The Crystal Ball project

Team Dick Dastardly

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Tutors

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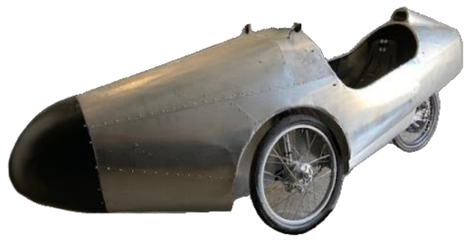


Our Goal & Objectives

The Crystal Ball Project is made up of multiple sensors and actuators integrated to a tricycle, that needs to be conscious of its surrounding and able to autonomously and safely drive itself and its passenger.

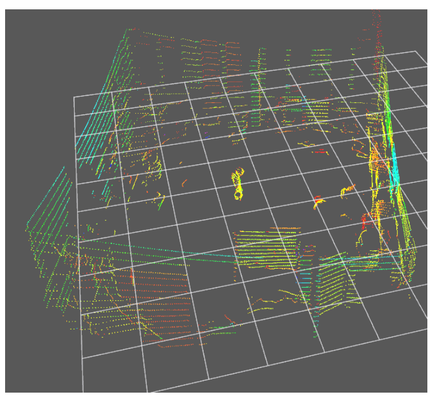
- Equip a **tricycle** with **sensors** and use **AI algorithms** to **assist the driver**
- **Warn** in case of danger

- **Identify** road signs, people walking, cyclists, etc.
- Avoid personal injury or material damage

- **React faster** than humans
- Automate **"conditional" driving**, the third level of automation in driving

Features

1. LIDAR



- 16 layers
- From 20cm up to 150m

2. Camera

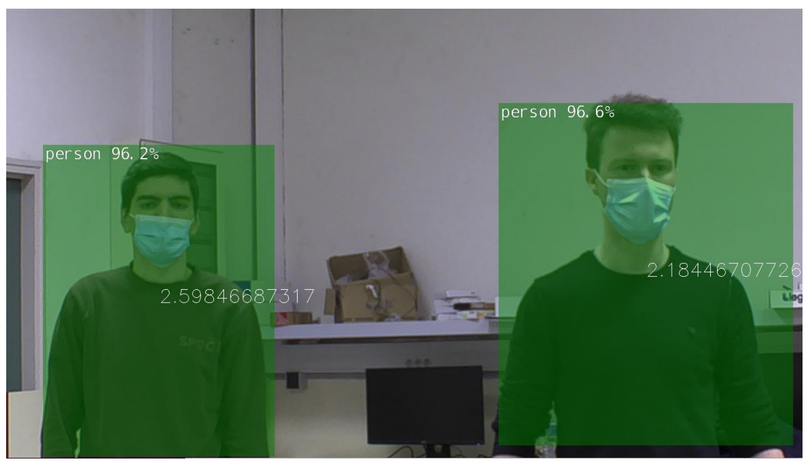
3. Software

- Can identify 70 different types of objects with the camera: Human, Car, Chair, Laptop, etc.
- Help us to fuse Camera and LIDAR data
- Display the level of certainty for each detection
- Raises an alarm for specific situations

ROS, Ubuntu, OpenCV, C++, Qt, Python

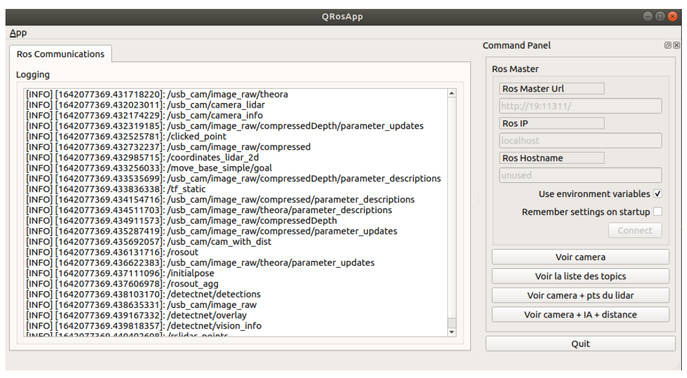
Our results

Fusion of the Camera & LIDAR



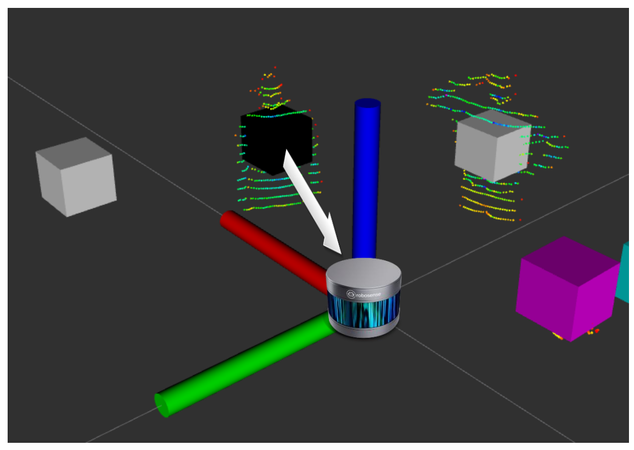
We clearly see what is detected by the software and at which distance it is from the LIDAR

Graphical User Interface



We can debug the software and display all the data we need

Prediction of the trajectory



We can track an object and predict its trajectory

Improvements

- Finding other hardware to compute data, the Jetson Nano is not powerful enough
- Changing the camera to a 60fps one would significantly improve reaction time
- Moving the tricycle, because for now prediction only works for a static vehicle

Our project's GitHub

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