



Summary Report

ORI-KOTI Qualitative Study 2018

**Public Perception and Ethics of Implementing
Cars with Automated Features**

Prepared for

The Korea Transport Institute (KOTI)

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Delivery date: December 25, 2018

Executive Summary

Open Roboethics Institute completed a series of interviews with individuals who have a driver's license and live in Canada as part of a four year project that ORI is conducting with The Korea Transport Institute. Summary of the main themes from the interviews are the following:

- Overall, people have an optimistic perspective on autonomous cars. Some are worried about their implications due to a lack of knowledge and experience.
- Cost of commute, impact on the environment, convenience and anxiety associated with driving are the key values considered when choosing a transportation mechanism. Safety is assumed as the bare minimum for all cars and vehicles.
- Human drivers would like to know what the car will do and how it will impact their driving and travel experience so that they can respond in time if needed.
- The pass off of control between an automation feature and a human driver is challenging and it is unclear for users how this could be done in a safe manner.
- The general public's understanding of what automated features look like is limited and incomplete.
- Not all people want to take over control from automated features as long as they are safe.
- New drivers' training and education should not be decreased but rather supplemented with new material.
- The notion of privacy is changing with the introduction of more automated features that require sensors. How the data is used has a major impact on people's perspective. Using data to improve the safety of driving is encouraged. Any other uses such as law enforcement, providing convenience features and collision investigation cause distress for the general public.
- Considering that control is shared between the car and the driver, accountability is difficult to determine unless a clear and concise division of labour is developed for semi-autonomous cars.
- Changes to autonomous cars will lead to shifts in the licensing process, insurance plan and policies and potentially rules of the road.

Introduction

The objective of this report is to summarize the preliminary findings from the qualitative study Open Roboethics Institute conducted to understand the public perception of cars with automated features with a particular focus on ethical concerns. This qualitative study is part of a 4-year research project that the Open Roboethics Institute is conducting with The Korea Transport Institute to understand the ethical and social implications of semi-autonomous cars. The outcome from this qualitative study will be used to shape the direction of public opinion polls in 2019 and 2020.

The report outlines the study design and protocol, followed by a list of themes and associated overarching questions that came from the analysis of 23 interviews.

Study Design, Protocol and Analysis

To understand the public perception towards cars with automated features, ORI researchers designed semi-structured interviews to investigate what Canadians between the ages of 19 – 65 value in their choices of transportation and what they think about the increased implementation of automated features in cars. Furthermore, the interviews explored topics of trust between the user and a semi-autonomous car, data-collected from the driving experience and privacy, accountability in the case of collisions and changes in the regulation of semi-autonomous cars. The full study protocol and semi-structured interview guide can be found in Appendix A. The participants had to have a full Canadian driver's license and live in Canada. The interviews were recorded with the informed consent of the interviewees and all participants filled out a demographics questionnaire. Both of these forms could be found in Appendix B.

The participants were mainly recruited through social media channels and word of mouth. From the 23 participants, 14 were between the ages of 18-35, 4 were between the ages of 36-50 and 5 were between the ages of 51-65. It is noteworthy that it was challenging to gather older participants for this study. There were 13 males and 10 females who participated in the study.

All the interviews were transcribed by a transcription service called GoTranscribe.com and coded by an ORI researcher. Samples of the coding table and a transcribed interview are presented in Appendices C and D, respectively.

The following is the list of the fifteen pre-designed questions and the interviewer asked a number of other questions depending on the flow of the interviews.

Values and Transportation Choices

1. What do you currently use as your main mode of transportation?
2. What do you like about your current mode of transportation? Why do you choose this method?

3. What do you NOT like about your current mode of transportation? How would you change it?
4. Do you own a vehicle currently? If so, tell us about your vehicle. Prompts: what is its make, model and year? When did you purchase it? Why did you purchase this vehicle?
5. Have you been in a car accident over the past 5 years? If so, was this a minor or major accident?

Autonomous cars and overall perspective

6. What do you know about autonomous cars? What is the overall perception of autonomous cars?
7. Does your car have any automation features? If so, what are they? Examples of automated features are emergency braking, adaptive cruise control or assisted lane change or lane-keeping.
8. What automated features would you like to have in your car?
9. What do you think are advantages of having automated features in a car? Are there any disadvantages? If so, what?

Trust, Transparency, and Autonomy

10. How much do you know about how these automated features work? How much would you want to know about how these automated features work so that you can trust using them?
11. To what extent do you trust the use of these automated features in terms of safety? Do you have any concerns about safety? Do you think these automated features are safer compared to the alternative manual mode?
12. Would you want to be able to override these automated features? If so, when and why would you want to override these features?

Data and Privacy

13. A lot of vehicles with automated features have driver monitoring elements. That is they generally have a form of tracking the behavior of the driver. This can be in the form of sensors on the wheel or video track of the driver from the front. What do you think of these driver monitoring systems? Do you think you should have the choice to opt-out of them? What do you think is the advantage/disadvantages of these systems?

Accountability and Regulation

14. If an accident occurs while the automated system is running—for example if a car swerves into your lane and hits your car even though the emergency braking is on—who do you think should be responsible for the crash?



15. Who do you think is currently monitoring and regulating the use of cars that have automated features? What do you think is the role of government/regulators in monitoring and supporting the use of cars that have automated features?

Themes and Overarching Questions

The thematic analysis highlights the major themes that came from the 23 interviews that we conducted. Each theme is accompanied by a set of overarching questions that could be used to shape surveys in the future.

