

A Millimeter-Wave Radar Point Cloud Dataset in Indoor Scenarios

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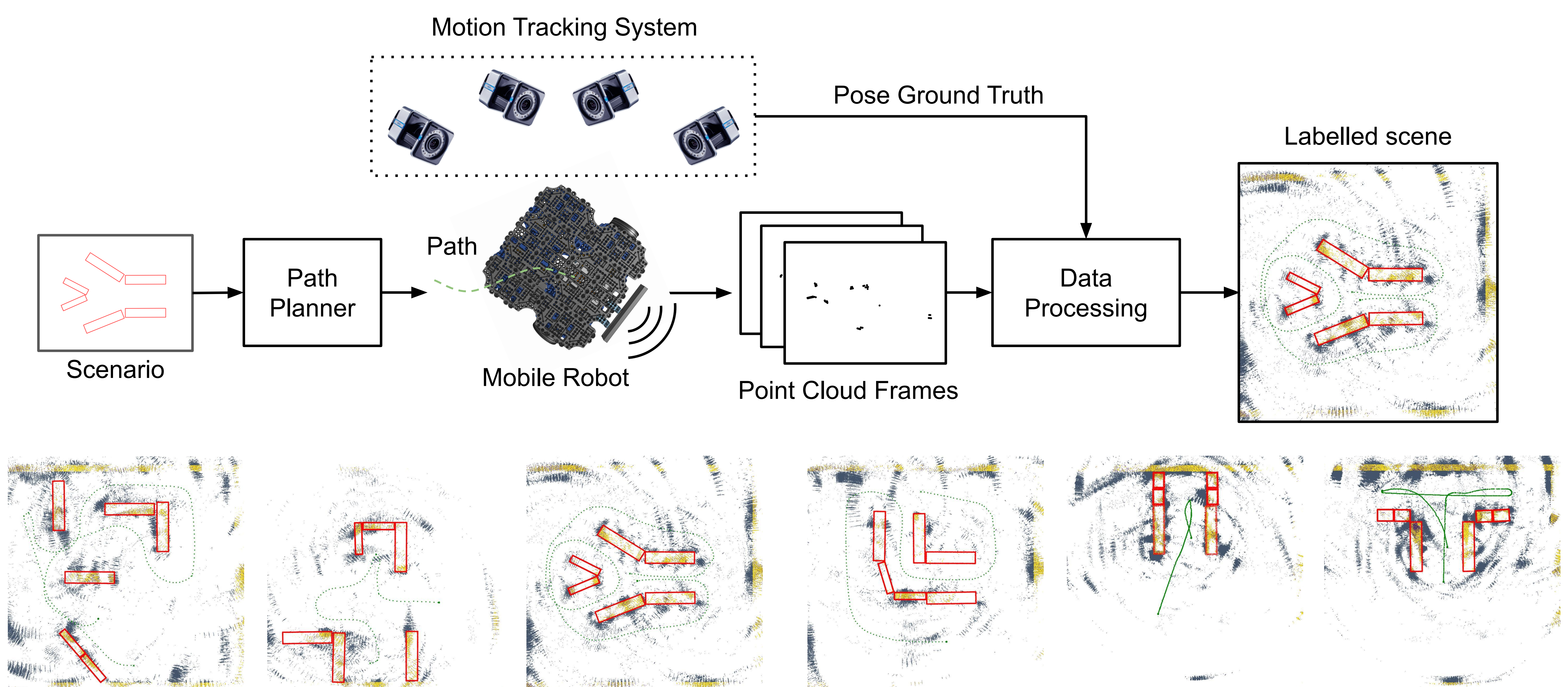
Objective of the work

Millimeter-wave radar sensors produce *Point Clouds* (PCs) that are much sparser and noisier than other PC data (e.g., LiDAR), yet they are more robust in challenging conditions such as in the presence of fog, dust, smoke, or rain. We present a millimeter-wave sparse point cloud dataset captured in several indoor scenarios with each point labelled as either *noise* or *clean*.

mmWave radar sensors

A set of *chirp* signals is emitted by TX antennas and the reflections generate peaks on the RX antennas. The signals are elaborated through Fast-Fourier Transform to extract *position* of the objects and *radial velocity*. To each point is associated the *intensity* of the related points. *Challenges*: generate PCs are very sparse and noisy.

Dataset Collection Methodology



Dataset Features

- **6 scenarios**
- Total of **50 runs** each obtained following a different path in the scene
- **~12 million points** (~60% noise, ~40% clean)
- **~58k frames**
- **8 hours** total recording

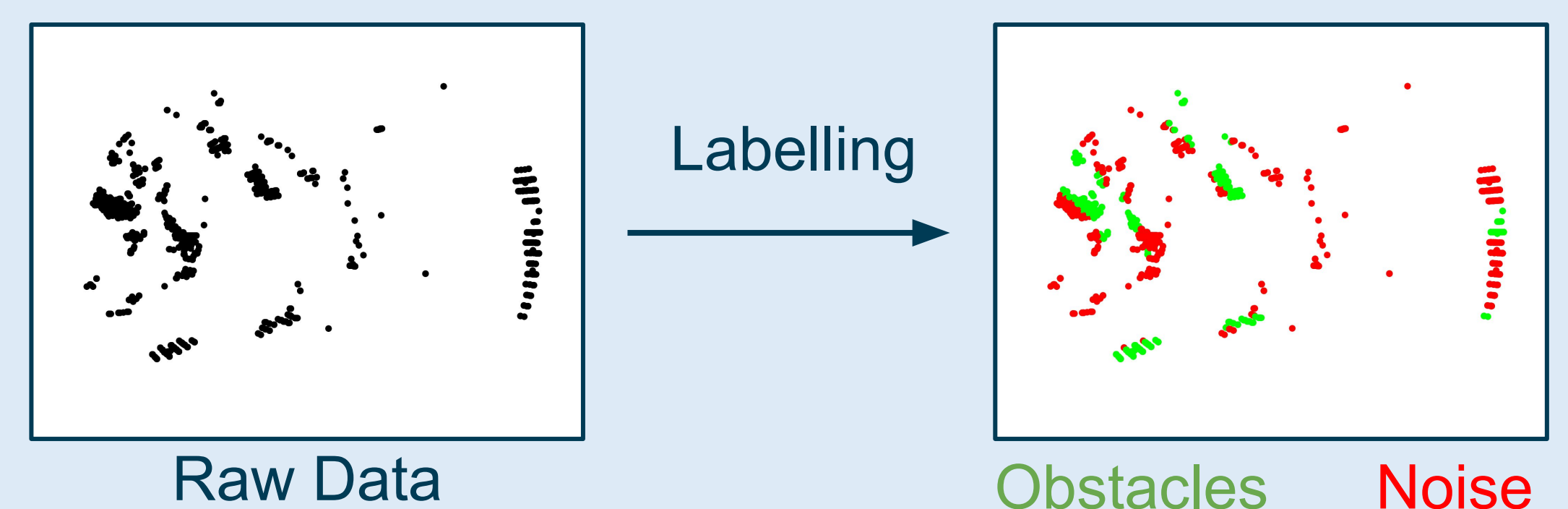
Data format

For each captured frame in each run we collect a PC with the following information:

- *Point coordinates* (x,y,z) and *radial velocity* (v)
- *Point intensity*
- *Distance* from closest obstacle
- *Label* (noise or true)

Data Processing

Each frame is accurately labelled using the pose provided by the Motion Tracking system locating the robot and obstacles



Dataset available here

