CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

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Project Number

35262

Project Title

Lane Merge Algorithm for Autonomous Cars

Abstract

Objectives/Goals

Traffic jams are caused in a lane merge when people overly slow down when they are approaching the merge. As the people in front start to slow down people behind them also start to get backed up causing everybody to squeeze together like an accordion being pushed from one side. But in the case of an autonomous car if the proper algorithm is implied to accelerate on entry to the merge point it can avoid traffic jams and still maintain a safe distance between each car. So my goal is to create an algorithm that will allow autonomous cars to successfully execute a lane merge under certain assumptions.

Methods/Materials

The method I intend to use is a computer simulation of a lane merge scenario that includes only autonomous cars.

Results

Initially my algorithm was not working for some cases because I was first approximating the distance between each car which allowed for some faults in the program. To fix those faults, I used another approach of finding the actual distance between each car for every delta t the program was running for.

This helped me better understand the type of angles the autonomous cars would be turning at, and the speeds they would be going at in real life on the road. Through the course of figuring out my algorithm, I realized that it is correlated with the Venturi Effect. In the Venturi Effect it states that if the space within the pipe is smaller, the velocity within the pipe will be more so that it can maintain streamline motion.

Conclusions/Discussion

My original intuition that I had to the solution of the problem was demonstrated to work in several cases for autonomous cars. Accelerating at the merge point is the best way to avoiding a traffic jam on the road. Not only does it prevent traffic jams, but it also keeps a safe distance between consecutive autonomous cars. I am inspired to continue my research in the subject of autonomous cars. Even though in most cases my algorithm works, there are still some cases that aren't covered. I will continue working on these problems concerning autonomous cars and making the algorithm more intelligent and safer for real life use. I see that my vision about the future of transportation , as shared by an article in National Geographic, is slowly turning into a reality.

Summary Statement

My project describes using a computer visual how autonomous cars can successfully perform a lane merge.

Help Received

My dad helped me get familarized with the programming language that I used for my project.

Preliminary