Overall, people have an optimistic perspective on autonomous cars. Some are worried about their implications due to a lack of knowledge and experience.

Participants had a positive perspective towards autonomous cars and most were enthusiastic about fully autonomous cars. In fact, many of the participants were unfamiliar with the notion of semi-autonomy and found that worrisome as it was less defined for them. The idea of a fully autonomous car that is safe and works as intended was very appealing for the consumers. However, they were skeptical of the technology because it is so new and also inaccessible for many of them. The perceived advantages of autonomous driving were increased safety and time-saving.

Cost of commute, impact on the environment, convenience and anxiety associated with driving are the key values considered when choosing a transportation mechanism. Safety is assumed as the bare minimum for all cars and vehicles.

The interview participants often used a mix of public transportation, biking, and individually owned car and car-sharing services to accommodate their commuting needs. The participants valued the convenience that individually owned cars offer; however, they noted that driving is stress inducing, a waste of time, expensive and has negative impacts on the environment. On the other hand, public transportation is much more cost-effective and it can be convenient depending on where you live and work. Public transportation also allows people to use their time more effectively and has a higher level of safety in case of an accident. Interestingly, safety was not mentioned as a reason why people choose a particular form of transportation except in one scenario where one of the participants does not choose to bike due to safety risks. The advantages of biking and walking are that they are an active form of commuting and people did enjoy getting physical exercise while getting to work. The disadvantages of biking and walking are the amount of time they take and inconveniences due to weather.

Some relevant questions for this theme could be:

- What would be your top 3 reasons for buying a semi-autonomous vehicle? Compare the values of convenience, impact on the environment, effective use of time, the stress of commuting and cost.
- How can using a semi-autonomous vehicle improve the commuting experience for people given the values mentioned above?
 - Do current models of semi-autonomous cars provide the mechanisms that allow the users to save time?
 - Do current models of semi-autonomous cars increase or decrease the stress of commuting for users?
 - Are current models of semi-autonomous cars more convenient compared to other regular cars? How much value does this add to the driving experience?
 - How do current models of semi-autonomous cars impact the environment? How does that affect consumer's choices?
 - How do current models of semi-autonomous cars compare in terms of cost to regular cars?

Human drivers would like to know what the car will do and how it will impact their driving and travel experience so that they can respond in time if needed.

Knowledge about what a piece of technology does and how it does it can build the human-machine trust relationship. Most of the participants did not express the need to know how an automated feature works, but they were interested in what the feature is and when it will be activated. This is something that could be possible with existing automated features considering most of their algorithms are rule-based (i.e. if a car detects an object within in the driver's blind spot, then it will have a beeping sound altering a user). However, autonomous driving is moving towards increased use of machine learning. This improvement will also have its own challenges with transparency. A driver of a semi-autonomous vehicle does not need to know how a certain algorithm works. However, they need to know the meaning of the signals the car gives to them (i.e. beeping, shaking of the wheel), the goals of the algorithms that are assisting in driving the car (i.e. minimize collision, save gas, etc) and what they need to do when they receive certain signals from the vehicle. Some participants expressed the need to know about the basic features of the sensors so that they can troubleshoot the vehicle in case of an emergency. Lack of transparency can make it difficult for the user to develop trust in the use of semi-autonomous cars. With the

necessary knowledge about the system, the users can trust it and also respond effectively in the various driving scenario.

Some relevant questions for this theme are:

- What does the user of a semi-autonomous car need to know when they are first learning to use the car?
- Explore various driving scenarios and assess the pieces of information that the driver needs from automated features in order to make a decision comfortably.

The pass off of control between an automation feature and a human driver is challenging and it is unclear for users how this could be done in a safe manner.

One of the first concerns that the participants brought up when they thought about automation features was that it would be hard to know when one can rely on them and when the driver should be in full control. At times it might be difficult to know when the car will activate its automated features. This can create some major challenges in how control is passed from the human to the machine. The participants also mentioned that drivers can get lazy and not pay as much attention when only part of driving is automated. Some expressed interest in full autonomy instead of semi-autonomy.

Some relevant questions to this theme are:

- Should we provide clear pass-off points between humans and the machine (i.e. stop at the exit of a highway so a human can take over control) or should the pass off be less defined?
- Should certain tasks only be done by a machine since they are better at executing them? Should certain tasks only be done by a human?

The general public's understanding of what automated features look like is limited and incomplete.

When asked about the automation features that they have in their cars most participants referred to their automated braking system, automatic drives, blind-spot warning mechanisms and a rear-view camera. The features provide extra information to the user and in some cases makes some task easier. However, the vehicle is fully controlled by a person. The notion of giving control to a feature in the car is relatively recent and is mostly unfamiliar for the participants of this study. It would be good to

understand people's perspectives on what autonomy means to the public in terms of driving.

Not all people want to take over control from automated features as long as they are safe.

Surprisingly many of the participants did not want to take over control when an automated feature is activated. Some people thought that human reaction time is too short, others were happy to let go of the idea of control in order to gain greater safety for themselves and other people on the road.

Some relevant questions to this theme are:

- How does the willingness to take over control change in a possible pre-incident scenario?
- How does the willingness to take over control change due to personal preference and driving style?
- How does the willingness to take over control change due to change in ownership?

New drivers' training and education should not be decreased but rather supplemented with new material.

