Developing a Comprehensive, Efficient, and Mulit-Layered Navigation Algorithm for Coordinating Driverless Vehicles

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With the advent of Google's automated cars, newer technology is being incorporated into the actual driving of vehicles. They possess the sensors and processing power necessary to perform the job of a driver better than a person ever could. As these cars become more prevalent, a system that networks and coordinates them to obtain maximum safety and efficiency will become the obvious next step. The goal of this project is to create a system that is able to coordinate a swarm of driverless vehicles on the routing, intersection, and individual vehicle levels. The routing subsystem uses a version of the A* (A Star) shortest-path algorithm modified to account for the amount of traffic at intersections. The intersection subsystem use neural networks to improve the way they route traffic using a specific set of conditions that are detailed in the procedures. The reason that a subsystem is being created for the vehicles is to imitate the current driverless car technology on the market in a simple way, not reinvent them. At first, a simulation was used to test the system. Results show that the routing algorithm is highly efficient and that the intersection algorithm is far more efficient than existing systems. Robots were created to test the system in a real-world scenario. They were linked wirelessly to a server and used line sensors to navigate an electrical tape roadway network. Results from the trials with robots as the vehicles were just as promising as those of the simulations.

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