A Safety-First End-to-end Neural Motion Planning Model for Autonomous Driving

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Abstract

This document contains the instructions for preparing a camera-ready manuscript for the proceedings of ACL-2015. The document itself conforms to its own specifications, and is therefore an example of what your manuscript should look like. These instructions should be used for both papers submitted for review and for final versions of accepted papers. Authors are asked to conform to all the directions reported in this document.

1 Introduction

The last decade has witnessed a boom in term of research efforts, both in institutes and corporate sector, pouring into the autonomous driving (AD) technology. The hype is reasonable because of the huge potential of reducing accidents caused by human factors, improving traffic flow, and providing more freedom in transportation for disabled people, all of which this technology is expected to deliver once completed in the future.

To control the vehicle safely, the system is required to be capable of perceive, predict, and control the vehicle in a highly dynamic traffic environment without human intervention. In order to achieve that goal, although there are different approaches, AD systems in general all shared a common pipeline started with creating progressively a representation for the environment surrounding said vehicle from various sensors from the driver, and ended with emitting control signals to actuators to perform the driving task autonomously based on initial route planning inputted by the human driver. Classified as a primary safety-critical software, AD system must strictly account for the uncertainty in both familliar and unfamilliar contexts. In other words, the ability of measuring and understanding the uncertainty in operation is one of the most important features for the self-driving automobile to ensure the feasibility of the technology.