Overall, the participants thought anyone intending to drive needs to get a driver's license and learn how to drive a vehicle that has no automation features. The participants were concerned that in cases of an emergency anyone in a vehicle should be able to take over control and guide the car to where it needs to go. Additional training is encouraged to increase the public's awareness of automation features and how they work. Here are some relevant questions:

- What should the new licensing process look like for autonomous cars? It would be good to look at different licensing models and get the public's opinions on various changes to the licensing process.

The notion of privacy is changing with the introduction of more automated features that require sensors in a car. How the data is used has a major impact on people's perspective. Using data to improve the safety of driving is encouraged. Any other uses such as law enforcement, providing convenience features and collision investigation cause distress.

What data is collected, how it is secured and how it is being used are the questions that came to the surface in all of the interviews. Participants were optimistic about the use of data but were very clear about the need to have transparency about the intention behind the collection and analysis of their data. Participants also expressed the desire to opt-out of the data collection process.

Some relevant questions are:

- What type of data are people most sensitive about?
- What are the appropriate uses of data collected from the driving experience?
- How does the value of privacy balance with respect to the value of safety when it comes to providing data?
- What type of data should a person be able to opt-out of providing to the car manufacturer? How does opting out of providing a certain piece of data affect the privacy of the user and others in the road? Does this affect shift people's perspective?

Considering that control is shared between the car and the driver, accountability is difficult to determine unless a clear and concise division of labour is developed for semi-autonomous.

Who is responsible in case of a collision or an incident? Currently, there is no clear division of labour between the car and the human. It would be worthwhile to develop this division of labour to ensure that minimal incidents and confusions occur. Some relevant questions are:

- How is a division of labour shifted in cars with automated features compared to a car with no automation?

Changes to autonomous cars will lead to shifts in the licensing process, insurance plan and policies and potentially rules of the road.

The regulation around autonomous cars needs to shift to accommodate the new features and driving behaviors. The licensing process will likely need to be supplemented for both old and new drivers. Insurance policies might shift to decrease prices since fewer incidents might occur or they could increase in price since semi-autonomous cars are expensive. The rule of the road might shift as more autonomous cars are implemented.

- How should insurance policies shift when it comes to driving cars with automated features?
- Should the rules of the road shift for cars with automated features? Do they need to always follow the rules of the road? Can they bend the rules of the road? Explore various scenarios with multiple automated features.

Appendix A – Interview Protocol

Inclusion criteria for the interviews

- The participants must have a full driver license
- Age between 19 - 65
- 50% male-female representation in the data set
- Uniformity in a number of participants across the age groups. We would like to have equal representation across various age groups (19-35, 36-50, 51-65). That would require us to talk to approximately 6-7 people in each age group.

Recruitment strategy: We will be recruiting via our existing network and ensuring that they are all matching our inclusion criteria.

Interview length: 45 minutes

Number of interviews: 20 interviews

Interview compensation: \$30 for a 45-minute interview

Interview Protocol

Thank you for taking the time to participate in this interview. This work is part of the research we are currently conducting to understand the public's perception towards autonomous cars to inform future policies around the use of autonomous cars.

We have a series of questions that we would like to ask you about how you currently use your vehicle and how you foresee yourself using a car that has automated features in the future. We want to understand what you value in your choice of transportation. The interview will be 30 minutes and you are free to ask questions or stop at any time.

Before we proceed, we would appreciate it if you could fill out this demographics questionnaire and read/sign our consent form.

Interview Questions

We are interested to find out what you value in your choices of transportation. The next question will help us identify what you like and dislike about your choices of transportation.

1. What do you currently use as your main mode of transportation?
2. What do you like about your current mode of transportation? Why do you choose this method?
3. What do you NOT like about your current mode of transportation? How would you change it?

Proceed with the following questions to learn more about their driving history. This section should be very brief.

1. Do you own a vehicle currently? If so, tell us about your vehicle. Prompts: what is its make, model and year? When did you purchase it? Why did you purchase this vehicle?
2. Have you been in a car accident over the past 5 years? If so, was this a minor or major accident?

In this interview, we are interested to explore what you currently know about cars that have automation features and what you think of them.

1. What do you know about autonomous cars? What is the overall perception of autonomous cars?
2. Does your car have any automation features? If so, what are they? Examples of automated features are emergency braking, adaptive cruise control or assisted lane change or lane keeping.
3. What automated features would you like to have in your car?
4. What do you think are advantages of having automated features in a car? Are there any disadvantages? If so, what?

We would like to discuss a few questions around how much you trust the decisions that these automated features could make and how much control you would like to have in various situations.

5. How much do you know about how these automated features work? How much would you want to know about how these automated features work so that you can trust using them?
6. To what extent do you trust the use of these automated features in terms of safety? Do you have any concerns about safety? Do you think these automated features are safer compared to the alternative manual mode?
7. Would you want to be able to override these automated features? If so, when and why would you want to override these features?

The next few questions are focused on the use of data collected by these automated features.

8. A lot of vehicles with automated features have driver monitoring elements. That is they generally have a form of tracking the behavior of the driver. This can be in the form of sensors on the wheel or video track of the driver from the front. What do you think of these driver monitoring systems? Do you think you should have the choice to opt-out of them? What do you think is the advantage/disadvantages of these systems?

Finally, we would like to know your thoughts on the regulations of automated features.

9. If an accident occurs while the automated system is running—for example if a car swerves into your lane and hits your car even though the emergency braking is on—who do you think should be responsible for the crash?
10. Who do you think is currently monitoring and regulating the use of cars that have automated features? What do you think is the role of government/regulators in monitoring and supporting the use of cars that have automated features?

