The Semi-Autonomous Systems' Dangers to Humans

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Abstract

Semi-autonomous vehicles represent a technological leap forward, yet they come with their own set of challenges. The term "semi-autonomous" often misleads users into thinking these systems are fully autonomous, leading to complacency and trust in the technology, a trust that should not exist to the extent that it does. While the safety of AI-powered systems has been extensively studied, the lack of warning mechanisms for distracted driving remains a concern, contributing to a rise in fatalities. This paper reviews the limitations and risks posed by current semi-autonomous systems and addresses the need for enhanced safety measures and potential adjustments to semi-autonomous systems, arguing that semi-autonomous systems amplify risks on the road rather than enhancing driving efficiency.

Introduction

Semi-autonomous vehicle use and production have soared in recent years due to advancements made in mechanical engineering and computer software technologies.

While semi-autonomous vehicles are a start to a future of great technological advancements, they have their setbacks. The lack of warning messages or alerts in the case of distracted drivers has led to over 3,000 deaths under the cause of distracted driving [1]. The purpose of this paper is to cover ideas and potential add-ons to semi-autonomous systems. While the safety of systems with artificial intelligence has greatly been studied by researchers, there is a lack of warning systems within the car for the high risk of distracted driving while using a semi-autonomous system. Adding on these systems which could prevent accidents would benefit society by reducing fatalities in the upcoming era of autonomous vehicles.

Literature Review

Semi-autonomous systems are threats to the people sitting in drivers' seats and other people on the roads. In Toronto, Canada, they could not even be relied upon downtown [18], Elon Musk's reasoning being that the street cars were the issue - interfering with regular anticipations due to people getting on and off in the middle of the road [18]. Even more so, the Massachusetts Institute of Technology (MIT), conducted a review [13] in which semi-autonomous cars were predicted fatalities. Since 2016, an observable increase in fatalities due to distracted driving every year was greater than the last 50 years' increases, resulting in about a 7.2% increase every year [13]. This trend lines up with the autonomous systems going onto the roads, with distracted driving increasing as the cause of deaths in general, as shown by

this graph presented by MIT.to increase distracted driving.

Human Error
A sharp uptick in fatal car crashes due to human behavior was led by an increase in the rate of distracted driving.

Figure 1. This image shows the stark increase in the rates of deaths due to distracted driving. [13]

Although labeled as semi-autonomous, many users in the general public have treated these vehicles as if they were fully autonomous. They "believe, dangerously, that they can eat or text with impunity while at the wheel" according to US News and World Report [17]. Nissan and Infiniti's ProPilot Assist, Tesla's Autopilot, and Cadlillac's Supercruise drivers act on the promise of perfected self-driving expectancies, which is not at all what is marketed or safe [19]. Subconsciously, of course, everybody knows this, but when they are put behind the wheel and have been using these sorts of features for a lengthened period of time, the trust in the vehicle grows as laziness, drowsiness, fatigue, and boredom envelopes the drivers' brain. Over half of the SuperCruise users mentioned that they had no issue treating the car as if it was 100% autonomous, a statement of great concern [19].

Threats in Artificial Intelligent Systems

The semi-autonomous systems on the roads now increase threats more than they improve driving efficiency. Human demeanor is not taken into consideration within their models, resulting in mistakes constantly occurring in the streets which then get blamed upon the backup driver; but, how can the mistake of a semi-autonomous car be the mistake of the backup driver who exhibits predictive behaviors of drowsiness or lack of attention while on a drive? Elaine Hersberg, a woman killed by an Uber on autopilot that failed to recognize her figure crossing the street, became the sole fault of the backup driver, Rafaela Vasquez, while Uber remained blame-free [2]. Unsafe and unfair, this practice establishes a system where the actual criminal gets off: the autonomous car's software itself. Cars travel quickly-humans are not robots to be on high alert even hours following a drive- and high speeds make it harder to discern an impacted situation.

