

Capstone: "A Vision Based Approach to an Autonomous Vehicle"

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The research challenge with self-driving vehicles is to efficiently design a safe vehicle that is affordable for the general population. So far Google's self-driving car has traveled one million miles in various conditions all over California, and Google's success has inspired other companies to follow suit with their own versions of autonomous vehicles. Despite all this ground-breaking progress self-driving cars still have a long way to go until they are officially, and legally on the roads. Here we present a design and implementation of a small, low-cost self-driving vehicle that emphasizes three key features: responding to traffic lights, stopping in the correct location for stop signs, and allowing pedestrians to cross the road unharmed. We use artificial neural networks to capitalize on their high recognition rate. Furthermore, we investigate the effects that the sampling rate of the video has on video quality and lag. We discuss our hardware and software design approaches in building a prototype of the proposed design. We also review our experimental methods. Lastly, we point out lessons learned from the operation of our prototype identifying directions for future upgrades.