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Exploring Real-World Applications of Computer Vision

There are many interesting applications in the computer vision application realm that intrigue me. Today I'll give an analysis of autonomous vehicles which really blows my mind. Autonomous vehicles also known as AV's are self driving cars, a very groundbreaking and game changing advancement in transportation technology. There are a variety of factors that contribute to this technology. A combination of sensors, algorithms, and data work together to be able to navigate without human interaction, or disturbance. The goal of autonomous vehicles is to improve safety, efficiency, and convince for the user and passengers. Initial ideas and prototypes of autonomous vehicles began way back in the 1920's. In 1925 U.S Army electrical engineer unveiled a driverless car which was a radio controlled vehicle, which fueled interest in what later would become autonomous vehicles.

Let's dive a little more in depth into the actually technology behind autonomous vehicles and how they actually function. These vehicles depend on a complex series of hardware and software components to operate safely and efficiently. Sensors, perception, localization and mapping, decision making, planning, and control systems. The sensor category consists of cameras which detect lane markings, traffic signals, road signs, other vehicles, pedestrians, and other potential hazards. LiDAR which is light detection and ranging uses laser beams to create precise 3D map of the environment. Radar uses radio waves to detect speed, and stance of other objects. Ultrasonic sensors use sound waves to detect nearby objects which is very useful for low

speed situations and parking. The perception category consists of computer vision, object detection and classification, and sensor fusing. The localization and mapping category focuses on GPS and IMUs. GPS which means Global Positioning System provides a vehicles exact location. IMUs (Inertial Measurement Unit) measures the change in acceleration, orientation, and improving navigation accuracy. Decision making and planning consists of a path planning algorithms, behavior prediction, and decision making systems. Control system consist of actuators, and control algorithms.

Benefits of autonomous vehicles is safety, efficiency, accessibility, environmental, economic, and convince. With all the good there are definitely some challenges and cons of autonomous vehicles including; technical limitations, ethical/legal issues, privacy concerns, job displacement, infrastructure and integration challenges, cost and accessibility, security risks, social and behavioral impacts. I feel it's honestly too early to tell if the pros will outweigh the cons as only time will tell. Reaching this level we're at now is pretty now to the majority of the world so seeing how things will go forward will be very interesting.

As I sit and reflect on the future of autonomous vehicles I'm very excited about the potential and convenience it'll provide. I feel it may affect society in both good and bad ways. Jobs will defiantly be lost, there will definitely be technically errors and potential tragedies, data breaches and etc. There will also be good things going on, people who are unable to drive will have their own transportation, less effort will be put forth on navigation, and who knows maybe you won't even need a license to be able to have transportation one day. Only time will tell, but I'm very intrigued and excited for what's in store, too be able to witness the evolution of this technology in real time will be marvelous to witness.