Ethical and Legal questions around autonomous vehicles

WHO IS TO BLAME WHEN AN AUTONOMOUS VEHICLE CRASHES?

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Introduction

This report aims to outline the various ethical and legal issues surrounding what happens when an autonomous vehicle – that is one that drives itself – is involved in a collision with another car. For this report, I will be focusing on level 5 autonomous vehicles, which are those that, other than inputting a destination, need no other human interaction.
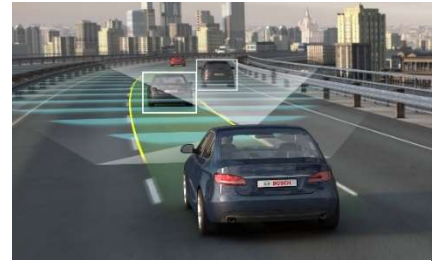
(Wilson, 2017)

The Technology – How do self-driving cars work?

According to Armstrong (2016), there are many systems that work together to allow the vehicle to navigate itself.

- Radars are used to keep track of other vehicles on the road.
- Cameras are used as the eyes of the car – keeping track of road signs, traffic lights, pedestrians and other obstacles.
- Lidar sensors use pulses of laser lights to keep track of the side of the road and lane markings.
- Ultrasonic sensors on the wheels can detect the curbs on the road while driving and parking
- A central computer analysis all the data and makes decisions about how to move the car safely.

How far are we from fully functional Autonomous Vehicles?

Autonomous vehicles of some sort have been around for much longer than people may think. In the 1940s, Neurologist Dr Grey Walter was working on robots what could move around and react to light and touch stimuli. These 'Tortoises' are the first example of autonomous vehicles as they would take an

(CyberneticZoo, 2009)

input and use that information to change their course of action. (Boden, 2006-2007)
(Martin, 2017)

More recently, in 1971, the UK Road Research Laboratory was working on a self-driving car that supposedly drove better than a human. (Roose, 2015)

Guy Martin recently did a program on Channel 4 where he raced a fully autonomous vehicle round Silverstone racetrack. In this program, you can see how the vehicle has some flaws. For example, when it came to the race lap, the AI spun off the track as it could not account for the change in tire temperature at the beginning of the race, and therefore misjudged the speed at which it could corner. (Martin, 2017)

(De La Cuesta, 2015)

Who is to blame?

The question of who is to blame is more complicated than you may think. There are many factors involved and many potential parties at fault. (Krauss, 2017)

THE DRIVER

The driver of the car could be to blame depending on how automated the vehicle is. Some autonomous vehicles still allow for the human driver to take control of the car. If this is the case, then the human driver of the car could be held responsible for not interfering and preventing the incident.

There is also the case where the driver has not correctly maintained the vehicle. This could be either the fault of the driver for not properly performing these checks or the fault of the manufacturer for not fully briefing the driver on these procedures. (Cassidy, 2017)

THE VEHICLE MANUFACTURER

The manufacturer could be to blame for the crash if there was a fault with the hardware within the car. While an automated vehicle does not require human interaction to function, it was built by humans, or at least built by robots that were built by humans. Because of this, there is still room for human error within the hardware. (Bogart, 2017)

THE SOFTWARE DEVELOPERS/DESIGNERS

If there is an error in the code, then the fault would fall to the developers and designers of the code. It could be that the designed program was not implemented in an efficient way, and so the programmers would be to blame. Or, the design of the system was faulty, meaning that the designer would be at fault. There are many examples of this, such as the program could be designed so it could not exceed the speed limit. However, it may be required for the vehicle to speed up past the limit in an emergency. (Krauss, 2017)

Example Cases

TESLA MODEL S CRASH (2016)

On May 7th, 2016, the first crash involving an autonomous car on autopilot occurred in Williston, Florida. The Tesla car was unable to tell the difference between a white tractor-trailer from the bright sky. This incident resulted in the death of the driver of the car. (Yadron & Tynan, 2016)

(Autoblog, 2017)

It is difficult to assign blame in this case as it is unknown what the driver was doing at the time of the crash, however, some articles, such as the one written by Levin and Woolf (2016), suggest that the driver may have been watching a film. If this is the case, then some blame at least can be placed on the driver as this technology is still relatively new and the

autopilot system throws up several different warnings to alert the driver to keep their hands on the wheel. (DeBord, 2017)

SELF DRIVING BUS CRASH (2017)

On November 9th, 2017, an autonomous bus crashed in Las Vegas within its first hour of service. The shuttle was built by a French startup company called Navya and was designed to travel around the Fremont East district. However, under 2 hours into its year-long trial, this

(Munn, 2017)

shuttle bus was involved in a crash with a delivery truck. Luckily, none of the passengers or the driver of the delivery truck were harmed, however, the shuttle was left with a damaged front bumper. (Shah, 2017)

Many people, in this case, assign blame to the truck driver, as the shuttle bus was stationary at the time of the crash. However, it may not be that simple. The bus had supposedly detected the truck with its sensors as it had stopped to avoid the collision. However, many believe that the bus should have been able to reverse. (Gibbs, 2017)

Conclusion

As I have stated above, it is very difficult to assign blame in some cases as there are so many different variables involved that could have caused the crash. Truly autonomous vehicles are still a long way off so there is still a lot that can go wrong.

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