Appendix B – Consent Form and Demographics Questionnaire

Informed Consent

Public Perception towards Cars with Automated Features Open Roboethics Institute

Who we are: Open Roboethics Institute is a not for profit organization that takes a stakeholder-inclusive approach to analyze the ethical, legal, and societal issues of advanced technologies.

Why we are here: Our researchers would like to interview you to get a better understanding of your perspectives and insights on the implementation of cars that have automated features.

What information we will be collecting: Audio and written notes.

Your rights as a participant: Getting your insight on this project is important to us, but protecting your rights is more important. Please feel free to say as much or as little as you want. For any of the questions we ask, you can decide not to answer them. You can also decide to stop the interview at any time. Simply let us know of your decision. You do not have to offer us any reason.

How we will use the information we collect: The recording(s) will be transcribed and analyzed by the Open Roboethics Institute researchers. The result of the analysis will be shared with researchers at the Korea Transport Institute as part of a research collaboration and will be published in various conferences. The publications will fully anonymize the findings.

Who can access the recording: Only the Open Roboethics Institute researchers working on this project will have access to the raw recordings from this interview until the expiration of this project. We will not provide the raw data (both audio and transcripts from the audio) to any third party groups without your consent.

Who will know what I say in the interview: The audio recordings, transcripts of the recording, and the notes our researchers may take during the interview will be stored in an anonymized form. That is, the raw data will not be stored with information that identifies who you are (e.g., your name or employee number).

Data security: When we store recordings from the interview, the data collected will be encrypted using 128-bit or stronger Advanced Encryption Standard.

If you agree to participate in this interview, please sign your name on the following page.



Informed Consent:

Public Perception towards Cars with Automated Features Open Roboethics Institute

I, _____, agree to be interviewed for by Open Roboethics Institute for the purposes of the project outlined above.

I certify that I have been given satisfactory answers to my inquiries concerning project procedures and other matters; and that I have been advised that I am free to withdraw my consent and to discontinue participation in the project or activity at any time without prejudice. *Check the box if you agree with this statement.*

I agree to participate in one or more electronically recorded interviews for this project. I understand that such interviews and related materials will be anonymized as much as possible, and that the recordings from this interview will be collected, stored, and analyzed for the purposes outlined above. *Check the box if you agree with this statement.*

I agree that any information obtained from this research may be used in any way thought best for this project. *Check the box if you agree with this statement.*

Date

Signature of Interviewee

If you cannot obtain satisfactory answers to your questions or have comments or complaints about your treatment in this interview, please let us know. Directors of Open Roboethics Institute can be reached via email:

Jason Millar (jason@openroboethics.org)

Cc: signed copy to interview.

Demographics Questionnaire

1. Gender:
 - Female
 - Male
 - Do not want to identify
 - Other: _____
2. Age:
 - 19-34
 - 35-50
 - 51-65
3. How much driving experience do you have?
 - Less than 5 years
 - Between 5 – 10 years
 - Over 10 years
4. Do you currently own a car?
 - Yes
 - No
5. Which one of the following best describes your familiarity with autonomous cars (cars that can operate on their own without a human driver)?
 - I have never heard of them
 - I have heard a little about them
 - I have heard a lot about them

Appendix C – Coding for Thematic Analysis

Name	Files	References
Accountability	10	14
Norms	11	23
What should government do	2	3
Who should monitor	10	13
Advantages of AV	2	2
Cost	2	2
Increased safety	9	13
Less accidents	5	5
Saves or redirect time	4	4
Autonomous features	13	29
Autonomy	1	1
Challenges with transfer of control	7	11
Would you like to override	13	21
Current knowledge on autonomous cars	9	14
Data and privacy	2	2
Are you comfortable with data gathering	13	15
Defining or redefining privacy	8	11
Intent of data collection	12	17
Negative or unintended consequences	7	10
Opinions on opting out	11	18
Privacy vs safety	7	10
Disadvantages of AV	9	9
Sense of ownership	1	1
Mode of transportation	2	2
Car sharing	5	9
Cycling	7	24
Personally owned car	11	36
Public transportation	14	31
Perspective towards autonomous cars	10	22
Trust	1	1
Current level of trust	12	18
How much do we need to know to trust	13	28
Intended use or design objective	2	2
Time	4	6

Appendix D - Sample Transcribed Interview

Interviewer: Alright, so what do you currently use as your main mode of transportation?

Interviewee: Walking, biking. I would say those are my two main, but I also drive a car occasionally and take the bus.

Interviewer: What do you like about each one of them?

Interviewee: I like the physical activity part of walking and biking. To be honest, it's because I live close to work, it's probably why I walk so much. I don't like being cramped, I don't like being around other people like at stress times, is why I don't take the bus. I find the people are not super positive on the bus. In cars it's expenses, parking and gas consumption, I would say, are like things that go against it. The ease and convenience is huge about of cars.

Interviewer: What would you then--I guess you've already mentioned some of them, but is there anything that you don't like about what you chose to use as your transportation method?

Interviewee: Well, yes. I mean the cost of walking, that it is slow, but it's probably my favorite mode of transport for all the opposite reasons, it's outside, lots of space. Biking, I like it quite a bit because it's fast and it's still outside you're still getting physical activity and stuff like that. Then cars, I don't like the idea of not having a less gas-consuming car, would entice me to drive one more but the expenses related to cars are a big deterrent.

