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Assignment L01

Autonomous vehicles, or self-driving cars, are vehicles equipped with the technology to navigate and operate without human intervention. When I think of computer vision this is the first example I think of. The primary goal of autonomous vehicles is to improve transportation safety, efficiency, and convenience. They are designed to perform all driving tasks such as steering, braking, accelerating, and navigating traffic autonomously, using a combination of sensors, cameras, radar, and artificial intelligence (AI).

Computer vision is a crucial component of autonomous vehicles, enabling them to "see" and interpret their surroundings. Key computer vision technologies and methods used in autonomous vehicles include depth estimation, object detection, and lane detection. Depth estimation is a part of computer vision that to me links it directly to human vision that we are use to. This ability to be able to range and estimate the distance of everything around us using systems like light detection and ranging (LiDAR) the vehicle is able to know this information which is vital for the rest of the systems to work, without this the data that is fed to many other systems is irrelevant as the distance matters more than several other factors and allows the computer system to see and act as humans do. Object detection is another example of computer vision for autonomous vehicles. There are several systems that aid in the ability to detect and classify objects with the use of cameras and sensors to allow systems to make the decisions on what certain objects are and to use the information accordingly. Another system that uses cameras and sensors for its primary input is the lane detection systems. Both the lane detection system and object detection systems use the same sensors but use the input in different ways just as we do with everything we see and do as humans with our vision. Lane detection uses the data it gathers to keep the vehicle centered in the lane allowing the vehicle to maintain position as where the object detection allows the vehicle to know its surroundings and if it needs to swerve out of a lane to avoid an accident or to stop at an intersection for a red light. The goal of both systems is to allow for the most efficient and human like driving experience in the vehicle which without computer vision would not be possible.

The future of self-driving cars is full of possibilities, thanks to progress in computer vision, and sensor technology. As these technologies improve, we can expect self-driving cars to become more reliable, efficient, and safe. These vehicles could greatly impact society by reducing traffic accidents, cutting down emissions, and offering new ways to get around. However, to make sure this impact is positive, we need to solve the technical, ethical, and legal challenges involved. Moving towards a future with fully autonomous vehicles will require teamwork between technology developers, government regulators, and the public to ensure a balance between innovation, safety, and ethical concerns.

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