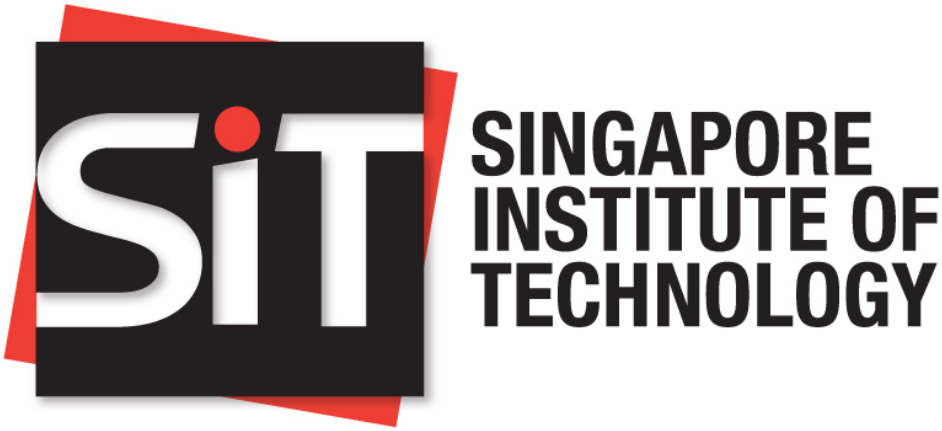

ICT 2102 Human Computer Interaction

Studio 2 – Needfinding

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1. CHOSEN ACTIVITIES

Currently, while there are existing self-driving cars, many are still skeptical and cautious towards self-driving technology. This is largely due to the many news articles highlighting the test failures and accidents of self-driving cars. In addition, self-driving technology is still far from perfect. The algorithms in self-driving cars are still largely unable to react to very unconventional traffic accidents. As a result, owners of self-driving cars are still required to obtain a driving license to drive self-driving cars, in case of emergencies as they would be required to be able to take over the car's controls.

There are some who do not learn to drive due to certain fears or anxiety. Others do not learn to drive because public transport is more economical and they can spend some time by themselves. Most are open towards the idea of a self-driving car that have emergency measures built in and do not require the driver to learn driving.

2. NEEDFINDING METHOD USED

In this project, we had chosen survey and interview as our needfinding methods.

2.1 SURVEY

The reasons for choosing to do surveys are as follows:

1. Anonymity of respondents
2. Short time to complete and large outreach, resulting in being able to get a good sample size of opinions towards the matter
3. Suits the privacy needs of people who prefer to remain anonymous, resulting in more open and honest feedback
4. As surveys provide a snapshot of the attitudes and opinions towards the topic, the feedback obtained can be quantified, analyzed and visualized in graphs and charts

2.1.1 PROCEDURE OF SURVEY

There was no criteria or target survey audience. The target was to get as many different aspects of opinions and views pertaining towards a large demographic of target survey audience, in order to obtain diverse and distributed sample of data from the audience.

2.1.2 SURVEY GATHERED DATA

Refer to Appendix A for gathered data using survey

2.1.3 SURVEY RESULTS & CONCLUSION

46.7% of respondents do not have a driver's license, the other 53.3% have a driver's license.

Main reasons for not obtaining a driver's license include the actual cost of purchasing a car, which acts as a deterrence. If self-driving cars cost the same as normal conventional cars, 81.3% of respondents would purchase a self-driving car over a conventional car, most reasons for this answer is that of the convenience self-driving cars bring. In addition, some respondents stated that it could reduce driver error rate.

Usually when there is a traffic jam, a large majority of respondents would find something to preoccupy their time (78.3% would listen to music, 36.7% would watch a show, 31.7% would find someone to talk to).

If presented with a self-driving car, most users' favorite function would be automated parking (81.7%) and braking. Most respondents would like some sort of sound (smart assistant voice over 65%, or loud alert sound 60%) when the system detects a possible accident, to alert them about it.

Common fears about self-driving cars include the user getting stuck in the car, the car's system gets hacked and the user loses authority control over the car's functions, glitches in the system which might cause severe safety issues.

From the survey results, it seems apparent that as of self-driving car's current technology, a good number of people are still skeptical about the technology as it is still a budding technology and it seems vulnerable to security loopholes or system glitches.

2.2 INTERVIEW

Rich data are directly from the users, which adds a lot of context [Further explain]

Can ask for slightly more in-depth questions and answers

2.2.1 PROCEDURE OF INTERVIEW

- Zoom down to people who do not have driving license
- From People who took the survey

2.2.2 INTERVIEW GATHERED DATA

Refer to Appendix B for gathered data using interview

2.2.3 INTERVIEW RESULTS & CONCLUSION

From the interviews, we gathered and concluded that both drivers and non-drivers currently remain skeptical about the technology of self-driving cars due to it being a new technology and society as a whole have yet to adopt it. We also gathered that both drivers and non-drivers tend to find something to occupy themselves whenever they are stuck in a traffic jam.

3. TASK ANALYSIS

3.1 ANALYSIS OF DRIVERS (WHEN THEY ARE DRIVING)

Our goal is to transport user from point A to point B in the safest and shortest time possible, whereby it also caters to both drivers and non-drivers. The product should be able to bring convenience to the users.