Interviewer: Alright, thank you. Do you currently-- The only reason why I'm asking is just because to know what type of vehicle you drive as basis. Do you currently own a vehicle or use a vehicle significantly, I guess?

Interviewee: I don't use it significantly. I probably use it like once a month. I have access to my parents' car, which I use when I need to do something or go out of town or something, but I don't own a car. I've access to a Honda Odyssey van and a Ford truck.

Interviewer: Also, have you been in a car accident or a major or minor one in the past five years?

Interviewee: No.

Interviewer: Okay, thank God. That's good. All right, that was so our sponsor get a picture of what's happening and then now I'll ask a little bit more of about autonomous cars. These ones are about your background. Can you tell me a little about what you know about autonomous cars and what is your overall perception of them?

Interviewee: I don't know a ton. I generally pay attention to what's happening in the world. I know a lot through TV or random stuff I've read. I generally think automation is great and improves the cost of- or reduces things that humans shouldn't be doing. Like focusing on driving cars, there's so many spots for human error. It makes me anxious to depend on people that much for something that's a technical skill. That being said, driving still requires a lot of human intuition is, I guess, my belief. In one sense, I'm very positive and optimistic about automated cars but I think it needs to be proven on such a level that they're safe.

I find myself to be more on the side of trusting robots over people and I err that way more than the average person. That's my perception, and I still would need to see a lot of trials where there is very little accidents or I would need to be informed for myself of how successful it is compared to human errors which I assume is lower already than human errors. I assume they're kind of already quite developed and

outperforming people in actual cities where they're being implemented. I don't know much, this is largely from as I said just passive knowledge in society.

Interviewer: Yes, I just wanted to know where you're at. The cars that you mentioned that you use, do they have any automation features?

Interviewee: Yes, they do. One of them has none and one of them- the truck has none and the Odyssey's much newer and has quite a few automated- I don't know, it has the camera stuff, it doesn't really have any driving automation I would say, it doesn't do any of the actual process of driving for me but it does warn me about things I might hit with a little beeping thing and the camera. That's like, I don't know if that counts. That's about it.

Interviewer: Yes. I think a lot of the vehicles now do that sort of like, "We're going to warn you" and the "You do what you need to do" you can make your decision based on that warning. That's some level of help, assistance, but there's one where actually they see something and then they will take an action. For example, one of their features like emergency braking, where they'll see something jumping in front of cars or something and then they'll see that, they won't just warn but they'll actually brake for you.

Interviewee: No, I haven't experienced any of that kind of stuff.

Interviewer: There's five levels of autonomy. I think Level 2 is what you have experienced in the sense of having that warning and assistance. Level 1 there's nothing, you're the driver, then Level 5 is full. I think this study is intended to be focused on Level 3 where there is some action from the car [crosstalk]. The questions are phrased towards level three where the car does take action but I'm interested in understanding opinions from different the wholes spectrum. Just want to give some context. Considering your own experience driving or in general transportation, what do you think would be some automated features that you would like to have in a car that you use?

Interviewee: I would start from the most dangerous actions down, I found the more trivial the action, the less- it's probably obvious, the less I care about automation. I guess the features I would want to know or the features that would make sense for me to integrate would be stuff that prevents accidents. That's a very broad thing, like taking over the wheel when an accident's going to happen for whatever reason is something that I'm very interested in bringing into my life. Then in the future like fully not driving your car is something I'm very much into.

I think part of it is like there's a mixed system of people and automation. If it was all automation I'd feel much more comfortable with buying into it if everything was more automated and integrated with one another.

Interviewer: That seems interesting that you would actually be okay with trusting the vehicle in more dangerous situations.

Interviewee: Yes. The other thing I don't really know is what's the hierarchy if a human wants to override an automated system. It might make me feel more or less uncomfortable or comfortable depending on how I guess the science of it works and how it actually is felt and experienced when shit hits the fan and the car takes over and I disagree with it or whatever. I don't know how it would play out but it would influence the amount to which I would be willing to want to take over in emergencies.

Interviewer: We're going to get to in just a bit but what do you- in terms of the automation features, you mentioned that if there is a situation that is more dangerous, I would want the car to step in and save me from the collision or potential incident that's going to happen. That could be a difficult one for the emergency braking system when that comes to my mind, right?

Interviewee: Yes.



Interviewer: Some cars right now have this rear end, they detect whether another car is going to hit you from the back and it'll move you forward. That's another example. What do you think are some of the advantages or disadvantages of having these automated features in a car?

Interviewee: The advantages are machines are more balanced than people and more reliable and there's less human error. To me, the value of automation is always greater than having humans involved assuming that nothing can go wrong which is obviously not the case. Can you say the question one more time? I'll just start again.

Interviewer: [unintelligible 00:11:23] particular advantages or disadvantages of automated features that comes to your mind when you think about them?

Interviewee: Like specific features like the advantage of the rear end technology is this or more general?

Interviewer: Thinking about those [unintelligible 00:11:43] features [inaudible 00:11:45] like a more general overall, overview answer. I mean, if there's a particular one that comes from is you can talk about the specific features of that if it makes it easier for the question to be answered. I'll extract from it.

Interviewee: Again, I think for me, it always comes back to the automation is generally safer is my guiding philosophy. I don't think humans are that safe. I think we reserve humans for things like teaching and things that require the human reading of other humans. An operation like driving a vehicle is really not something I feel humans are needed for at all. I think automation actually literally driving the car for you, completely autonomous, sounds great.

