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Policy Brief

ETHICAL, SOCIAL AND LEGAL ISSUES: THE FUTURE FOR CONNECTED AND AUTONOMOUS VEHICLES

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Connected and autonomous vehicles (CATV) have become a focal point for the automotive and technology industries, as industry giants like Apple, Waymo, Ford, Nissan and Tesla have made enormous investments into the development of this transportation technology. But while the CATV field is advancing quickly, the legislative and regulatory response to the ethical, legal and social implications (ELSI) of this technology has not been as extensive. And we may need to act quickly. Although some, more conservative forecasts predict that widespread, successful adaptation of autonomous vehicles will not come for at least another 30 years, it seems clear that some degree of automation has already arrived, and that new forms and degrees of automated technologies will be adopted more widely in the next five years. This brief describes some of the main ELSI issues around CATV through the lens of current research, public interest and societal need, and examines possible policy implications associated with these risks.

Privacy

Connected and autonomous vehicles will likely operate using highly sophisticated on-board computing systems which will have the ability to transfer enormous amounts of vehicle data to the manufacturer, as well as other CATV, including the transportation history, current and future location, travel routes, and personal information of the vehicle passenger(s). Without the ability to transmit this information through the CATV system, the vehicles would not be functional or capable of operating without human intervention, as proposed. It is also possible that these vehicles will employ biometric data, such as fingerprint or retinal scans, for security. This data would be stored in the vehicle database, available to a variety of parties with access. The federal or state registration of the vehicle might also allow government entities to access this information.

Without legal intervention, it is not clear who would own this information, or who would have the ability to extract it and view it for any use. Solutions to these privacy concerns are both technical and legislative. Infrastructure design and safeguarding measures can be put into place to protect data, but the key element for privacy control and protection of vehicle passengers and owners will be creating laws that make any breach of data or misuse of data illegal.

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Security

Connected and autonomous vehicles will be vulnerable to security breaches, such as hacking. While it is not likely that an "unhackable" system will be developed, a requirement for a multi-tiered verification system and a series of redundancy checks can help avoid malevolent intrusions into both vehicles and infrastructure systems.

Insurance and Liability

CATV present several issues for insurance and liability structures. In theory, the driver/passenger of the vehicle will not be able to influence the "decisions" made by the vehicle. Who will be liable in the case of an accident? The manufacturer? The designer of the algorithm? It has been noted that the passengers will likely be required to use the vehicle with the understanding that they accept the risk. Accidents will result from programming bugs, computer error, and machine faults. Algorithms can be designed to ensure the vehicle will always make decisions that would protect the passenger from liability. But protecting passengers from liability may not result in the most ethical decisions, posing legal problems for both passengers and vehicle manufacturers. Recasting questions that pertain to liability in the case of the operation of CATV will involve both government and insurance industry actors.

Infrastructure, Workforce and Economic Impact

The infrastructure updates required to support a CATV environment would be large scale and expensive. Roadways would need to become connected, allowing the vehicles to communicate with stop lights, stop signs, and other traffic signs, as well as to take on weather conditions and other information. In addition, this infrastructure will need to support communication between vehicles. The cost of these kinds of upgrades to American transportation infrastructure is not known or fully understood, but is expected to be extremely high.

It is likely that the high cost of CATV infrastructure will inhibit industry growth in the early stages of adaptation. However, it is expected that the technology will decrease in price over time. It is not known how the proliferation of CATV will affect other industries, such as the taxicab industry, public transportation, or the freight trucking industry. It is estimated that a shift to automated semi-trucks and taxicabs would result in job loss for over 4 million workers in the US.

Safety

Industry experts estimate that the implementation of CATV could reduce automotive fatalities from human error, especially from drunk driving, to less than 10% of the current rate. However, the likely error/failure rate and degradation style of CATV technology is not known. Current research has done little to investigate how to handle human takeover in the event of failure, as human takeover has been shown to be infeasible and unsafe if passengers are passive or unengaged. Because these mechanisms are not known, it is not possible to determine if the trade-off between less accidents from human error and CATV technology failure are acceptable

Conclusion

Autonomous vehicle implementation would have an enormous impact on transportation in the United States and globally. There are many positive effects that would come from such a large-scale innovation, but there are many issues and concerns that must be addressed to achieve successful execution and societal acceptance.

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