Katherine Rose Driggs-Campbell, Victor Shia, and Ruzena Bajcsy. 2014. Decisions for autonomous vehicles: integrating sensors, communication, and control. In *Proceedings of the 3rd international conference on High confidence networked systems* (*HiCoNS '14*). Association for Computing Machinery, New York, NY, USA, 59–60.
DOI:https://doi-org.libproxy.uoregon.edu/10.1145/2566468.2576850

During this research study, Driggs-Campbell discusses algorithms that could be used by autonomous cars during their decision-making process. Multiple times throughout the research, Driggs-Campbell also notes that there is lacking research in regards to vehicle-to-vehicle (V2V) communication; furthermore, most all decision making is happening internally with little to no cooperation with other autonomous vehicles. Therefore, the main goal for Driggs-Campbell and her colleagues is to shift attention outwardly to V2V technology.

This research aids in answering my initial research question; a homogeneous population of self-driving automobiles could potentially interact with each other through a V2V communication technology. Furthermore, this information falls within the scope of my research project. In particular, the research by Driggs-Campbell has shown me some feasible features of autonomous vehicles. The work done by the Driggs-Campbell team is beneficial to the field of autonomous automobiles because the proper attention has not been given to V2V technology in the past.

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Kai Holländer. 2019. A pedestrian perspective on autonomous vehicles. In *Proceedings of the 24th International Conference on Intelligent User Interfaces: Companion* (*IUI '19*). Association for Computing Machinery, New York, NY, USA, 149–150.
DOI:https://doi-org.libproxy.uoregon.edu/10.1145/3308557.3308725

Holländer discusses the current evolution from semi- to fully-autonomous vehicles. As a result of this changing autonomy, the disconnect between vehicles and pedestrians is widening by the day. During this research, Holländer ponders how personal vehicles may someday become a shared community resource or service. Furthermore, Holländer believes that the relationship between the individual and the automobile may begin to change as time and technology progress. One example of this progress includes external displays on autonomous vehicles that could also interact with the local "smart city" environment. This concept again highlights the potential shift from private to public use in regards to the automobile industry.

Throughout this research, it is difficult to spot bias because so many of the core remarks are based on hypotheticals. Regardless of this, Holländer's examination of possible changes in the self-driving car industry opens a window into a new world of theoretical applications and ideas. Many different spheres in the autonomous vehicle realm could benefit from this research because it offers a roadmap to the potential future of such technology. Researching this material has given me a new outlook on not only the proven abilities of self-driving cars but also on their

future possibilities.

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José L. F. Pereira and Rosaldo J. F. Rossetti. 2012. An integrated architecture for autonomous vehicles simulation. In *Proceedings of the 27th Annual ACM Symposium on Applied Computing* (*SAC '12*). Association for Computing Machinery, New York, NY, USA, 286–292. DOI:https://doi-org.libproxy.uoregon.edu/10.1145/2245276.2245333

This study takes a different approach to researching the possibilities of self-driving cars. Instead of solely examining the hardware aspect of autonomous cars, Pereira mainly focuses on the software of the vehicle. Pereira begins by addressing how the current use of computer simulations and technology to model the patterns of self-driving cars is inefficient. Instead, Pereira proposes the use of a new computer simulator that joins both a traffic *and* robotics simulator into one. Pereira states that this would allow for more practical research of how self-driving cars could interact with their environments without the need to do so in the real world.

The research done by Pereire is beneficial for the field of autonomous vehicles. With these findings, much more research can be conducted from within a computer simulation; inside the simulation, all aspects of the environment can be controlled and it can become easier to receive accurate results for different types of decision-making algorithms. This research has aided me in my own research project because it answers a question that I brought attention to in my scope: How can computer simulations aid in learning about the impacts of self-driving vehicles on traffic?

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Sghiri Meryem and Tomader Mazri. 2019. Security study and challenges of connected autonomous vehicles. In *Proceedings of the 4th International Conference on Smart City Applications* (SCA '19). Association for Computing Machinery, New York, NY, USA, Article 13, 1–4. DOI:https://doi-org.libproxy.uoregon.edu/10.1145/3368756.3368979

In this study, Merymem discusses the many different types of challenges that face self-driving cars in terms of cybersecurity. First, Merymem organizes each type of potential attack into two separate categories: attacks that involve taking control of the vehicle, and then passive attacks that infiltrate the software and/or data of the vehicle without causing any immediate physical damage. Within the subset of attacks that take control of the vehicle, the category can be further divided into risk attacks and risk-free attacks. Merymem states that with the increase in network connectivity comes an increase in potential vulnerabilities and attacks.

