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The Influence and Apprehensions Around AVs

The emergence of autonomous vehicles(AVs) marks a revolutionary development in the transportation industry, promising increased comfort, safety, efficiency, and sustainability to future riders, passengers sharing the roads, and pedestrians along roads. Unfortunately, the process of fully realizing this technology is constantly flooded with challenges and setbacks, highlighted by pessimistic John Angwin of The New York Times in “Autonomous Vehicles are Driving Blind”(Angwin, 2023). In this review, I will be delving into claims made by these companies, the current state of AVs, the potential futures of AVs, as well as ethical considerations pertaining to the adoption of AVs that require policy recommendation for regulation before they’re common.

Despite hundreds of companies worldwide racing to get the first fully autonomous vehicle onto the market, a significant challenge they haven’t solved still exists. Regardless of the vast array of potential benefits AVs can provide in theory, public opinion is nowhere near ready for AV adoption. In 2022, a shocking 63% of Americans were extremely reluctant to ride in AV (Pew Research Center). Even if offered as a free taxi or bus service, an even more worrying 75% of Americans wouldn’t be willing to ride even once (Haboucha et al., 2017). While a large majority of those skeptical are part of our nation’s aging population who tend to be less informed on technological advancements such as AVs, companies are forced to take notice and address this

distrust due to the implications of forcing an adoption of such a different technology. This technology will not only change the way we go about our lives, but will be solely responsible for our lives while we ride in an AV or walk as a pedestrian in an area with AVs.

Given this overwhelming distrust in the future of AVs by a majority of the United States population, my study aims at answering the following questions:

- What aspects of AVs cause the most distrust? How can this be addressed?
- How sustainable are AVs, generally and relative to conventional internal combustion vehicles? How can community infrastructure and the car companies themselves prioritize sustainability to maximize carbon dioxide reduction?
- How does the safety of AVs compare to conventional personal vehicles for passengers and pedestrians, considering both a situation where AVs are the minority (early adoption), as well as when they're the majority on the road?

As stated earlier, I've chosen to complete a literature review to obtain a greater understanding of the wide range of potential benefits, ethical dilemmas, and setbacks within the rising AV industry. Utilizing surveys like those offered by Pew Research Center and Haboucha et al. in "User Preferences Regarding Autonomous Vehicles", people's motivations to accept or reject AVs are better understood for future policy. Scholarly articles, such as "Understanding Autonomous Vehicles" provide a detailed view of the advancements made in the AV industry, the different levels of AVs and technology

backing these capabilities, as well as the future of AV integration and potential prioritization of AV implementation into certain sectors before full adoption for private use. The popular media sources used, like “Autonomous Vehicles are Driving Blind” mentioned earlier, reinforces public opinion by stressing the urgency of regulation before an attempt at integration.

From a utilitarian perspective, AVs theoretically hold their promise of significant benefits, especially in terms of safety. A 90% adoption rate of AVs could prevent over 4 million US car crashes annually, saving around 22,000 lives(Faisal). This finding aligns exactly with utilitarian principles of seeking out the maximization of overall well-being of the majority. Moreover, in the case of a potential accident, remote human operators are deployed to the car’s system to prevent the likelihood of an extreme or fatal crash, further enhancing the relative utility of AVs. Nevertheless, the significant resistance and reluctance by the general public to try AVs will prove to pose a major roadblock once AVs are prepared to be put on the market.

Addressing this issue requires building public trust in a truthful manner. Due to the lack of knowledge a large portion of the public has on AVs, campaigns to spread awareness and education on the benefits, enhanced safety, and potential lives saved through AV adoption could go a long way. By involving the public in discussion on potential visions for the future of AV implementation, a utilitarian approach can be actualized to ensure societal well-being is being prioritized throughout the major shift.

From a deontological standpoint, there are many current issues in the way of producing safe AVs. Prioritizing moral good and rejecting potential for morally wrong events, AVs still have a long journey ahead of them. The finding that 76% of Americans are afraid of their hypothetical AV being hacked and hijacked highlights the ethical dilemmas stemming from the computer systems of these AVs(Pew Research Center, 2022). In some cases with particular companies, the AV has no steering wheel or gas pedal, making the option to override potential failure impossible. Even with an override option available, it is the ethical duty of companies to ensure strict regulations for appropriate cybersecurity measures in these vehicles.

Americans aren't just worried about their software and data being hacked, but simply sold as well, which could potentially cause major problems in the AV industry. Unlike any other type of technology company, AV adopters will ruthlessly have their location data, travel data, time of travel data, etc. tracked, collected, and sold by these AV companies for profit. Obviously, a firm or individual being able to buy access to one's daily travel patterns and location can end tragically. While much of the data tracked is vital to the advancement of the AVs systems, companies should be obligated to give individuals an opt-out option to ensure their data isn't being released in any way.

