# Developing and Simulating Self-Driving Car A.I. for a Crash Free Autonomous Intersection

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The purpose of this project was to create a computer simulation of an intersection with no traffic controls (stop signs or traffic lights), and develop artificial intelligence capable of making decisions autonomously, meaning self-driving cars regulate their speed and pass through the intersection without collision. This intersection would be more efficient in terms of letting more cars through the intersection per minute, and also by eliminating the stop-and-go traffic flow of a normal, controlled intersection. This simulation was created in the Microsoft Visual Studio 2017 IDE using C#, an object oriented programming language created by Microsoft geared towards game design, and leveraged the MonoGame framework, an improvement to Microsoft's XNA. The physics and mathematical details of the simulation were created by the experimenters specifically for this simulation. Acceleration and deceleration physics were derived from data from real world tests on the Tesla Model S. This year, much more time to be spent on the artificial intelligence and expandability of the experiment, meaning the simulation could easily model multiple real world intersection types, with the artificial intelligence continuing to function well. Vehicles, unlike last year, are able to turn and navigate the intersection in a much more realistic manner and collisions are predicted and detected at a visibly higher rate. Based on hours of testing, running, debugging, and revising the simulation, the observed results support the hypothesis. The cars noticeably detect future collisions and make decisions either to stop, slow down, or speed up, such that collisions are avoided. ♀

**Awards Won:**