My concerns are when it has to interact with people. From interacting with other people to interacting with me and my car, how would it even know-- For example, the same a move is not even related to so much overall life-saving things but helping increase efficiency in the way that the car moves. If automation decides to do a tactic, let's say, that makes the human user anxious, for example, I don't know how it would handle that kind of hierarchy if it's not so linear. I don't know if that makes sense.

I could see that maybe the way the automation occurs makes someone feel helpless and uncomfortable. There could be an issue. Basically, anytime the automation has to interact with a human, which is kind of unpredictable, that to me makes me want to less use automation. It's kind of like an all or nothing thing. I feel like if automation is used across the board, I like it more. I feel like the limits of it are less and less.

The more it interacts with people which it will have to do as it transports human beings around, I guess, I can see a problem with understanding the hierarchy of who's calling the shots when there only is one driver and there's a human in it with emotions and unclear communication or changing routes, or whatever. Just the unpredictability of humans is the limiting factor, I guess.

I don't really see any specific feature being particularly more attuned to automation than others. I think automation just takes over in different areas maybe is more infantile in some than others. In general, I think automation improves overtime particularly with the skills so linear as driving. It should be

a better substitute than a person is my thought.

Interviewer: Looking at that [unintelligible 00:15:09] must mean there's going to be movements involved, as you mentioned in the process. Especially if it's [unintelligible 00:15:16] autonomous vehicles [unintelligible 00:15:18] there's a lot of [unintelligible 00:15:21]. They're the ones who is technically in charge and some tasks are only automated and it's a very grey zone actually, generally with that. Thinking about that, and you can also extend that thought to full autonomy, but then thinking about the same autonomous case first, how much would you like to know about how this automated features work in order to actually be able to trust them when you're using it?

Interviewee: Lots. For me, trust is all about transparency, whether it's with an automated machine, or a human being, or governments, whatever. Transparency and the human understanding exactly when automation will occur and why, in the particular components of driving, are to me absolutely necessary and more so than we would with another human. I don't really ask the cab driver what's the governing mechanisms are that are on their mind, as they drive me around, but I would--

Interviewee: I don't really need to know this is how humans deal with one another. I don't really need to know its order of operations when it's driving me around, the cab driver, but I think it's just a natural thing. Humans are skeptical of things that are not humans. An automated machine would really need to be explaining the exact circumstances in which it'll interact, or take over certain aspects of driving, what necessitates it, how it gets overridden if that's all part of it. I think it has to be explained in the most legalese and over the top way so that people know how this system is interacting with them.

Interviewer: As of today, let's just say-- I think I know the answer to this question but I wanted just ask it explicitly. What extent do you think you can trust a use of automated features in a semi-autonomous vehicle right now? If you get into one today, or somehow own one, or get a used one, how much would you trust actually using any of these features?

Interviewee: I guess it depends what the future is. If it's actually going to say emergency brake for me, again I think if I actually knew myself how it works, which I don't at this moment in time, I would feel more comfortable with it, than I am currently. Given that, even let's say I did know exactly how these features work, I'd still be uncomfortable because I believe it's in its infancy.

I don't even know if that's accurate but that's how I would be, probably more uncomfortable with it than I am comfortable say on emergency braking. Even though I assume if they're putting it into the world, they have idiot-proofed it, so that people can't be too stupid with it. I would just assume from my passive cultural knowledge that it's actually not that far along, accidents still happen and I don't really know how this thing is interacting with me so I would feel quite uncomfortable. I'd feel like I would need almost a training on how it's operating before I'd feel comfortable with that.

Interviewer: When you're thinking about using these features, let's just say, then do you think you would like to have the ability to override their decisions in various circumstances? For example, if the car decides to change a lane because it's either seeing a congestion in front or it's seeing a potential accident or something, some sort of it had to [unintelligible 00:20:05] something besides change lane, but you don't want it to change lane, or if it decides to slow down or stop because it's up against a potential incident or just bare streets. Would you want to be able to override that decision all the time or some of the time?

Interviewee: Again, without context it's a weird- a bit of a hard question to answer because if I knew how it works I would change my answer a lot but currently I'd want complete override on every single thing it does. Again, because it's kind of a hypothetical question I might be incredibly comfortable with it, choosing, changing lanes for me to save me three seconds overall in my trip but that would only be the case if I got how the system worked myself and understood the safety mechanisms in itself was integrated as weird as that might sound. I kind of want to know it's thinking before I would feel like less things could be not overridden [sic] by me.

Interviewer: Yes. I think the idea is that it's like at this point just knowing what you know, is that something that you would want to have- [crosstalk] That sort of [unintelligible 00:21:40] but again, yes and the answer to our question might shift as you use one, right?

Interviewee: Yes. Totally to me I've never interacted with these ever, so I literally have no idea how it works but that's why currently out of more like a state of fear, I'm like, "I would want to override because the current status quo driving doesn't or has an acceptable level of risk to me," so it's a bit just venturing into the unknown and until I get more comfortable with the unknown I would be reserved.



Interviewer: Makes sense, yes. I think it would be interesting if we had the funding to do it it would've been fun to have that everybody who is doing the commute try an autonomous car after doing this interview and then ask some questions afterwards to see how things have shifted.

Interviewee: Yes, totally. I assume there's going to have to be like, just like those Driver's Z, there has to be like an intervention or when you get on the bus, there are protocols for how it works and how it fits into other systems. I wonder if, after this, all of us, all of the subjects actually had some data to work from if it changed their mind I'm certain it would.

