

Community / Organisation Studied: Transportation industry

Challenge 1: How GPS influences decision making, reducing free will

According to the survey sent out to the parents of our fellow schoolmates, 36% of the people have disagreed with their personal information being shared or accessed by corporate companies, and quite obviously so. Out of 24 people, 16 are using their GPS by saving locations such as their homes and friends' homes, as well as schools and workplaces. They also felt very strongly about cutting ties with the private car company as shown from how the majority of 26 people. This shows that people are uncomfortable with corporate companies that they do not trust handling and accessing their personal and private information without their consent by using GPS as well as saving and frequenting locations. In the end, people will ultimately lose trust in the car industry and the companies' stocks will fall, sales will drop and go out of business.

Challenge 2: Using Greener forms of transportation (eg. buses and bicycles)

Based on the survey we have sent out to adults or the parents of our fellow hwa chongians, 35/39 of people have agreed that they would prefer to use public transportation if it could reach all parts of the country, and walk or cycle if the walkways were sheltered. Out of these 39 people, 24 people initially preferred to use private transportation as it was much faster and efficient, as opposed to the constant stopping of public transportation, as well as because private transportation was more convenient than public transport. This shows that after knowing that the ability to reach all areas using public transportation as well as there being more sheltered walkways, people would prefer to use public transportation rather than private transportation as the incentives to use private transportation such as convenience and efficiency are cancelled out by the benefits of a cheaper price as well as the fact that public transportation will almost be as convenient and efficient as private transportation. Thus due to convenience, efficiency and affordability, people in 2030 will have a majority of people who decided to use public transportation and other means of transport like cycling and walking. This will impact the car industry as they will have less consumers which will ultimately affect and hurt their businesses.

Challenge 3: Following Trends to Go Eco-friendly

As shown from the survey sent out to adults and parents alike, 14 out of 39 people felt the urge to take public transportation to play a part in saving the environment via social media, with 39 people of them rating on a scale of 1 to 10, the majority of 12 people chose 7 out of 10 as to how far they would take this trend. This shows that the people probably wanted to kill 2 birds with 1 stone. Firstly, they could take part in a new buzz and "be trendy", and also give back and save the environment. Knowing that the earth is undergoing global warming, it will most likely heighten and prompt this new buzz, along with people participating in it. By the time the trend dies now, the transportation industry, specifically the private transportation industry, would be heavily affected. This can also severely affect the private transportation industry as less people would take private transportation. Even if the trend dies down, the car industry would have already been too badly damaged to be restored due to their low sale rate.

Challenge 4: Biased decisions made by AIs in cars that leads to a loss in trust in companies

Project Work - Future Trends (10-27)

Written Report

Biased decision in cars? Can we trust the AI in our transportation/cars to make the right decisions for us? It is supposed to be a moral thought experiment, but it could get very real in the very near future. This time, it won't be a human at the controls, but your autonomous vehicle. Who should an autonomous vehicle save in the event that something goes wrong? Passengers? Pedestrians? Old people? Young people? A pregnant woman? A homeless person? A research assistant with MIT's Media Lab, Sohan Dsouza discovered that the way we answer that question depends on the culture we come from. He joins Ira to discuss how different cultural perspectives on the trolley problem could make designing an ethical autonomous vehicle a lot more challenging in the future. Two years on, researchers have collected a lot of data about people's preferences and opinions on the trolley problem: some 39.6 million judgement calls in 10 languages from millions of people in 233 different countries and territories, according to a paper published in *Nature* today. Encoded inside the paper and data are different cultures' various answers to the ethical knots of the trolley problem. For example: participants from eastern countries like Japan, Taiwan, Saudi Arabia and Indonesia were more likely to be in favor of sparing the lawful, or those walking with a green light. Participants in western countries like the US, Canada, Norway, and Germany tended to prefer inaction, letting the car continue on its path. Participants in Latin American countries, like Nicaragua and Mexico, were more into the idea of sparing the fit, the young, and individuals of higher status. Some of the logic that goes into making these decisions include utilitarianism which is saving as many lives as possible, even if that means committing to an action, like intervening. And there's also the deontological approach, which is to do no harm. Those are the well-known ones. However, there may be some concerns as these autonomous vehicles are unable to recognise the physical characteristics, gender, age and etc of the people in these types of situations. Thus, how do we know what decisions these vehicles will make? Another concern is questioning the probability of whether autonomous vehicles would be a good idea or would it be the downfall of the transportation industry. One of the reasons why is when the advertisers are trying to promote these vehicles, will they say, "We take your safety as the number one priority and the vehicle will protect you at all costs, even if it means risking the lives of others." This may seem ridiculous or a bad idea to pedestrians or the public. In the future of 2030, the trolley problem can ultimately question the usefulness and viability of these autonomous vehicles because of the moral thought process and due to the lack of thoughts and identification these autonomous vehicles have on pedestrians. However, looking back at the concerns for autonomous vehicles, some researchers have fired back that there may be some benefits on why autonomous vehicles are better than vehicles with drivers to operate. For example, when asked why the trolley problem is the best way to think about the future of driverless cars, Sohan Dsouza states that driverless cars promise to eliminate a large number of accidents that can happen due to human error. Also, previously I have mentioned in the research conducted that the lack of knowledge for the physical factors that autonomous vehicles consider and in that case, what decisions they will make should a crash occur. Well, a few researchers state that what they want to do is understand what the public's reaction to an autonomous vehicle crash might be. They want to understand what fears need to be elated in order to encourage adoption of autonomous vehicles. So the primary goal of the research is to see that conversation which provides the ground tooth for conversation about autonomous vehicle ethics and they do not expect to use the data collected and plug it into an autonomous vehicle such as even a default decision, even a decision to randomize, even a decision to always never intervene, those are still decisions that have to be made. In conclusion, in the near future of 2030, there are many different discussions on the viability of autonomous vehicles and the main concern of the moral thought experiment-the Trolley problem questions what decisions these autonomous vehicles

