Theodore Arvanitis

IT 104

Section 001

Dr. Ryshell Henderson

27 September 2021

Is Artificial Intelligence Safe to Use With Self-Driving Technologies?

Introduction

Artificial intelligence first started in the 1950's, but has since evolved into almost everything we see and have today. What is artificial intelligence you might ask? It is a computer science that takes human intelligence and translates it into devices and machines we use every day. We see artificial intelligence in smartphones, video games, navigation systems, and even in smart cars. Smart cars use artificial intelligence to run many different systems including a self-driving program. Self-driving programs, while convenient, can also be very dangerous. We must ask ourselves, is artificial intelligence safe to use with self-driving technologies? I do not believe that artificial intelligence is safe to use with self-driving technologies because it lacks mechanical human tendencies as well as ethics.

Current Use

Self-driving cars use artificial intelligence to essentially drive the car for you. If you have a long car ride ahead of you, put it on autopilot and sit back and relax. The artificial intelligence is used here to let the car know when to slow down, speed up, stay in its lane, change lanes, and to also know how to get to the final destination. As you can see, there is a lot of responsibility and trust involved in this program. I feel that there are certain situations that require a more humanlike response or reaction. While I know that humans are not necessarily ready for everything, I feel that we have a better chance at controlling it faster and more efficiently. Back in 2018, there was an incident involving a self-driving vehicle that struck and killed a pedestrian in Arizona. According to Tom Harvey, "The March 2018 fatal event in Tempe, AZ, when a self-driving experimental vehicle struck a pedestrian continues to offer safety lessons to safety professionals and influence the public at large" (Harvey, 2018). Harvey also goes on to talk about the specifics of the incident. While the people behind the wheel have

responsibility for the car, the whole point of not physically driving it is to allow the driver to be able to do something else. This is an enormous amount of trust and Tom Harvey's excerpt is a prime example of what can happen using self-driving cars.

Security

Smart cars have devices built into them that run on a network. This could be a good way for someone to hack into an individual's smart car. According to Nela Mircica, "In addition to the advancement of autonomous vehicles, more personal devices and systems will be integrated into the autonomous vehicle network, which may expose self-driving cars to significant vulnerabilities" (Mircica, 2019). What if someone were able to hack into your vehicle and control it? This is a huge safety concern for the driver as well as the others around them. There is also the fact that these vehicles can store data. Once these cars store the data, who knows where it goes from there or what it could be used for. This is a big privacy issue.

While there is a danger of hacking the vehicle, there is also potential to hack the surrounding area. As stated by Gabor Kiss, "There is no perfectly secured system, there will be no 100 % safe solution for self-driven cars either, S. Chen, the head of BlackBerry, has claimed that his company will be able to provide 90 % security for the systems of autonomous vehicles" (Kiss, 2019). He also goes on to give a couple examples as to what an individual could do to distrupt the system, directly or indirectly, one of which was with road signs. He explained that newer cars have a device that is able to read speed limit signs to alert the driver of the speed limit. These signs are not the same ones humans see on the road. Instead, these are ones made specifically for the car to pick up. Autonomous cars use the same method, except this is how the car is able to guage the speed at which it should drive. What if someone were able to change the signs from 'all roads closed' to 'speed limit 50' and cause an accident? What if someone were

able to change it from ‘speed limit 50’ to ‘all roads closed’ to cause a traffic jam? Autonomous cars are just one more piece of technology that could be dangerously vulnerable to potential hacking.

Ethical and Social Implications

One of the big questions surrounding self-driving cars is: Can they make ethical decisions when the situation calls for it? One example is the infamous trolly car problem. In this example a decision needs to be made between letting a trolly car collide with a group of children, or pushing a man in front of the trolly car to stop it before and save the children. Goodall puts this example into a real-life scenario. He suggests, “Suppose an automated vehicle were programmed to avoid pedestrians at all costs. If a pedestrian were to suddenly appear in a two-lane tunnel, and the vehicle couldn't stop in time, the vehicle would be forced to swerve, even into the path of an oncoming bus loaded with passengers” (Goodall, 2016). In some cases, what the vehicle is programmed to do may result in an even more dangerous and disastrous outcome. We cannot solely rely on self-driving cars to make crucial life decisions such as this. According to Cummings, “This fundamental lack of contextual reasoning, combined with a lack of understanding of what constitutes maturity in artificial intelligence-embedded systems, has significantly contributed to the failures of these systems” (Cummings, 2021). Self-driving cars still have many problems that need to be addressed when it comes to the ability to make split second decisions that can make heavy impacts. This is due to artificial intelligence taking a more literal approach to how humans would conduct themselves in certain situations. This leads back to the question of whether artificial intelligence can make ethical decisions when it comes to autonomous driving.

