M61024
[G-PCC][CE0.5-related][New] Non-spinning/spinning indoor LiDAR dataset

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Overview

- **Problem statement**
  - Current G-PCC dataset has only data acquired with a few types of spinning LiDARs.
- **Proposed dataset**
  - It was acquired in three different indoor environments with two non-spinning LiDARs and one spinning LiDAR.
  - One of the non-spinning LiDARs provides RGB color attributes by combining a RGB camera.

Introduction

- **In recent years, LiDAR usage has expanded.**
  - **In addition to spinning LiDARs, non-spinning LiDAR is also becoming popular.**
  - **Because they are less expensive and less prone to failures due to fewer mechanical parts.**

- **Current G-PCC contents**
  - **Spinning LiDAR: Included (Ford and QNX)**
  - **Non-spinning LiDAR: Not included**

- **It is proposed to include the non-spinning LiDAR contents for the second edition of the G-PCC standard.**

Proposed LiDAR dataset

Three types of indoor environments

- **Conference room**
  - It includes multiple desks and chairs, a front screen, and room doorways.
- **Corridor**
  - It is a straight corridor with some branches and elevators.
- **Café**
  - It is a space for refreshments and rest.
  - It includes many objects, such as chairs, desks, vending machines, plants, and moving pedestrians.

Proposed LiDAR dataset

■ Three types of LiDAR sensors

- **Cepton Vista-P90 (non-spinning)**
  - It has multiple lasers allocated to different areas and the areas have overlap with each other.
- **LIVOX Horizon (non-spinning)**
  - It has complex laser trajectories with non-repetitive movements.
- **Velodyne VLP-16 (spinning)**
  - It is a spinning type but is provided for performance evaluation in indoor environments.

Product	Cepton Vista-P90	LIVOX Horizon	Velodyne VLP-16
Spinning / Non-spinning	Non-spinning	Non-spinning	Spinning
LiDAR Type	MMT (Micro-Motion Technology)	Original semiconductor components	mechanical rotary
Attributes	Reflectance	Reflectance	Reflectance
FoV	90° (H) x 40° (V)	81.7° (H) x 25.1° (V)	360° (H) x 30° (V) 16 lasers
Frame Rate	10	10	10
Points per second	About 300,000	About 240,000	About 300,000

Proposed LiDAR dataset

RGB Color Attributes

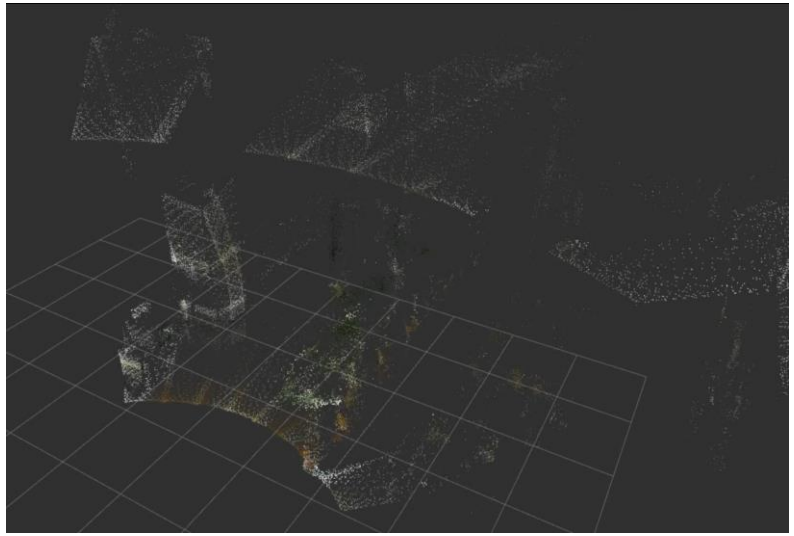
- We'll provide RGB-colored point clouds using Cepton Vista-P90 combined with a wide-angle RGB camera.

Carrier and Trajectory

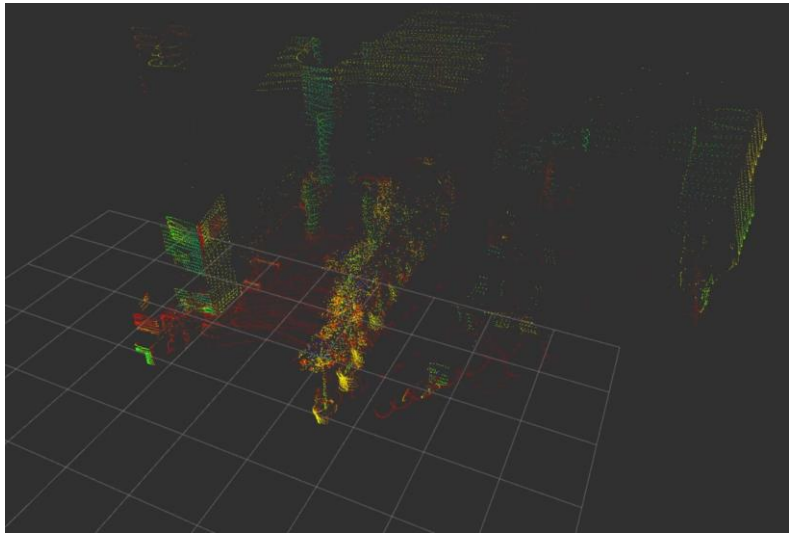
- The LiDAR sensors and RGB camera are fixed at about 60-100 cm height.
- They move on a cart while scanning for at least 10 seconds.
- They scanned simultaneously so that different devices have the same imaging environment.
- The movement trajectory is basically a straight line but includes a circular bend only in the conference room.

