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<th>Dynamic object tracking on UGV</th>
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Dynamic Object Tracking on UGV

Interpreting sensor data in its infancy

The techniques for obtaining 3D profiles of the environment had advanced very far, but interpreting this data and using it for robot navigation have not been widely explored yet.

The LIDAR sensor is able to take 1 million readings per second, scan 360° horizontally and 26.8° vertically, and sense objects 120m away. With this high resolution data points, objects can be detected accurately further away compared to conventional sensors. We can potentially use it for navigating vehicles at high speed safely, paving the way for autonomous, road-worthy vehicles.

With this objective in sight, we will explore how to turn the massive amount of data collected into usable information for navigating. More specifically, we will condense the data into objects of which locations can be tracked and predicted.

Turning points into objects

Capture

• Detect dark object → Missing data points imply an obstacle too

Process

• Cluster points → Isolate points belonging to an object from the others

• Approximate 2D geometries and centre points
• Store points in one capture in Bayesian network
• Associate objects in subsequent captures with the previous capture → For tracking movement of objects

Predict

• Calculate velocity of object
• Update Bayesian network predicting object locations for the next capture → Can be extended to predict locations for the next few seconds

Preliminary results for ground removal

Method: Using points immediately in front and behind the vehicle, the best fit plane is found. Subsequent points are checked if they are near this plane—if they are, they will be removed and also added to the multiple regression equation; if not, they will be preserved for further processing.