Lastly, the major job displacement caused by the AV industry predicted by 83% of Americans must be addressed in advance to its occurrence(Pew Research, 2022). Taxi

drivers, food service delivery drivers, mail delivery men, etc., many of whom are immigrants to the country, will be without employment or transferrable skills. To prevent a shrinking job market, companies developing AV technology should be obligated to invest in reskilling programs for displaced workers from the transportation industry.

From a virtue ethics perspective, we can come to a much more optimistic conclusion on the future of AV adoption. Assessing the potential solution above of enhancing public knowledge and trust in AVs through education exemplifies transparency and honesty from the corporations leading the charge. Growing a culture, starting from within, where the AV industry prioritizes clear and open communication with consumers about the technology's capabilities, relative benefits, and current limitations should be considered virtuous. Addressing the negative impacts of the AV industry like job displacement by offering reskilling initiatives embodies corporate responsibility and compassion for customers.

However, using the principles of virtue ethics, there are still areas of improvement that need to be recognized proactively. AV companies, as morally responsible actors, must ensure that the benefits or AVs are spread ethically and in an equitable manner, especially when Shared Autonomous Vehicles (SAVs) are more prominent. Major improvements in areas like fuel savings, passenger safety, pedestrian safety, and more efficient travel shouldn't compound with existing American inequalities. Ensuring a fair

distribution of the technology will prevent this, all while more quickly shifting public opinion and trust positively.

In comparing these ethical perspectives, certain conflicts emerge, particularly in addressing public reluctance to the technology. While utilitarianism aims to maximize well-being by emphasizing the potential benefits of AVs, deontology and virtue ethics stress the dire need for increased ethical considerations of safety, data privacy, and job displacement. To synthesize in hopes of creating well-received, moderate policy, a more balanced approach incorporating the utilitarian view to gain public trust, the deontological perspective of necessary strict regulations, and the virtue ethics principle of sympathy and aid for the underrepresented and underserved should result in an integration process that addresses ethical challenges while prioritizing the interests and safety of the average consumer.

As a politician, crafting a concrete stance on AVs and a policy statement on the adoption and regulation of AVs serves crucial to addressing the complex issues and ethical concerns present and feared by the public, according to the research and analysis above. The policy statement below's purpose is to provide a balanced approach that aligns with the current state of AVs, public perception to the technology, as well as the potential future outlooks of the AV industry discussed within the review.

Policy Statement for AV Regulation and Adoption:

The first and most important priority of this policy is to instill trust in the population, as smooth integration will prove to be impossible regardless of how safe if distrust among the public remains. To fight the significant reluctance among the public, public awareness initiatives should be presented frequently to educate citizens about the benefits of enhanced safety, and potential positive environmental impacts of AV adoption. These campaigns can be on the local, state, or national level, both in person, on TV, or the internet. Paired with this, a more hands-on initiative may be necessary through community engagement campaigns. By opening up communication with communities about how they would want AV integration to look like and even bringing AVs to communities for people to test for the first time, individuals will become more comfortable with the technology while feeling like they have a say in how these future vehicles will impact their community.

Along with the transparency that comes with awareness initiatives, strict regulation must be backing it, as a better informed population only proves beneficial to the AV industry if the vehicles are as safe as the companies claim. To proactively prevent some of the several safety concerns with AVs, cybersecurity regulation and data privacy regulation should be paramount before there is even a thought of bringing the technology to market. Mandatory safety features within the software, regular security audits, an opt-out option for data sharing, as well as constant monitoring of

cybersecurity health should be obligatory measures provided by the AV company during production and throughout the car's life.

As vital as the safety of our data, the safety of individuals from job loss or potential attacks in a SAV also plays a role in the future of AVs and the regulation needed. To address the inevitable job loss of drivers due to AVs, I propose that AV companies should be obligated to reskill the citizens whose jobs they're replacing, ensuring they'll be able to find new opportunities. To prevent unwitnessed attacks on an SAV, similar to the attacks that have occurred in Ubers, I propose that all SAVs are required to have cameras throughout the passengers' space, as well as a panic button in the vehicle for the passenger if they're under attack or trapped in a dangerously malfunctioning car. Upon pressing the button, the AV company and local police department could find the person's current location, identify the issue, and flag the car efficiently to stop the AV and prevent the attack from going any further.