"Smoothing the edges" of an autonomous system should not fall on the shoulders of backup drivers or

Driver Age Group	# of Fatal Crashes Involving Distracted Driving
15-20	321
21-24	317
35-44	474
45-54	368
65-74	192
75+	156

[15]

humans in general. Young people especially are prone to succumb to distracted driving and should not be able to access systems to increase the likeliness of them getting distracted [15]. To add, assembly Bill 316 [4] prevented the deployment of autonomous trucks on the roads, proving that the government itself argued against its safety and its ability to efficiently provide secure passage for all persons and vehicles on the streets. This provides a message to those preaching for the technological advancements to hurry onto our highways that there are legitimate reasons behind the slow progression of artificial intelligence in cars and that strict regulations are highly necessary for them to be set free; if they do not meet the rigid standards then they cannot be let loose on our highways to endanger civilians just for the sake of progress. Young drivers have been shown to get more easily distracted than older drivers, as shown by the table[15]; it is imperative to do everything to prevent fatalities when we can, especially so when a simple alert could save a life.

Can you really rely on a human with the "attention span of a goldfish" [3] to be able to take over a car moving at common high speeds at profound efficiency? All these accidents that have been put under "human error"... are humans really the only ones to blame? If a car fails to recognize a human or a biker on the roads and hits them and kills or injures them is it really the human at fault because of their inefficient reaction to save the pedestrian's life, or the software of the autonomous system that failed to identify the pedestrian in the first place? These questions need to be scrutinized deeper due to the getaway of autonomous car companies who fail their vehicle's software and then blame it on backup drivers. "Human error" is essentially "semi-autonomous vehicle error" but in the words of the companies who want to save themselves from lawsuits. March 18, 2018, was the date the first pedestrian was killed in the US due to a car that was driving on its own [11]; granted, the backup driver was reported to be on their phone, but this is not the last case of distracted backup drivers and is one of the many first. Clearly, this demonstrates that humans are incapable of maintaining focus on the roads while a car is monotonously driving for them. The 419 crashes and 18 fatalities [7] are 419 and 18 too many; the entire point of these cars being on the road is to perfect human driving. The roads shouldn't be their field tests.

Unsafe Expectations

Human attention span has been reported to decrease over the years [20], making it especially dangerous to depend on them to react in the moment of milliseconds that it takes for a car to make a mistake. In 2019, distracted driving was the cause of 3142 deaths, and 424,000 injuries, with 566 of the injured being nonoccupants(individuals outside of the vehicle) [20]. This type of driving is already such a widespread cause of accidents, imagine how much the numbers are going to increase as semi-autonomous software takes over the roads. The key term is *semi*-autonomous; not fully autonomous, but *semi.* Depending on humans to "smooth out the edges" of artificial intelligence is highly dangerous and unfair to pin the blame on them. Having expectations on humans to fix

artificial intelligence's mistakes in a matter of milliseconds at times is unrealistic and should not be the fault of the human. This practice is strictly only to save the company's reputation and should be stopped.

If semi-autonomous systems are to be on the roads they should have driver monitoring systems in place: scanning facial features to identify someone sleeping or someone on their phone by scanning their eyes as not on the roads, etc. Driver Monitoring Systems (DMS), exist as software- but are not used to alert a driver using a semi-assisted system to keep their eyes on the road or to keep their eyes *open.* This implementation would vastly aid distracted driving in the fault of autonomous systems. Backup drivers have been reported to be on their phones at the time of a crash numerous times, with no help from supportive A.I. systems warning them of danger even though the same A.I. systems are making it so much easier to succumb to distractions. In this day and age especially, a phone provides a million different distractions, and a car driving you on long stretches adds to the difficulty of lasting focus on the road. "The system gives you a sense of false security", says a researcher at the University of Windsor [8] studying the 'tuning-out' that drivers do subconsciously; they tune out the roads. Francesco Biondi, a kinesiology professor at the University of Windsor, stated that the people in the experiment driving Tesla Model 3s using semi-automated autopilot mode tended to "tune out" Highway 401 more than the users who drove manually. Driver Monitoring Systems are the solution to this issue. Their scanning abilities can allow drivers to not lose attention and keep other people safe.

Warnings can include verbal messages by an artificially intelligent device scanning the driver's face for programmed signs of drowsiness; maybe something as simple as a repeating sound would be sufficient until the driver looks back towards the road with open eyes. Of course, this can only be done with advanced artificial intelligence systems using driver monitoring systems and responses to inform the driver of their misconduct and dangerous actions.

Conclusion

Humans cannot be expected to monitor a car driving on its own with complete alertness, especially after considerable time has passed. The statistics of the field prove that distractions are easier to succumb to when using a semi-autonomous system. If we are to go parallel to the advancements of the 21st century, we need to keep up with safety and understand human abilities are not capable of maintaining full focus in a monotonous drive. After all, they are semi-autonomous, not fully autonomous.

Acknowledgments

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