Proposed LiDAR dataset

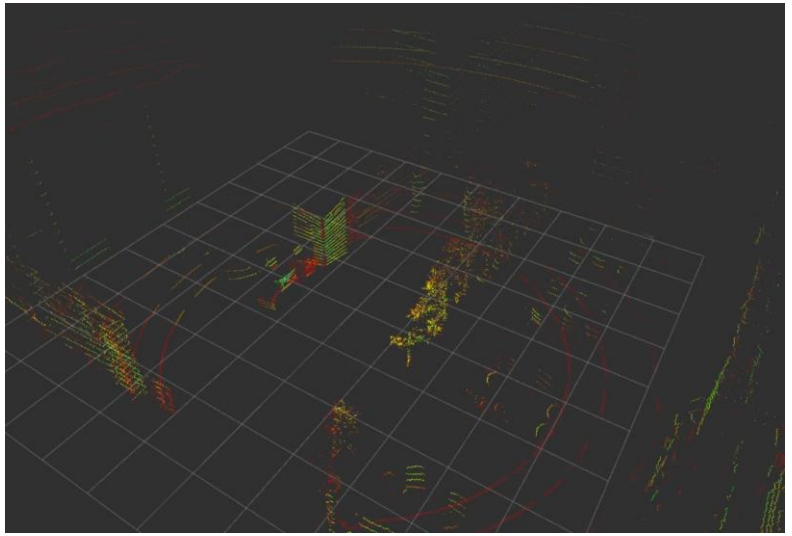
■ Examples: Three types of LiDARs at café



(a) Cepton Vista-P90 (RGB)



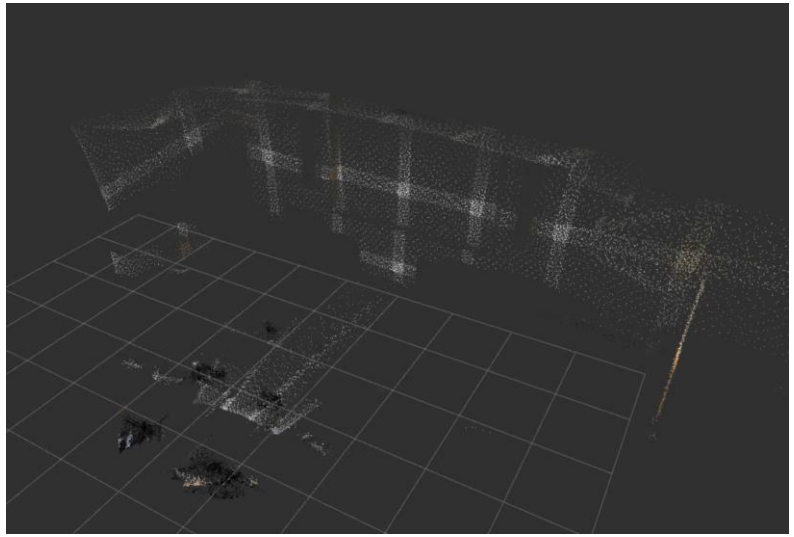
(b) LIVOX Horizon (Reflectance)



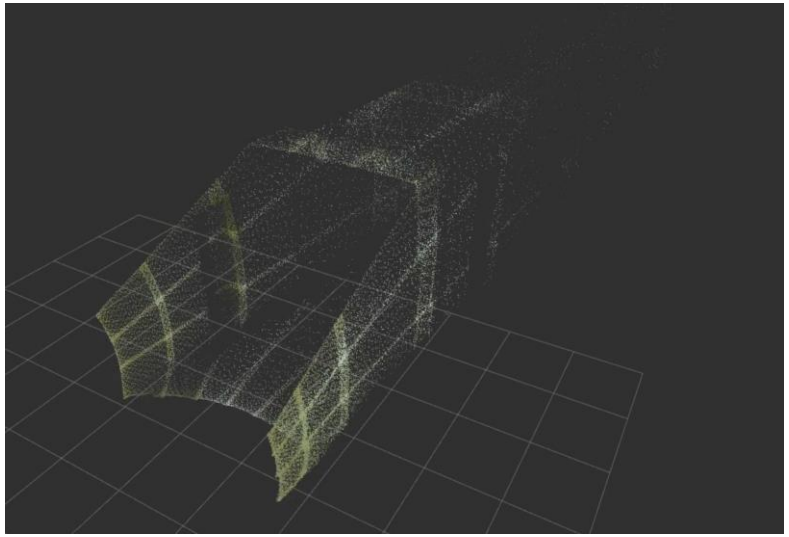
(c) Velodyne VLP-16 (Reflectance)

Proposed LiDAR dataset

■ Examples: Cepton Vista-P90 (RGB) at other indoor environments



(a) Conference room



(b) Corridor

License

- Licenses will be defined accordingly at the time of dataset release.
- Currently, it will only be limited to research purposes including non-commercial use and MEPG WG7 standardization activities.

Conclusion

- **Problem statement**
  - Current G-PCC dataset has only data acquired with a few types of spinning LiDAR.
- **Proposed dataset**
  - It was acquired in three different indoor environments with two non-spinning LiDARs and one spinning LiDAR.
  - One of the non-spinning LiDARs provides RGB color attributes.
- **Next Plan**
  - We will provide the proposed contents in the next meeting.
- **Recommendation**
  - Evaluate the proposed contents in CE0.5 when the new contents are made available.