Merymem's look into the many possible attacks on self-driving cars helps to answer a question outlined in my proposal scope: What kind of cybersecurity threats face the autonomous vehicle industry today? I think this research can also be of use in the field of self-driving cars because it creates a set of benchmarks that other researchers can reference when designing systems for

autonomous vehicles. In terms of issues with this research, I found various areas in which text needed to be reorganized due to the fact that it was choppy and hard to read.

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Lars Müller, Malte Risto, and Colleen Emmenegger. 2016. The social behavior of autonomous vehicles. In *Proceedings of the 2016 ACM International Joint Conference on Pervasive and Ubiquitous Computing: Adjunct* (*UbiComp '16*). Association for Computing Machinery, New York, NY, USA, 686–689. DOI:https://doi-org.libproxy.uoregon.edu/10.1145/2968219.2968561

In this study, about the integration of autonomous vehicles into society, Müller, Risto, and Emmenegger explain how self-driving cars move as "embodied agents." Despite how intelligent such vehicles are, there are still some human subtleties that they fail to adapt to while out on the road. The researchers argue that there is a "social dimension" to driving; this is difficult to teach to a computer. One example that the researchers highlight is the ability of human road users (or RU as they define them in the article) to make and understand visual communication with other drivers. This is why the researchers argue that self-driving cars have to be treated as more than just tools or machines; they need to be treated as the "embodied agents."

This study backs up all of their claims with ample evidence. I believe that this research is useful to engineers of self-driving car technology; before going forward in development and production, software engineers working on autonomous vehicles will need to account for the human-like mannerisms needed to maximize their safety in a public environment. This research also helps me in discussing and answering my research question because it pertains to multiple concepts outlined in my scope proposal.

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Tobias Holstein, Gordana Dodig-Crnkovic, and Patrizio Pelliccione. 2020. Real-world ethics for self-driving cars. In *Proceedings of the ACM/IEEE 42nd International Conference on Software Engineering: Companion Proceedings* (*ICSE '20*). Association for Computing Machinery, New York, NY, USA, 328–329. DOI:https://doi-org.libproxy.uoregon.edu/10.1145/3377812.3390801

In this research study, Holstein begins by explaining how self-driving cars are attracting more and more societal attention each day and how the self-driving industry will fundamentally change society as a whole. The main issue that Holstein et al. discuss is how the ethical and social problems surrounding autonomous vehicles are often disregarded and are instead viewed as "idealized unsolvable problems." One example of this predicament, as cited by Holstein, is The Trolley Problem. By simplifying the vastly complex software and decision-making abilities of self-driving cars down to such a black-and-white set of options, so much nuance is lost. According to Holstein, such a set of polarizing choices is greatly unrealistic in a real-world setting.

The research completed by Holstein directly correlates to my research study. In my research study, I heavily examine the social side effects of self-driving cars. Holstein's research will allow me to explain some of the ways that autonomous vehicles will do just that. In his article, Holstein also highlights how the industry is not properly preparing for the future integration of self-driving cars. This notion is one that I touch on in many of the articles I include in my literature review.

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Andrew Gambino and S. Shyam Sundar. 2019. Acceptance of Self-Driving Cars: Does Their Posthuman Ability Make Them More Eerie or More Desirable? In *Extended Abstracts of the 2019 CHI Conference on Human Factors in Computing Systems* (*CHI EA '19*). Association for Computing Machinery, New York, NY, USA, Paper LBW2513, 1–6. DOI:https://doi-org.libproxy.uoregon.edu/10.1145/3290607.3312870

Andrew Gambino and S. Shyam Sundar set out to address popular opinion in regards to autonomous vehicles. Specifically, the two researchers wanted to conduct a survey to get opinions on the "eeriness" or "desirability" of self-driving car technology. As stated by the researchers in this study, "self-driving cars may have clear societal benefits, but individuals have personal concerns." In their study, four main areas surrounding autonomy were surveyed: acceptance of the technology, the "coolness," danger, fun, and convenience factors, the "posthuman ability," and finally the uncanny valley of self-driving vehicles.