The social implications of self-driving cars are important to their success. Society must trust driving them as well as being around them on the road. Lee and Kolodge (2020) suggest, "Furthering trust and diminishing risks are pivotal in ensuring the continuing effectiveness of autonomous vehicles" (as cited by Jones, 2020). However, gaining society's trust and acceptance will be difficult considering the potential impacts and adjustments they would have to make. For example, for self-driving cars to become more common, there will have to be updated rules and regulations on roads and highways. For some, after driving so many years a certain way, it might be difficult to abide by new driving rules. If society is not ready to change old driving habits, or have trust in autonomous driving, then we should not be allowed to have these types of vehicles on the road. This is for the safety of yourself and others.

Future Use

Some believe that using autonomous cars is actually safer than human driven vehicles. When talking about Tesla's autopilot software, Kiss stated, "The accidents statistics of the journey showed one accident or accident-like incident every 3,34 million miles. According to the US Department of Transportation there is an accident every 492,000 miles in America" (Kiss, 2019). If this is true, then why are people having such a tough time putting trust in autonomous cars? According to Hong it is because, "people tend to trust AI to be better than humans, including driving. So, AI drivers making an accident can be seen as a violation of trust" (Hong, 2020). With a good level of trust from the public, autonomous cars could be seen as good for the well being and safety of society. Some might argue that you must also consider the era we are in with the COVID-19 pandemic. According to Richard Threlfall of KPMG, "Looking forward, driverless vehicles could have an expanded role in addressing new requirements for moving people and goods, arising from the COVID-19 pandemic" (As cited by "COVID-19 may

accelerate self-driving vehicle growth," 2020). Autonomous vehicles could be great for social distancing and conducting contactless delivery to help slow the spread of COVID-19. With further development, there are many upsides to using autononous driving.

If we were able to get self-driving cars safe and trustworthy enough to be on the road, I think that it could be beneficial to society. There would be an opportunity to reduce the number of accidents caused by motor vehicles, as well as improve the safety on freeways and in tighter city-like areas. If we were able to get to the point where we do not have to have someone in the vehicle, there could be upside to that as well. One upside to this is product transportation and distribution. We could be able to transport goods faster, which would lead to higher productivity. However all of this would be dependent on making self-driving safe, which I believe is a long way away.

Conclusion

When asking the question whether artificial intelligence is safe to use in autonomous cars, my answer would be no. I do not believe that the road is ready for autonomous cars because of their inability to make ethical decisions and for security reasons. It is too dangerous to put trust in a machine that can potentially make life changing decisions. In addition, the risk exists for individuals hacking into your car and stealing personal data, or potentally taking control of it. Society must trust autonomous driving first and I do not believe that the majority of people have full trust in these vehicles. Society should stick to humans driving behind the wheel because artificial intelligence lacks ethical, moral or indecisive decision making.

References

COVID-19 may accelerate self-driving vehicle growth. (2020, 10). *Quality Progress, 53*, 8. http://mutex.gmu.edu/login?url=https://www-proquest-com.mutex.gmu.edu/magazines/covid-19-may-accelerate-self-driving-vehicle/docview/2468684663/se-2?accountid=14541 . Accessed September 27, 2021.

The Quality Press does a good job of relating autonomous driving to present day issues. This article serves as a positive for people that are for autonomous driving. So, this is good for the reader to see the pros and cons of autonomous driving. This article helps my research because it will help me to get another perspective on how autonomous driving may be helpful. Even though I am against self driving, it opened my eyes to other ways it could be used.

Cummings, M. L. (2021). Rethinking the maturity of artificial intelligence in safety-critical settings. *AI Magazine, 42*(1), 6-15. http://mutex.gmu.edu/login?url=https://www-proquest-com.mutex.gmu.edu/scholarly-journals/rethinking-maturity-artificial-intelligence/docview/2515179201/se-2?accountid=14541 . Accessed September 20, 2021.