Interviewer: Okay. [unintelligible 00:23:10] The next set of questions a little bit more on data, collecting- [crosstalk] [unintelligible 00:23:16]. Right now the [unintelligible 00:23:18] as just an example the Tesla has nine cameras. Eight of them are outside and then [unintelligible 00:23:27] drive. Besides that there's a lot of touch sensors sort of saying where the driver is and what type of features the driver is using so for example if their hands are on the wheel, how are they controlling the vehicle and stuff.

One of the main purpose of the data is to improve the safety of the vehicle but there are potentially other purposes for it that are sort of unknown or could be developed over time. What do you think of the collection of data in these automated vehicles and [unintelligible 00:24:20]-

Interviewee: Okay. I could care less, I don't. Dig and take as much data on me as you want. I kind of think in the modern world-- I'm more skeptical in that regard of who could possibly hack or control the data. I think big companies have too much to lose to not be trustworthy in a way when they're collecting from me but I wonder about their security over that. For example, I watched something once on someone's car, just a modern- car getting hacked from far away and someone cutting the brakes remotely.

Same with data, if that then I data my relationship would say Tesla, I have no concerns over what they do with my data and that they respect my privacy towards-- if I didn't then I would shop around and pick a company I did trust. Then I don't really care how much sensors they add to me if they measure more invasive stuff than that. I'd be completely fine with it. It's more about the security and transmission of that data, and the networks it's in and how safe that is, and who could access it, and all that stuff.

A bit like Facebook, I don't really care that they know that much about me. What upsets me is that they allow other people to use it in a way that I didn't consent to with those other parties. That would be my concern.

Interviewer: Through elaborating on that, are there [inaudible 00:26:11] of uses and then you would be okay it or and uses that you would definitely not you okay it right now and also computer [unintelligible 00:26:20]?

Interviewee: Well to me the purpose of them having such sensors is to help me with the process of driving exclusively. Outside of that I would want them to come and get my consent for any objective that's outside of safe driving. It's just like-- I don't know. I only want to give consent to-- My doctor knows lots about me, but it's only I assume that they are only using it in the interest of my health and not in the interest of any other end. That would be the one after me.

Interviewer: I see. Do you think that people have the choice to opt out of giving certain pieces of data? Like when purchasing one or when you're using one, or--

Interviewee: Again I think it would be related to safety and stuff. If it was possible that someone's privacy, needs to be removed for the safety of me or others, vice versa. If I wanted to opt out to something, but it impact to the safety of others, then I don't think I should be allowed to opt out. Then that again is my guiding principle is if it's about safety, have at it, and then I expect the company to take that or the company or network to take that great privilege with incredible respect and not misuse it for one little bit outside of the focus of it.



I am all about people set being free to opt out of these many things as possible, but I cannot opt from an airport security screener for good reason. It's the same kind of thing. If that is our condition of using the system and its related to safety, I am like, "It makes perfect sense." Anything outside of that makes me suspicious.

Interviewer: All right, thank you. That's really interesting.

Interviewee: It's interesting to think about all these things.

Interviewer: It's like I was [inaudible 00:28:51] is the only thing the topic of safety coming up so much as a value like it seems so-- I mean it makes sense, but it's really having value. I mean you can, but also in general even from the interviews that I've done, it seems like it has a strong power to change other values and say [crosstalk].

Interviewee: I think something that really guides me is in philosophy you study why do we even have society and government, and the Thomas Hobbes' *Leviathan*, a classic reading, it's like very much about he gives this immense power to this thing intentionally for the sole reason of being safe, of not being murdered when you're sleeping at night.

To me, it's similar with my interactions with every single institution is about safety and then safety is such a broad concept. It can be a sense of safety, not even a real safety. People can feel unsafe which I value, but not as much as true safety for people to be able to use things and return home at the end of the day is the number one principle I value across automation, or whatever I interact with.

Interviewer: Talking about institutions, and we're going to talk a little bit about regulations for autonomous vehicles and what are you thinking about that. These are the last couple of sets of questions and then we can see if you have anything else you wanted to share.

Let's just say an accident occurs, when you're using a semi-autonomous vehicle. The system, it's a Level 3, the driver is in the vehicle and needs to pay attention and also the car has automated features, like the ones we've talked about. Let's just say as a classic example I gave is that that you're driving and another car comes into your lane and the car didn't stop in time and there's a collision. In this situation who do you think should be responsible for this incident?

Interviewee: That's what I think would have to be figured out before the system is implemented, is like jurisdiction, law, who is meant to brake in those situations and then I guess it's possible that there is never an answer to be given there, that each individual case would require, just like current collisions that go to ICBC and the fault is assigned. I don't know how you would do this with automation because it's consistent. We should know when it would fail and why, but in that case to me it's like, "Okay was the person at fault, or the automation system?" would depend on what agency humans are responsible for when participating and driving with an automated system.

If it was vague and the company says, "Sometimes when the machine thinks it's wise to do so, it will shift you out of a lane when someone cuts in front of you." Right off the bat, I think that language is far too vague and has to be hammered out more, so that we know we have a guiding principle that when a human being is interacting with something we know whether or not it was reasonable. We use that concept in law quite a bit, even though it's insanely vague to me. Was it reasonable for someone to have known this?

