Elevated LiDAR system to Facilitate Autonomous Driving in a Factory Floor.

University of Oulu

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Task 1: Data Fusion

Point cloud maps from multiple LiDARs (up to 4) were merged together.
Different landscapes were tried out and the data point accuracy was +/- 10 cm.
Multiple point cloud maps taken from different angles to increase the details of the dynamic map.

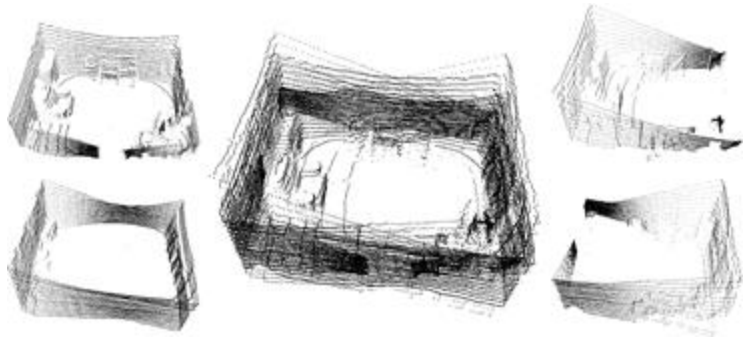

Fig 2. 3D map of a stationary environment using 4 point clouds

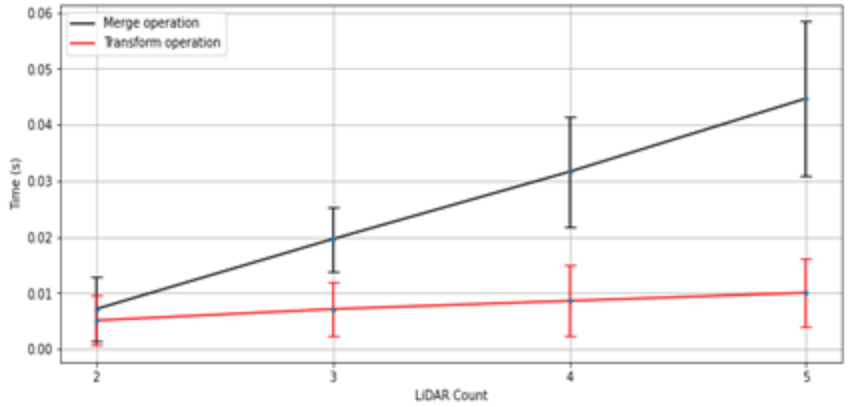

Fig 2. Processing time for different LiDAR counts

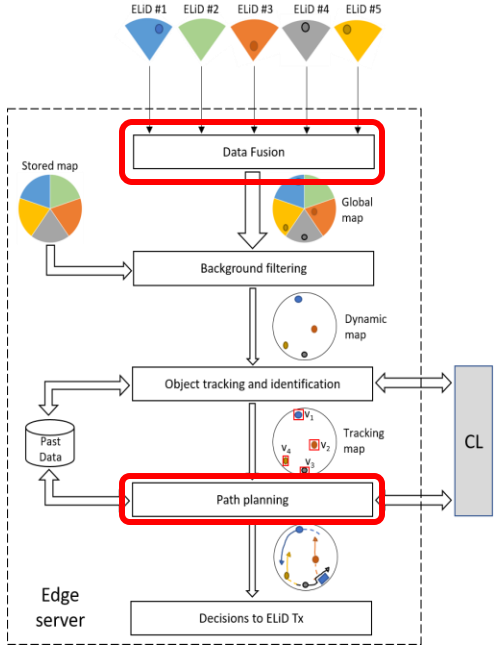

Figure 1. work plan for edge sever implementation

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Task 2: Path Planning in static environment

Robot traversal from a given point to its destination using the generate 3D map in offline mode.