Cummings talks about how machines cannot reason in certain situations. She goes through the different ways that autonomous driving could be used, but also where it has it's flaws. She gets more specific and also goes into bottom up versus top down reasoning and where AI excels and lacks in those areas. This journal helps my research because it gives me an understanding of where AI could excel and where it could fail in certain scenarios.

Goodall, N. J. (2016). Can you program ethics into a self-driving car? *IEEE Spectrum, 53*(6), 28-58. http://dx.doi.org.mutex.gmu.edu/10.1109/MSPEC.2016.7473149 . Accessed September 20, 2021.

Goodall brings up some good points about ethical decision making when it comes to AI and autonomous cars. As a result of machines being very literal, can they really make ethical decisions that could mean life or death? He talks about an AI's ability to make rational decisions in certain scenarios where both outcomes could be disasterous. His conclusions about AI brought to my attention some serious ethical concerns. I think this source impacted my research because it shows many ethical concerns and why there may need to be more work done to AI.

Harvey, T. (2018). HUMAN ERROR & ADVANCED TECHNOLOGY: An analysis of an NTSB news release on self-driving vehicle fatality. *Professional Safety, 63*(11), 55. http://mutex.gmu.edu/login?url=https://www-proquest-com.mutex.gmu.edu/scholarly-journals/human-error-amp-advanced-technology-analysis-ntsb/docview/2132692235/se-2?accountid=14541 . Accessed September 20, 2021.

In this article, Harvey talks about tragic accidents involving autonomous cars and who was at fault. In his example with the pedestrian in Arizona, he explains how the car failed to realize that he was there, and had plenty of time to stop. This was the result of a failure of recognition on the autonomous vehicle's part. While the person behind the wheel had some blame, the AI is what failed in this instance. This helped my research because it put factual support behind my stance on the issue.

Hong, J. W. (2020). Why is artificial intelligence blamed more? analysis of faulting artificial intelligence for self-driving car accidents in experimental settings. *International Journal of Human - Computer Interaction, 36*(18), 1768-1774. http://dx.doi.org.mutex.gmu.edu/10.1080/10447318.2020.1785693 . Accessed September 20, 2021.

This source is based off of a study where Hong looks at why people blame AI more for self driving accidents. In this study, it is suggested and proven that because people trust AIs more, when we see an automonous vehicle get into an accident, we immediately do not trust it. This is believed to be true for most of society. This study has helped my research because it has provided reasoning behind why we may or may not trust autonomous driving.

Jones, H. (2020). The social ethics of self-driving cars: Public perceptions and predictions of autonomous vehicle safety risks. *Contemporary Readings in Law and Social Justice, 12*(1), 37-43. The Social Ethics of Self-Driving Cars: Public Perceptions and Predictions of Autonomous Vehicle Safety Risks - Research Library - ProQuest (gmu.edu) . Accessed September 20, 2021.

In this journal, Jones talks about the social impacts of autonomous cars. She goes into how society must show trust in autonomous cars in order for their success. While autonomous driving may be an impressive technological feat, there are still flaws that could still make it dangerous. This helped to further my research because I had the opportunity to understand how society may be affected and feel about autonomous driving.

Kiss, G. (2019). The danger of using artificial intelligence by development of autonomous vehicles. *Interdisciplinary Description of Complex Systems, 17*(4), 716-722. The Danger of using Artificial Intelligence by Development of Autonomous Vehicles - Research Library - ProQuest (gmu.edu) . Accessed Spetember 20, 2021.

In Kiss's journal, he does a good job of giving insight into both sides of the argument of whether autonomous isfd driving safe. He talks about the security of these vehicles as well as the risk factor of getting in an accident. There are many examples throughout this journal that help illustrate the dangers, as well as the rewards, of autonomous driving. This journal helped to provide more insight to my research because of the ample examples provided, as well as giving me more information the security issue with automonous cars.

Mircică, N. (2019). The design, implementation, and operation of self-driving cars: Ethical, security, safety, and privacy issues. *Contemporary Readings in Law and Social Justice, 11*(2), 43-48. The Design, Implementation, and Operation of Self-Driving Cars: Ethical, Security, Safety, and Privacy Issues - Research Library - ProQuest (gmu.edu) . Accessed September 20, 2021.

Mircica explains in her journal that there needs to be more of a transition from human driving to autonomous driving. She also mentions that there are big underlying privacy issues associated with autonomous vehicles. These vehicles have sensitive data stored in them such as destinations, phone contacts and user information. This journal helped me to understand the potential privacy issues associated with autonomous vehicles.