Project Work - Future Trends (10-27)

Written Report

will make should there be a car crash that will ultimately benefit the majority in terms of the number of people saved or who will be saved and etc. These are factors that autonomous vehicles cannot consider due to the lack of knowledge of physical factors and more as they are only programmed, ultimately, to transport a person from destination A to B. Yet, what makes autonomous vehicles an impact to the transportation industry or different in general is that it could potentially minimize human errors when making decisions of a large number of accidents. Therefore, it is very hard to tell about the success rate of autonomous vehicles in 2030 because of the possibility of biased decision making or even any decisions made at all that could make the right decisions for us should an incident or crash occur.

Challenge 5: Hackers obtaining personal data

From the survey results, we can see the majority of people do not know that hackers have access to their data from their GPS. However, after learning that this data can be hacked and used illegally, they said that they do not feel secure with storing their personal information on their GPS. With more education on the security of GPS data, more people would learn how their personal information stored on a GPS is not 100% private. These people would probably start to lose trust in the GPS systems in their cars. However, a car without a GPS system might no longer appeal to some people as they will no longer be able to get to places they are unsure how to get to. This may result in them choosing public transportation over private transportation. With lower demand for cars, sales will decrease, affecting the revenues of car companies. In an article published by The Atlantic, the author first describes how convenient autonomous vehicles can be, giving you choices on what to eat, where to go, etc. However, they describe how this can be an infringement of one's privacy afterwards. In order to recommend restaurants that you like to go to, the AI system in your car will have to record the restaurants that you frequent. This possibility that this data can be stolen by hackers might drive potential car buyers to opt for the safer option of public transportation instead. Also, the prospect that a GPS system can be hacked is also dangerous. According to techworm.net, hackers can use "GPS simulators" to hack into GPS systems like Google Maps. They can alter the coordinates of a place to lead you to drive to an incorrect location, which may threaten your safety. With this knowledge, people might lose their trust in GPS systems and decide to do away with it. They might instead choose to use public transportation like MRT or buses, which do not operate based on GPS services.

Incorporating Challenge(s) # 4

Underlying problem

As we progress into the future, there will be an increased probability of drivers, pedestrians and manufacturers alike being affected by the advancements in technology. How can we enhance the future of driving so that the car industry can contribute to a safe and more sustainable environment in the year 2030 and beyond in Singapore?

Solution 1

To introduce new laws and regulations to combat this problem. As shown from the evidence linked below, About one million accidents occur yearly in Finland (population 5.2 million in comparison to

Project Work - Future Trends (10-27)

Written Report

Singapore's population size of 5.639 million as of 2018) resources for these services have been allocated on the basis of population numbers. This shows that In areas with more dense populations, the level of social activity is greater, which leads to an increased risk for accidents. So by implementing the AI which have the chance of injuring humans greater than humans could to each other in accidents, we will be stopping situations like the trolley problem where human dilemmas are faced by AIs to not happen

Solution 2

Ensures that the artificial intelligence controlling the car would not have any bias towards other people, other than having the main purpose in mind of protecting and keeping the user safe

As seen from WIRED “how ethical challenges of AI cars are a problem - whether to protect the passenger (at the expense of others’ safety), or to protect the majority (at the passenger’s safety)” and nuTonomy: “focused on developing systems that are safe and rigorously well-designed”. This can be done using professional programmers who will program the car such that it will save the most lives possible in the case of an accident.

Solution 3

Enlightening the public to reduce accident rates and informing them on how to react in situations is also a possible solution. Education will enable pedestrians, including students, to understand the importance of road safety and how they should obey rules and react should a car crash is incoming. Receiving road safety education as part of their normal school curriculum is recognized as being one of the most effective ways of providing students with road safety knowledge. Road safety education develops knowledge, skills, attitudes and even more importantly - values that enable pedestrians, cyclists, motor cyclists, drivers and passengers to use the road safely

Solution 4

A sort of 911 for AI, this solution is basically a hotline. The AI technology in the cars will recognise imminent danger incoming when coming into contact with pedestrians, thus contacting help immediately to arrive.

