

# **Predicting pose of objects around a given agent with a quantitative measure of confidence**

Rebel Reindeers: Musab Abdullah, Ashray Desai,  
Dristi Patel, Abinith Thallam, Victor Xia

October 20, 2020

### **Abstract**

Our research involves using pose estimation techniques as well as a CSPN to not only predict the poses of objects around a given agent (for example, in our case, other cars with respect to a self-driving car), but also to provide a quantitative measure of its confidence in its pose estimations. To find this confidence level of position and orientation of traffic participants from images, we are using YOLOv4 for image detection and a CSPN for probability estimation.

**Outline** We introduce the topic of self-driving cars, especially their ability to safely maneuver in roads that are potentially full of other cars without collisions or threats to safety. We then introduce the idea of pose estimation and briefly detail its cruciality for robotics in general. Then we go over how important pose estimation is for self-driving cars, and introduce our goal of bringing a deeper insight into pose estimation for self driving cars through the provision of uncertainty measures. We introduce CARLA and kitti as data sources, and YOLOv4, darknet, and CSPNs as tools that can allow us to operate on this data.