DATASPEED

DATA SPEED inc.

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DATASPEED SENSOR CALIBRATION TOOL

FOR AUTONOMOUS VEHICLES

SENSOR CALIBRATION

The integration of various types of sensors has become the standard for most autonomous vehicles, but spending hours calibrating them consumes valuable testing and development time. The Dataspeed Sensor Calibration Tool provides a set of functionality that can be used to set up and calibrate a suite of lidars and cameras. This convenient tool reduces the hassle of sensor setup and allows the user to spend more time on essential autonomous or data collection research.

Feature Summary

- Automatic ground plane detection and alignment for 3D lidar
- Automatic lidar-lidar point cloud alignment and coordinate transform correction
- Automatic camera-lidar alignment and coordinate transform correction
- Quickly and easily adjust TF frame transforms manually to provide initial guesses for the automatic calibration modes, or to manually align other sensor data like radar objects
- Validate camera-camera extrinsics by visualizing how one image projects onto another
- Runs in ROS 1: Melodic and Noetic

Lidar Ground Plane Alignment

This calibration mode inputs the point cloud from a 3D lidar sensor, detects the ground plane in the cloud, and then adjusts the roll angle, pitch angle, and z offset of the transform from vehicle frame to lidar frame such that the ground plane is level and positioned at z = 0 in vehicle frame.

Lidar-Lidar Alignment

This calibration mode inputs point clouds from two 3D lidar sensors and computes the translation and orientation between the sensors' coordinate frames. It does this by comparing distinguishing features in the overlapping point clouds.
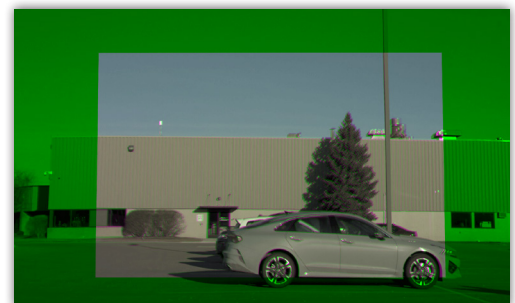
Camera-Lidar Alignment

This calibration mode inputs a camera image and a point cloud from a 3D lidar sensor and computes the translation and orientation between the sensors' coordinate frames. It does this by detecting edges and corners of a rectangular target board in both the camera image and the lidar point cloud and comparing multiple samples.

Camera-Camera Extrinsics Overlay

The camera validation GUI can be used to validate the extrinsics between multiple cameras with overlapping fields of view.
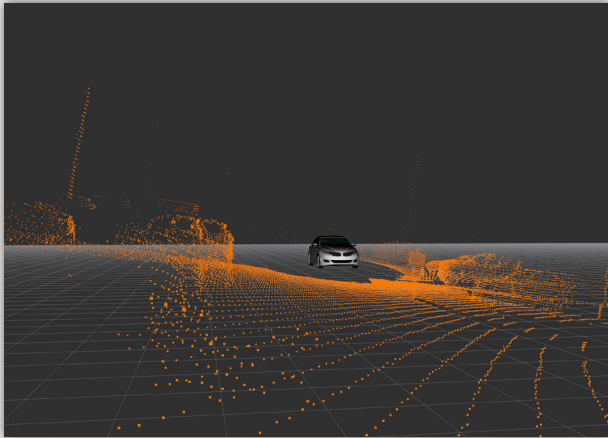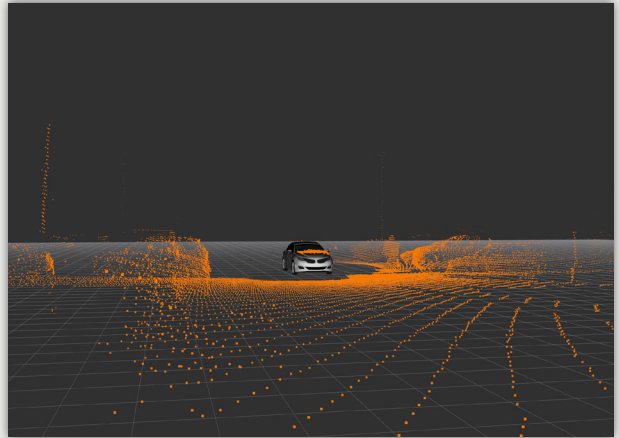

