A capstone project implementing Autonomous vehicle architecture for udacity Carla using ROS

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README.md

System Integeration on Carla

This is the project repo for the final project of the Udacity Self-Driving Car Nanodegree: Programming a Real Self-Driving Car.

Project Team Members

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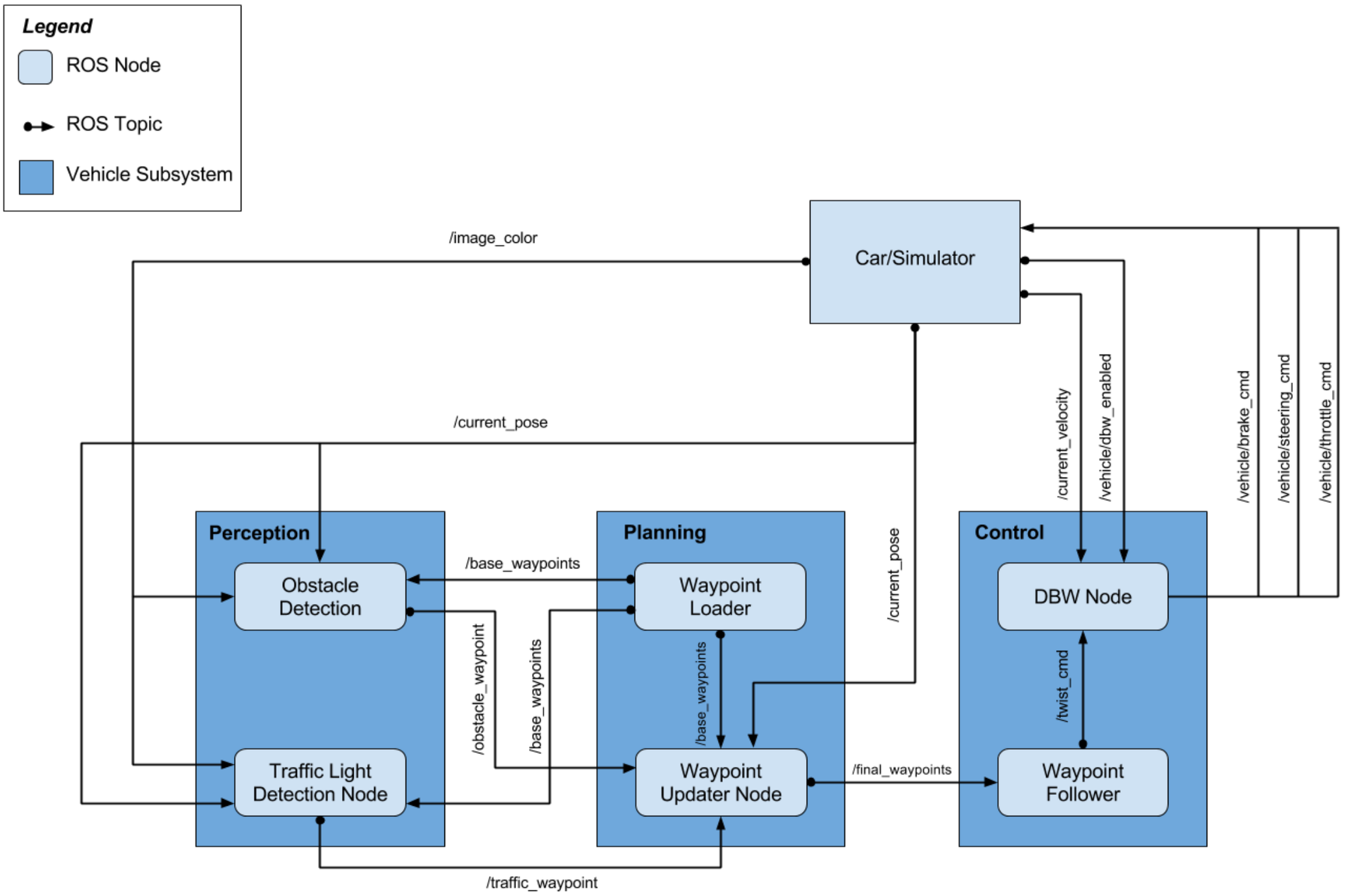
Architecture



For more information about the project, see the project introduction here.

Note to Tester

There are two convolutional neural network models trained to perform traffic light detection.

- sim model which is for simulator traffic light detection
  - Download the simulation model graph file from here and move it to model folder name `sim` in the traffic light node "CarND-Capstone/ros/src/tl_detector/light_classification/model/sim_model"
- real model which is used in real world traffic light detection
  - Download the real world model graph from here and move it to the model folder name `real` in the traffic light node "CarND-Capstone/ros/src/tl_detector/light_classification/model/real_model"

Other Info

Please use **one** of the two installation options, either native **or** docker installation.

Native Installation

- Be sure that your workstation is running Ubuntu 16.04 Xenial Xerus or Ubuntu 14.04 Trusty Tahir. Ubuntu downloads can be found here.
- If using a Virtual Machine to install Ubuntu, use the following configuration as minimum:
  - 2 CPU
  - 2 GB system memory
  - 25 GB of free hard drive space

The Udacity provided virtual machine has ROS and Dataspeed DBW already installed, so you can skip the next two steps if you are using this.

- Follow these instructions to install ROS
  - ROS Kinetic if you have Ubuntu 16.04.
  - ROS Indigo if you have Ubuntu 14.04.
- Dataspeed DBW
  - Use this option to install the SDK on a workstation that already has ROS installed: One Line SDK Install (binary)
- Download the Udacity Simulator.

Docker Installation

Install Docker

Build the docker container

```
docker build . -t capstone
```

Run the docker file

```
docker run -p 4567:4567 -v $PWD:/capstone -v /tmp/log:/root/.ros/ --rm -it capstone
```

Port Forwarding

To set up port forwarding, please refer to the instructions from term 2

Usage

1. Clone the project repository

```
git clone https://github.com/udacity/CarND-Capstone.git
```

2. Install python dependencies

```
cd CarND-Capstone
pip install -r requirements.txt
```

3. Make and run styx

```
cd ros
catkin_make
source devel/setup.sh
roslaunch launch/styx.launch
```

4. Run the simulator

Real world testing

1. Download training bag that was recorded on the Udacity self-driving car (a bag demonstraing the correct predictions in autonomous mode can be found here)

2. Unzip the file

```
unzip traffic_light_bag_files.zip
```

3. Play the bag file

```
rosbag play -l traffic_light_bag_files/loop_with_traffic_light.bag
```

4. Launch your project in site mode

```
cd CarND-Capstone/ros
roslaunch launch/site.launch
```

5. Confirm that traffic light detection works on real life images