Solution 5

In the case of an unavoidable threat, the car must be designed to minimize damage to both the pedestrian and driver. It will have minimum impact to both the driver and pedestrian so both driver and pedestrian would have the least injury in a situation like this. Seat belts stop you tumbling around inside the car if there is a collision. However, they are designed to stretch a bit in a collision. This increases the time taken for the body's momentum to reach zero, and so reduces the forces on it. Air bags increase the time taken for the head's momentum to reach zero, and so reduce the forces on it. They also act as a soft cushion and prevent cuts. Crumple zones are areas of a vehicle that are designed to crush in a controlled way in a collision. They increase the time taken to change the momentum of the driver and passengers in a crash, which reduces the force involved.

Project Work - Future Trends (10-27)

Written Report

Criteria

1. Cost
2. Public Acceptance
3. Time taken for implementation
4. Ease of implementation
5. Beneficiality for citizens

Project Work - Future Trends (10-27)

Written Report

	Cost	Public Acceptance	Time taken for Implementation	Ease of implementation	Beneficiality for future citizens	Total
Setting Laws	1	5	3	1	5	15
Artificial Intelligence Authority	4	1	1	2	2	10
Education	4	4	4	4	3	19
Emergency Hotline	2	3	5	5	4	19
Car Design	5	2	2	3	1	11

Action Plan

The creation of the AIA will introduce a second party that will have a say in decisions that the AI makes and this party will be made up of people from all walks of life to ensure a minimal bias, with an equal amount of the same race, language, gender or religion. This party will oversee all code created by different transportation industries either by themselves or by developing a code to do it for them. The code will have 1 rule, minimize the injury and protect the driver with multiple data sets and scenarios being uploaded into it every month as the world progresses. This code will be checked bimonthly by a third party with same rule sets of qualification and will be directly linked to the government and refer to them for opinions but only as another party and so the government can keep them in check as well as evaluate their work, ensuring they do not be biased. The agency itself will conduct random spot checks on the transportation industries code to ensure that the code given to them to oversee and approve before being used was not fake or just changed immediately after. They will also oversee the accidents involving transportation, ensuring there was no flaw in the code and getting back to the industry that created it if so. This Agency will oversee all Artificial Intelligence activities by the transportation industry and any industry that does not work under them will not be allowed to operate. The agency will be operated by a group which is overseen by another group who are indirectly overseen by the government. Through this, the transportation industry may face a lot of setbacks in their code as the AIA may not entirely agree with every code that they have, demanding for changes that may lead to delays in products or repairs may take a long time, to the inconvenience and annoyance of its users. At the same time, the AIA will provide 3 or 4 more opinions and parties to check and maintain an unbiased opinion in code so as to maintain its usability and trustworthiness to the public, allowing the AI vehicles to be allowed to operate safely and when faced with moral decisions, respond accordingly in an unbiased opinion with the rule sets of minimizing injury and protecting the driver. The industry known as the Artificial intelligence Agency will

be formed through tax money or investors and loans. implementation of this solution can be done over a few stages, where first the minister of this ministry is picked, after which the coders, etc. are selected. With a secure code that will prevent AI systems in cars from making biased decisions, commuters will be less likely to lose trust in these cars of the future. They will no longer have to worry about the outcome of accidents, and be assured that it will benefit the majority. For example, when a car reaches a crosswalk, there are two questions we need to look at. First, by what means do you decide if a pedestrian is going to cross/stop. Also, by what means do you decide to come to a stop and let the pedestrian cross? Various studies suggest that human drivers will base their decision on race. In one such study by the NITC (National Institute for Transportation and Communities), an experiment was undertaken and “revealed that black pedestrians were passed by twice as many cars and experienced wait times that were 32% longer than white pedestrians.” The researchers concluded that the “results support the hypothesis that minority pedestrians experience discriminatory treatment by drivers.” In this way, if data is collected about crosswalk crossing, and fed to the AI system in cars through machine learning, the AI system may come up with an algorithm that results in racial bias. According to an article published in Forbes, one way to solve this problem is to programmatically develop the code of AI cars, where AI systems operate on a fairer system. Instead of generating the code using real-life examples, programmers can be hired to generate a code from scratch. This will be based on the contributions of various programmers, thus helping to ensure a fair system that is agreed upon by various figures.

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Cite the resources you consulted using the APA format.

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Project Work - Future Trends (10-27)

Written Report

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<https://katu.com/news/local/hacking-gps-the-dangers-of-getting-off-course>

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1. Solution 1:

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2. Solution 2:

WIRED

how ethical challenges of AI cars are a problem - whether to protect the passenger (at the expense of others' safety), or to protect the majority (at the passenger's safety).

nuTonomy: "focused on developing systems that are safe and rigorously well-designed".

3. Solution 3:

<https://www.arrivealive.co.za/Education-and-Road-Safety>

4. Solution 4:

<https://singaporeofw.com/emergency-hotlines/>

5. Solution 5:

Written report

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