Bad camera-camera extrinsics

Good camera-camera extrinsics

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CALIBRATION EXAMPLES

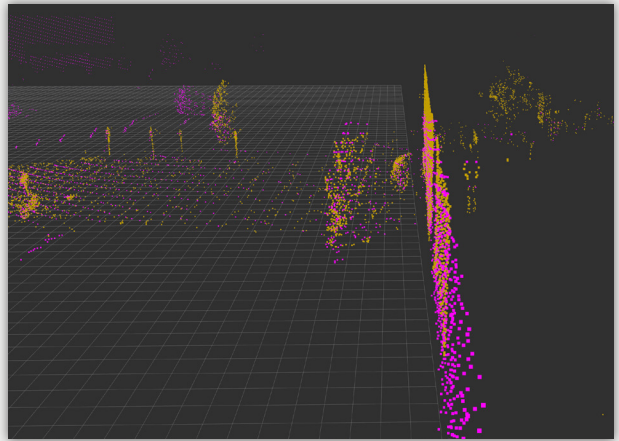## Lidar Ground Plane Alignment

Before

After

Lidar-Lidar Alignment
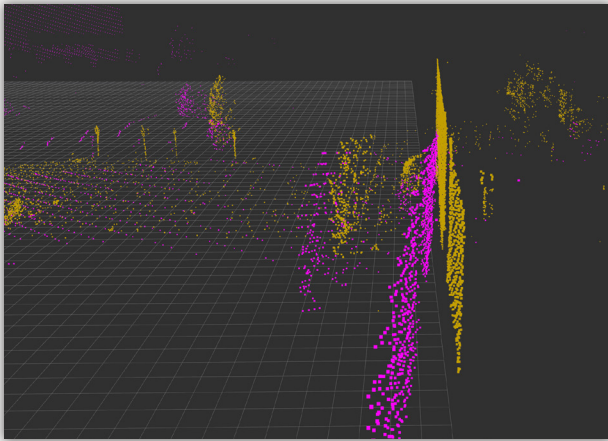
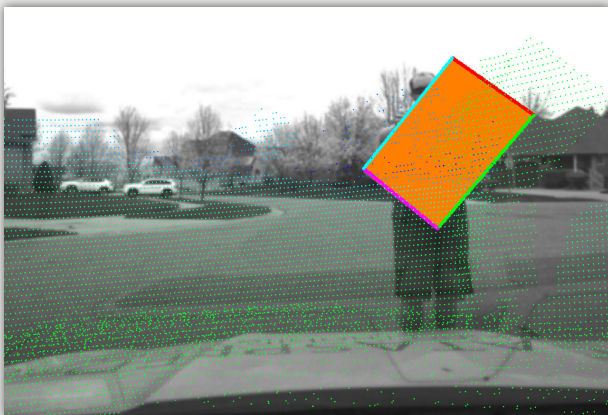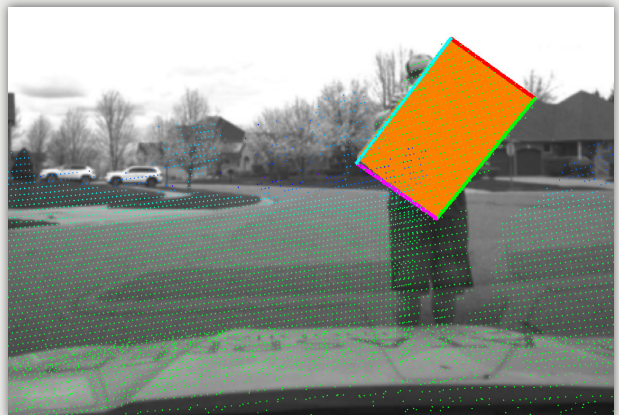*Before*

After

Camera-Lidar Alignment

Before

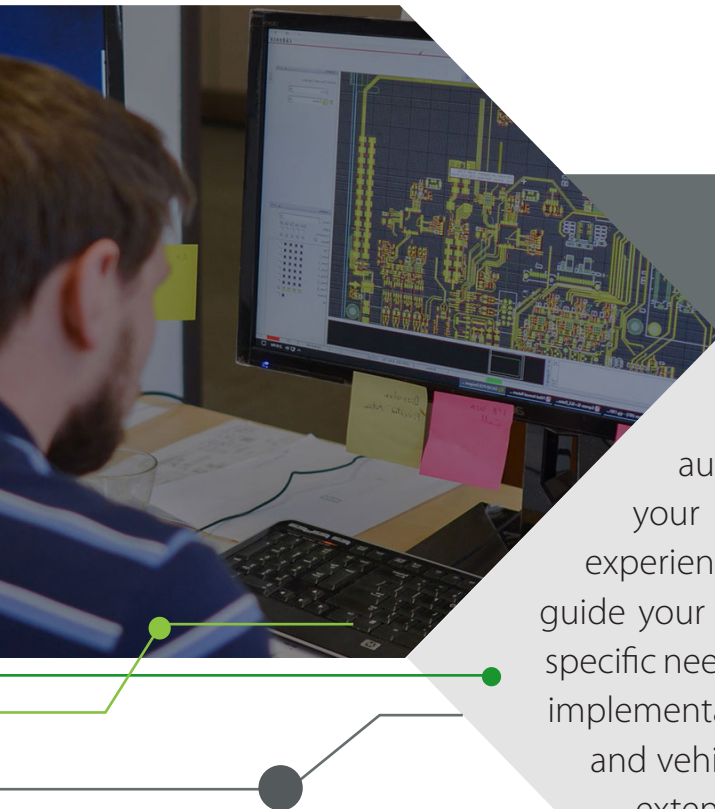*After*

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Partner with Dataspeed

Whether your company is just getting started in the autonomous vehicle (AV) industry or is looking to scale your vehicle fleet, Dataspeed has the solution for you. Our experienced team of engineers and business professionals can guide your organization in developing an action plan to meet your specific needs. We're skilled in full vehicle integration including by-wire implementation, sensor and computer installation, data acquisition, and vehicle communications. Our vehicle systems engineers have extensive experience creating custom hardware and software solutions. Contact us today to discuss how Dataspeed can accelerate your AV research and development.