Using Deep Convolutional Neural Networks and Feature Matching Algorithms to Develop Smarter Autonomous Cars

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Modern self-driving can cost upwards of $80,000 and has multiple environmental concerns due to the pollution from lithium batteries and the greenhouse gases released by the production of the car itself. This project seeks to develop an affordable and environmentally conscious self-driving car by only taking input from a single front-facing dash cam. This would solve the previously stated problems by allowing users to retrofit their existing cars with an autonomous car system instead of buying an entirely new one. Although this system is cheap, it doesn't lack in features. The steering is controlled by a deep convolutional neural network consisting of 5 convolutional layers and 5 dense layers. The neural network only takes dash cam footage as input and is able to output the angle at which the car should steer. The system is also able to control the speed and the braking of the car. It uses a feature matching algorithm to detect nearby cars, street signs, traffic lights etc. in order to understand its surroundings and control speed/braking accordingly. In order to improve the effectiveness of the self-driving car, the system is able to improve itself through cloud-based updates. The result of this project was a system that, with slightly more data, can be used on a real car. With this, self-driving cars can be available to much more people at a lower price and environmental impact without sacrificing any features or performance.

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