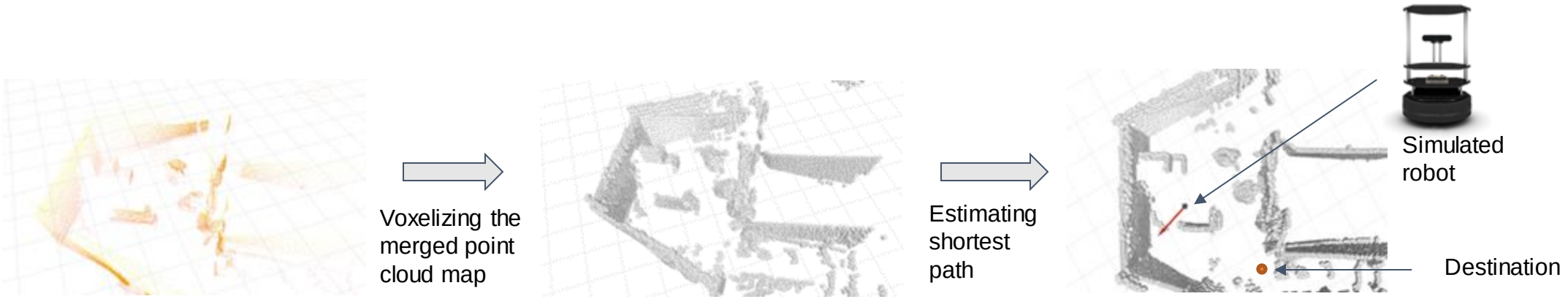
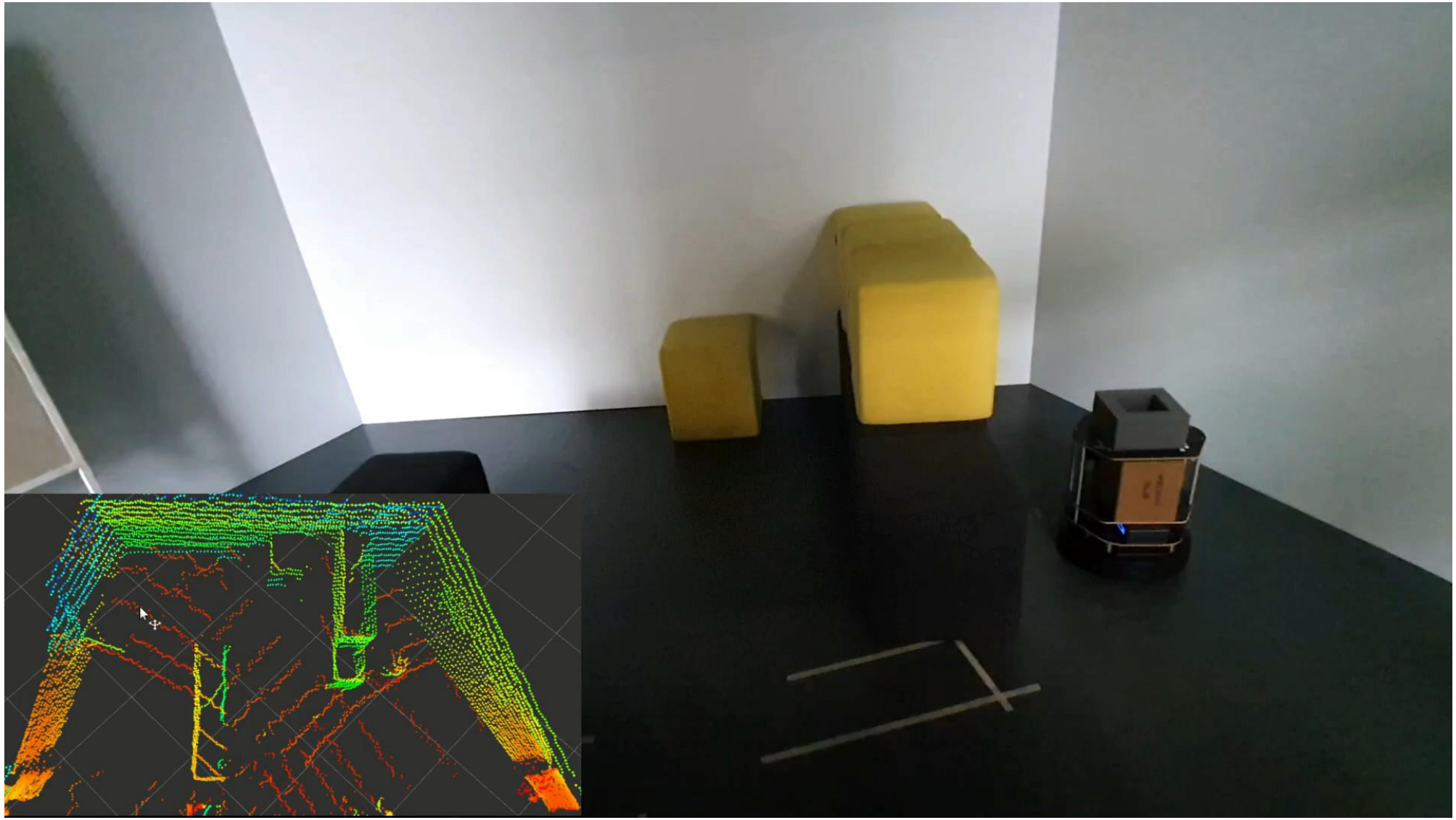


Fig 3. Path planning

Demo



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Other possible applications

- Port automation : cargo handling, vessel tracking.
- Traffic management.
- Epidemic management : People counting and social distancing.
- Real-time map services : Indoor

Publications

[1] M. Padmal, D. Marasinghe, V. Isuru, N. Jayaweera, S. Ali, N. Rajatheva, "Elevated LiDAR based Sensing for 6G -- 3D Maps with cm Level Accuracy,", 2021, Available [online]: https://arxiv.org/abs/2102.10849

[2] M. Padmal, “A method for registering partially overlapping ouster lidar point clouds with different viewpoints”, Master’s thesis, 2020, University of Oulu.

[3] Vijitha Isuru, “Path Planning for Autonomous Driving in a Factory”, Master’s thesis, 2020, University of Oulu.