Lastly, ensuring this wonderful technology can reach the hands of all in the United States, regardless of location, socioeconomic status, age, etc. should serve as a major priority when drafting policy. While most new technology, such as the computer, inadvertently furthers gaps of inequity due to the technology reinforcing existing inequalities, we now have the opportunity to solve this issue with AVs before it occurs. By implementing policies that keeps AVs, especially SAVs, affordable and available in all communities allows the benefits to spread to everyone. With such a major improvement

in quality of life for underserved communities, AVs could be a crucial player in the strengthening of historically oppressed communities due to the newly improved affordability, efficiency, and ease of travel. For example, an employee can save an hour each day taking an AI bus to work rather than a regular bus simply due to more efficient traffic flow on his route, or a single mother can take a higher paying job because an AI taxi is now affordable enough to pick up her children from school and take them to their after-school activities.

Personally, I'm still quite indifferent to the idea of AVs, which I was hoping wouldn't be the case upon completing my review. On one hand, I love the action of driving, as I find it to be one of the most relaxing activities to do alone. Also, as a fan of cars, I constantly see the negative attention that follows the current state of AVs. It seems like no more than a couple months can go by without a major automotive company recalling vehicles that have some sort of self-driving capabilities due to an error that makes the vehicle incredibly unsafe, with Tesla being the latest just this past week. Furthermore, with the current state of data privacy in the United States, generally and comparatively to our European neighbors, I don't know if I could trust an AV at the moment. While true that if I had the opportunity to test out a vehicle with highway autopilot, I certainly would, I couldn't see myself buying a car for the feature or even using the feature often if I had a conventional vehicle with autonomous capabilities.

On the other hand, given an optimistic view of the future of AVs where all regulatory needs are met, I believe I would love AVs, especially in SAV form. While I do have a car myself, I also pay for an Uber subscription due to how much I use the service and how expensive it is without the subscription. Getting a potentially cheaper ride without the fear of a creepy driver, talkative driver, or unsafe driver would provide a much more consistent, calming transportation experience. Additionally, solely for traffic reasons, I would love to see adoption of AVs even if I don't have one. Especially in Colorado, highway traffic is primarily caused by irregular driving patterns by particular drivers rather than road design. If sufficient evidence for increased flow of traffic such as the evidence found in “The effect of Autonomous Vehicles on Traffic” by Friedrich can be further proven, city populations everywhere will be begging for AV adoption. While highway autopilot is already common for bumper-to-bumper traffic in major cities, full AV technology could take care of the driving while simultaneously reducing traffic.

Though the benefits of this technology sound inviting as it advances, several areas that require further investigation appeared throughout my research. The first, and potentially most concerning, would be AVs impact on the environment. While most studies indicated a decrease in carbon dioxide emissions with the integration of electric AVs due to their replacement of internal combustion engines, the U.S. Department of Energy findings were much more grim, and unfortunately realistic. In the study, they determined that while AVs could reduce fuel consumption by 90%, they could also increase consumption by 250% due to an exponential increase in driving because of the ease and

accessibility. This eye opening statistic shows that while we expect AVs and electric vehicles to save us from the pain of global warming, they could easily quicken the damage if we aren't careful.

Pertaining to the individuals that AVs will impact, further research could take so many paths for many purposes. To constantly gauge public opinion on AVs, surveys should be conducted regularly, accompanied by education opportunities. Once those education opportunities have passed, surveys should be reconducted to see the sentiment of a more informed public. To ensure a smooth transition for displaced drivers, further research and surveys should be conducted to determine the most common skills of drivers that are applicable to other professions, which other professions they would prefer, and what types of reskilling programs have proven to be the most effective in other cases of mass job displacement.

Lastly, due to the perceived improvement of the flow of traffic being solely determined by theory and mathematical models, further research should be done on the ground to test the claims of improved traffic flow and reduced accidents. In many of the studies, authors suggested that AV lanes will be necessary in early adoption phases. If these lanes aren't available, how much does the flow of traffic differ? How difficult would it be to create these dedicated lanes? Some optimists in my studies claimed that creating space for these dedicated lanes would be easy due to AVs needing less road width to operate safely, but many highways already are short on space.

To conclude, the potential of AVs are proven to be undeniably vast, with companies promising a revolution in safety, efficiency, and sustainability in the transportation industry. Even so, as this text has illustrated, the realization of these promises rely heavily on overcoming the complex and numerous obstacles present and ahead. Public skepticism to AVs forms a strong barrier, creating a largely uninformed audience that becomes increasingly repelled as negative publicity pours in. Ethical concerns, ranging from cybersecurity concerns to job displacement, demand thorough regulation that balances innovation with the well-being of society. Crafting a comprehensive policy position requires addressing these ethical dilemmas while stimulating public trust through education. Further research, such as exploring AV impact on the environment, public sentiment trends, and more traffic flow implications, will prove critical in refining this research to attain a greater understanding. In the end, as we reach the beginning of a new technological revolution, a balanced and more informed approach is key to maximizing the benefits of AVs while preventing and mitigating their potential risks.

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