I particularly think with automation it's on the automators to be insanely cut and dry about who and when is responsible, but in reality it's not quite so simple and that is why we would, just like any car accident, we would assign, assess, culpability or whatever, guilt depending on how oblivious you were to your own risk, or whether it truly was outside of your vein of responsibilities.

Interviewer: I think that transparency point, that you did bring up earlier, feeds into that quite a bit. In a sense that the people that are designing the automated systems, if they can be transparent about what they're designing and the level of agency the car has, then I think that would help.

Interviewee: I imagine there'll be unlimited, literally, unlimited permutations of possibilities of things that could occur and to pinpoint each outcome is insane, but I do think that the precedent in our law system is to have guiding principles for prototypical cases that then are used and applied to unique cases. I do think that's central to really anything that's integrated in society, but particularly when robots and people are interacting with one another.

Interviewer: Just extending on that topic. Who do you think is currently monitoring and regulating these cars, that have automated features in Canada?

Interviewee: That was a good question, I honestly have no clue. I would guess that the government does what it needs to to sign off on things, which is usually some sort of guarantee that it's not going to kill people, and then honestly I have more faith in the companies themselves to not kill someone, because of the cost to the business.

Interviewer: Okay, yes.

Interviewee: To not screw up, basically. I think the regulators are often the industry itself, because they have to be so good at PR right now, and maybe forever. That kind of fear of the public is what I think is regulating this industry. I have no idea what actually is regulating them, though.

Interviewer: Yes, that's good. I think, this question was more of, I wanted to see where people are at in terms of their thoughts about this, and I think it's interesting to hear what people think is happening. Honestly not a lot of things are happening, especially in Canada, not a lot is happening. In US, there's state laws, some states are taking care of it, so in terms of if they are taking- it's being dealt with in a state-level **[unintelligible 00:36:19]**, but the regulations that they are looking at.

In Canada, the province of Ontario, there are some discussions going on right now and there's a movement that is looking at them, just because there are people that **[inaudible 00:36:35]** more in Ontario, more so than- **[crosstalk]**

A lot of what's happening is sort of the vagueness in the current regulations that allows the use of these vehicles. A lot of people go on- a lot of companies go under that and they say, "It doesn't say we can't do it, so we're just going to do it."

Interviewee: Yes. I think that that's standard across the industry, too.

Interviewer: Yes, exactly. Again, the public perception issue is something that probably is going to be causing people go under a lot of stress around this.

Interviewee: Yes, again, I think if Facebook knew the mistake it made upset people that much, they would have cared about our privacy. I think that kind of fear from companies or brain boost fearing, it doesn't take care of its customers. Education needs is a good fear for a company to have, but I am concerned that there's some gap.

I think of drones, and how people are using them to creep on one another or be disruptive. It's kind of outside of the purview of the company and outside of the purview of the government, and I feel like there's this gray area as they figure out regulations that can be a scary time. That's my biggest concern about the emphasis on government to protect us and it not really knowing how to. We're all new to this.



Interviewer: Thinking about sort of the [inaudible 00:38:30] Who do you think should be involved in forming the regulations and policies around this and how do you think the government should be involved, particularly?

Interviewee: I think the government is, again, the role of government is to keep us all safe and fair. They are central, they need to be number one, even conservative countries like the United States of America. They have federal oversight for the banking system to ensure that people's lives aren't ruined, and that's money, you know. Actually, you could be a physical event like an automated car.

I think number one, the person who makes the call is the collective good, society, the government, but I think they're completely naive and don't know shit. The industry is the people who inform them and suggest guidelines. I would see it as necessary, it couldn't be done by just government or industry, but both, with government being the authority and industry being kind of the brains of the operation.

Interviewer: Okay. Are there particular areas that you feel that we need to be developed? Do we need regulations as any particular part of using autonomous cars [unintelligible 00:40:06] widely that concerns you and you would like to see some policy development?

Interviewee: Yes I guess I'm a bit naive. I don't actually know what I should be concerned about, but the things that come to mind are stuff I said a little earlier like hacking a car, or misusing sensors, or manipulating sensors. Basically making the system closed so that it can deal with itself or whatever. That would be like I want some policy to know to what extent Tesla can share my data and to what extent they're responsible if my data gets taken and misused, how liable they are for that kind of stuff is something that comes to mind when I think of regulating these.

Then in terms of actual governing practices of automated car or the extent to which it can override the person, I don't really know enough but I assume there's a shitload of policy to be made in that entire area and I'm expecting it to be so clear that it will be calming to even the most, older person who is technology-phobic. I think it has to be that clear that the barometer is someone who hates technology and if they can feel like the government has covered it. That would be a good test.

Interviewer: Thank you. That was my last official question.

Interviewee: Yes, it's really interesting to think about and most scary and man that's going to be incredible when I don't have to drive. I hate driving and I'm quite good at it, but it's mentally taxing, it's not something I-- I like doing it once a year, but not this much. I'll be thrilled when it's living in my life.

Interviewer: That's good to hear. Thank you for sharing your thoughts and it's really interesting. Is there anything that I didn't cover, that you wanted to share?

Interviewee: No I felt like as usual. I went off on rant-mode, just like most of my life and then I didn't actually answer the questions you were asking, but as long as I did then I feel like I got more than enough out.

Interviewer: No I think you definitely answered all the questions very well.

Interviewee: Okay, good.

Interviewer: Generally if you go off track, I'll bring you back, but that was very much perfect.

Interviewee: Okay, great.

[00:45:38] [END OF AUDIO]

