ATS – An Autonomous Traffic Simulator

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***Abstract***: **In today’s world, autonomous cars are becoming more of a reality with each passing day. The prime example of such a vehicle is of Google’s autonomous car. Supporters of autonomous vehicles envision a future in which every day driving hassles, such as traffic jams and car accidents, become a thing of the past. They claim that since autonomous vehicles will have the ability to communicate with all other surrounding vehicles, one’s autonomous car will be able to “predict” the movements, actions, and responses of its neighbors to keep traffic moving safely and efficiently. While our team is supportive of the development and advancement of these autonomous vehicles, we are curious to see if such claims are true as the number of vehicles on a road increases. We created the Autonomous Traffic Simulator (*ATS*), a discrete-event simulation built upon the open source ROSS framework(1). Our simulation models a simple, yet common everyday occurrence: traffic lights at intersections. We will use this simulation to model how much time the ideal autonomous vehicle will take to traverse from a starting point to a destination point when having to obey traffic lights at each intersection.**

***Keywords* –autonomous, vehicle, simulator, traffic, lights, ROSS**

I – Introduction

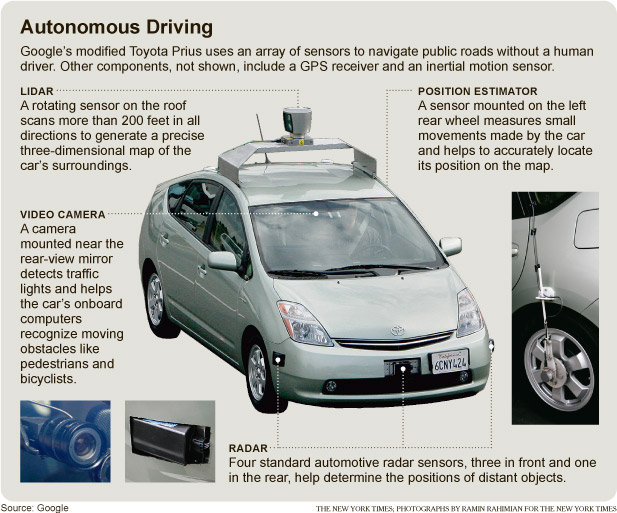
Autonomous cars are not a recent invention; one only needs to look at science fiction movies and novels to see countless examples of such vehicles. Perhaps the most famous autonomous vehicle is Google’s Self-Driving Car (**Figure 1)**. Google uses a high-performance computer in conjunction with a variety of sensors, most notably a LIDAR (Light Detection and Range) sensor mounted on the roof.

Individual Contributions:

**Bryant**: Designed and implemented ATS Traffic Light Event Handlers, wrote up this paper

**Derek:** Implemented Autonomous Vehicle Inter-Vehicle communication protocols

**Matt**: Designed and implemented ATS Traffic Light Event Handlers



**Figure 1** – Google’s Autonomous Vehicle(2)

One of the goals of autonomous vehicles is to reduce daily commuting time to and from work. Proponents of autonomous vehicles claim that these vehicles will achieve this goal because the cars are able to communicate with each other and thus synchronize their movements to improve traffic conditions and ensure a smooth flow of traffic. However, our team was interested in the case where everyone is driving an autonomous car that is capable of communicating with all other cars. We decided to write up a simulator to see how much time the average autonomous vehicle takes to traverse from one point to another as the number of vehicles increases on a fixed world size and under the condition that in each intersection on the world, there exists a traffic light.

References

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