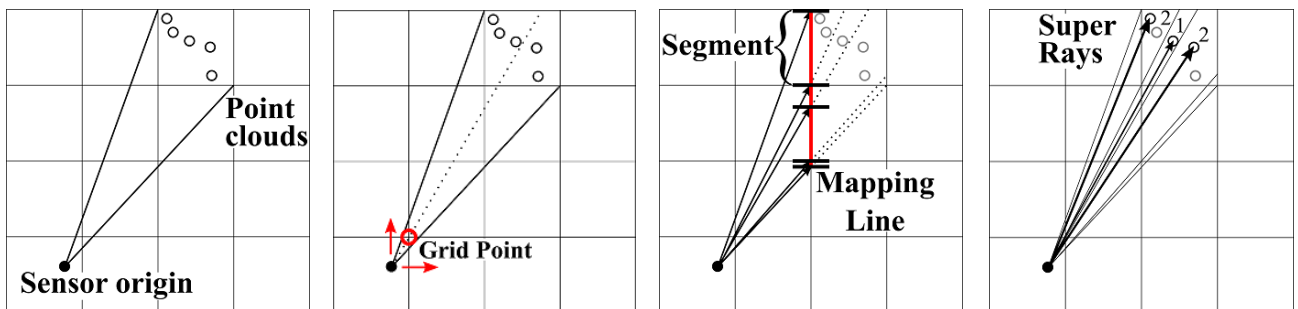
The process to generate super rays from point clouds using mapping line

Result

- Improve performance without degrading the representation accuracy by reducing the number of accesses to be updated
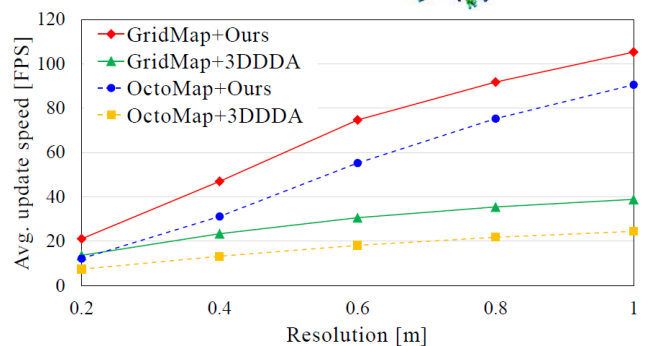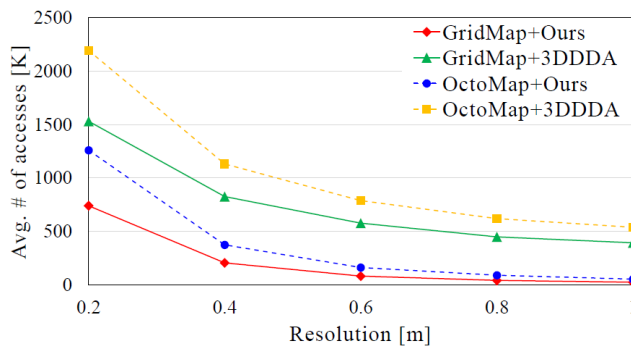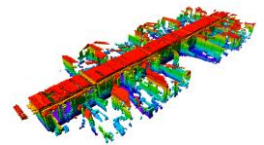
The result for the number of access (left) and update speed (right) with indoor benchmark