Project Plan

TRAFFIC SIMULATION SELF-DRIVING CARS

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Problem How do self-driving cars influence traffic?

State of the art Paruchuri, Pullalarevu, and Karlapalem describe an agent simulation of organised traffic. They name a number of factors that play a part in how a driver reacts to traffic. Human drivers are imperfect, and can be distracted by external or internal factors. Alternatively, Jiang et al. created a simulation of autonomous driving, in their paper they describe how one can model autonomous vehicles.

New idea We model several traffic situations where both self-driving cars and 'normal' cars are part of the traffic. We will start out with a simple intersection where the normal rules apply. As we are further along in the project we will add more complex situations such as traffic lights and stop signs. Furthermore we might also look into different acceleration speeds for the 'normal' cars and different drivers such as those proposed by Paruchuri, Pullalarevu, and Karlapalem, or cars with (adaptive) cruise control.

We will base or model of autonomous cars on Jiang et al., our humand drivers will be based on Paruchuri, Pullalarevu, and Karlapalem.

Results We expect that a high ratio of self-driving cars will result in fewer traffic jams, but that adding some self-driving cars to normal traffic will not change the flow of traffic significantly.

Relevance Self-driving cars are becoming more and more prevalent. Several companies are already testing their self-driving cars on the Californian streets [3]. These cars will change the flow of traffic.

References

[1] Tian Jiang et al. "Microscopic simulation for virtual worlds with self-driving avatars". In: *Intelligent Transportation Systems (ITSC), 2010 13th International IEEE Conference on*. IEEE. 2010, pp. 1319–1323.

[2] Praveen Paruchuri, Alok Reddy Pullalarevu, and Kamalakar Karlapalem. "Multi agent simulation of unorganized traffic". In: *Proceedings of the first international joint conference on Autonomous agents and multiagent systems: part 1*. ACM. 2002, pp. 176–183.

[3] Alexandria Sage. *Honda gets California approval for self-driving cars on roads*. Ed. by Lisa Von Ahn. Reuters. Sept. 11, 2015. URL: `http://www.reuters.com/article/2015/09/10/us-honda-autos-self-driving-idUSKCN0RA2G820150910`.