This research would benefit by literature review because it would help answer my research question. Specifically, it would aid me in figuring out how self-driving cars would impact society. This study will uniquely benefit me because it interacts directly with a subset of individuals (this is the only study I have reviewed that does so). When scaled up, this set of surveyed individuals could help to explain the opinions of the population at large and could also help predict how the rapidly changing industry could impact society.

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Bjarke Kristian Maigaard Kjær Pedersen, Kamilla Egedal Andersen, Simon Köslich, Bente Charlotte Weigelin, and Kati Kuusinen. 2018. Simulations and Self-Driving Cars: A Study of Trust and Consequences. In *Companion of the 2018 ACM/IEEE International Conference on Human-Robot Interaction* (*HRI '18*). Association for Computing Machinery, New York, NY, USA, 205–206. DOI:https://doi-org.libproxy.uoregon.edu/10.1145/3173386.3176987

In this study, researchers wanted to find out the differences in how research participants would react in a series of simulated situations involving self-driving cars. Ultimately, the researchers wanted to test how the participant's levels of trust of an autonomous vehicle would differ when "real-life consequences" were applied to the simulation. Here, the "real-life" aspect applies to an electric shock that researchers told participants would be administered upon crashing the

simulated self-driving car. In reality, no shock would ever be given, but researchers wanted to see if such a consequence would increase or decrease trust in the autonomous vehicle. In the end, the researchers found that there existed a certain level of "overtrust" in self-driving vehicles when participants were told that there would be no consequences compared to those who were told that there would be consequences.

In my literature review, one main pillar of the self-driving car industry that I highlight is simulation testing. This study would benefit my perspective in the simulation realm because it directly shows how testing (specifically through the use of simulations) has the potential to affect society as well as the safety of potentially affected individuals.

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Kotagiri Ramamohanarao, Jianzhong Qi, Egemen Tanin, and Sadegh Motallebi. 2017. From How to Where: Traffic Optimization in the Era of Automated Vehicles. In *Proceedings of the 25th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems* (*SIGSPATIAL '17*). Association for Computing Machinery, New York, NY, USA, Article 10, 1–4. DOI:https://doi-org.libproxy.uoregon.edu/10.1145/3139958.3139997

The advent of self-driving cars has the ability to change traffic as we know it. With the number of semi-autonomous vehicles on the road increasing each year, the researchers conducting this study believe new ways to make traffic more efficient are becoming within reach. As stated in their research study title, the question of "how," in regards to travel, will soon be a thing of the past. With a fully-homogeneous population of self-driving vehicles, the only question that would remain would be "where." Here, researchers aim to explain that, in the not too distant future, all that a self-driving car will need to receive from a human user is the destination of a particular journey; furthermore, he car will *not* need to be told how to get to the destination. As stated in the study, this will eliminate the "unpredictable nature of human behaviors." If all variability is factored out of the equation, then traffic flow efficiency could drastically improve.

In my research question, one area I inquiry I have is how self-driving cars could impact traffic flow; this study would directly answer that question. The study presents an ample amount of data and figures that grants me a large pool of information to gather from. Ultimately, this study will allow me to clearly and concisely answer part of my research question.

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Jianjun Wang, Xingqian Li, Shutong Shi, Siyu Lin, and Hongwei Zhao. 2017. Comprehensive Evaluation of Autonomous Navigation Based on Multi Model. In Proceedings of the 2017 International Conference on Information Technology (*ICIT 2017*). Association for Computing Machinery, New York, NY, USA, 308–312.
DOI:https://doi-org.libproxy.uoregon.edu/10.1145/3176653.3176666

This study takes a mathematical approach to examining how self-driving cars would impact traffic flow. The researchers utilized the fuzzy comprehension evaluation model and ultimately crafted a shortest path model utilizing various highway distances. Their overarching goal is to combine “micro and macro models” in order to find the optimal solution to the traffic capacity problem. To accomplish this, the researchers needed to find the equilibrium for the ratio between self-driving cars and manually-driven vehicles.

This study will allow me to expand more on how self-driving vehicles will affect traffic flow. It will be of use to me to cite information from this study because of how data-driven it is. Not many of the other studies that I am including in this annotated bibliography rely on math as heavily as this study does. This study is somewhat difficult to work with, however, because of the amount of grammatical issues that occur throughout it.

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