User book a private hire ride
0. Start phone application
1 Input current location and destination location
2. Press book a ride button
3. Wait until a driver picks user's request
4. Driver accepts
5. User waits for driver
6. When driver arrives, user board the car
7. User leave the car when reach destination

From the above HTA, I can conclude that user need to start the phone application and input their current and destination location in order to book a ride.

Driver driving from home to work (Traffic jam)
0. Walk from home to carpark
1 Locate car in carpark
2. Unlock the car
3. Start car engine
4. Start driving
5. Driver stuck in traffic jam
5.1 Driver do nothing
5.1. Wait for the car to start moving

6. Reached destination
7. Stop car engine
8. Lock the car

From the above HTA, I can observe that when drivers get stuck in a traffic jam they have nothing to do but to wait for the traffic to move. This might make them lose their concentration and have a higher chance of getting into an accident.

Driver exhausted while driving
0. Walk from home to carpark
1 Locate car in carpark
2. Unlock the car
3. Start car engine
4. Start driving
5. Driver feels tired while driving
5.1 Driver start to lose concentration
5.2 Driver cannot focus
5.3 Driver feels headache
6. Reached destination
7. Stop car engine
8. Lock the car
9. Driver cannot focus during work

From the above HTA, I can conclude that it will be very dangerous if the driver drives while feeling tired. It might lead to an accident or losing his/her job as they cannot focus.

New driver just got license
0. Walk from home to carpark
1 Locate car in carpark
2. Unlock the car
3. Start car engine
4. Start driving
5. Driver drives recklessly
5.1 Driver cause traffic hazard
5.2 Driver injures other commuters or drivers
6. Reached destination
7. Stop car engine
7. Lock the car

From the above HTA, I can conclude that it will be very dangerous if the driver are too reckless. It might lead to an accident, causing inconvenience to others

3.2 ANALYSIS OF NON-DRIVERS / DRIVERS AS PASSENGERS

Passenger stuck in jam
0. Passenger hire taxi
1 Passenger tell driver the destination
2. Passenger stuck in jam
2.1 Passenger listen to music
2.2 Passenger sleep in the car
2.3 Passenger watch video
3. Reached destination

From the above HTA, I can conclude that when passenger stuck in traffic jam, they will either listen to music, sleep in the car or watch video.

3.3 ANALYSIS OF PEOPLE ON PUBLIC TRANSPORT

Non driver during peak hour on public transport (bus/train)
0. User leave home
1 User reach MRT station
2. User wait for train
3. User squeeze into the train
3.1 User do nothing
3.2 User listen to music
3.3 User squeeze with the other passenger
3.4 User stand in the train
4. User squeeze out of the train
5. User reached destination

From the above HTA, I can conclude that when passenger took train during peak hours, they will feel uncomfortable as they need to squeeze other passenger and stand throughout the whole journey.

4. REQUIREMENTS

2.1 SAFETY AND SECURITY'S IMPORTANCE

Majority of the users' expressed safety and security as one of the fears they have about self-driving cars. Without feeling safe, users would not give self-driving cars a try. Users still do not totally trust computers to handle controls of a car such as the acceleration and driving at the current technology standpoint. Self-driving technology would have to improve to a point where safety measures are built in into the user interface and the systems have a way of automatically solving any possible accident situations.

2.2 NEED TO DESIGN SELF-DRIVING CARS TO SUIT NON-DRIVER'S NEEDS TOO

Non-drivers are willing to try self-driving cars, but are still adamant about driving to operate a self-driving car. As of current self-driving technology, in the case of emergencies, steering and braking systems are handed over to drivers, therefore for safety reasons drivers are still required to obtain a driver's license. This would currently rule out the possibility of people without driver's license operating a self-driving car. If the self-driving car's system has built-in contingency measures which cater to non-driver's needs as well, it would cater to a wider demographic.

2.3 CONVENIENT

Self-driving cars should bring convenience to users, rather than a problem, or not value adding anything. If self-driving cars are not bringing convenience, most users rather stay with normal cars, which are "safer".

2.4 PRICE SHOULD NOT EXCEED NORMAL CARS

81.3% of the respondents are willing to buy self-driving cars, if they cost the same as conventional cars.

2.5 AUTOMATED PARKING AND NAVIGATION

81.7% of the respondents prefer to have automatic parking and navigations to be in-build into self-driving cars.

5. CONCLUSION

During the needfinding and task analysis, we learnt that self-driving cars need to cater to both drivers and non-drivers.

It is shown that non-drivers are most likely to stay as non-drivers due to the cost of having a car in Singapore, anxiety, attention spend, etc. There is no foreseeable chance that these people will switch over to become a driver. However, if non-drivers were to purchase a self-driving car, the user interface must be able to consider non-drivers' skillsets and not pass over controls such as the braking or steering systems.

We also concluded that regardless of drivers or non-drivers, they have a fear of self-driving cars' security glitches (E.g. hack). With that, target audiences will only purchase a self-driving car only when security / safety issues are addressed in the product.

6. APPENDICES

4.1 APPENDIX A

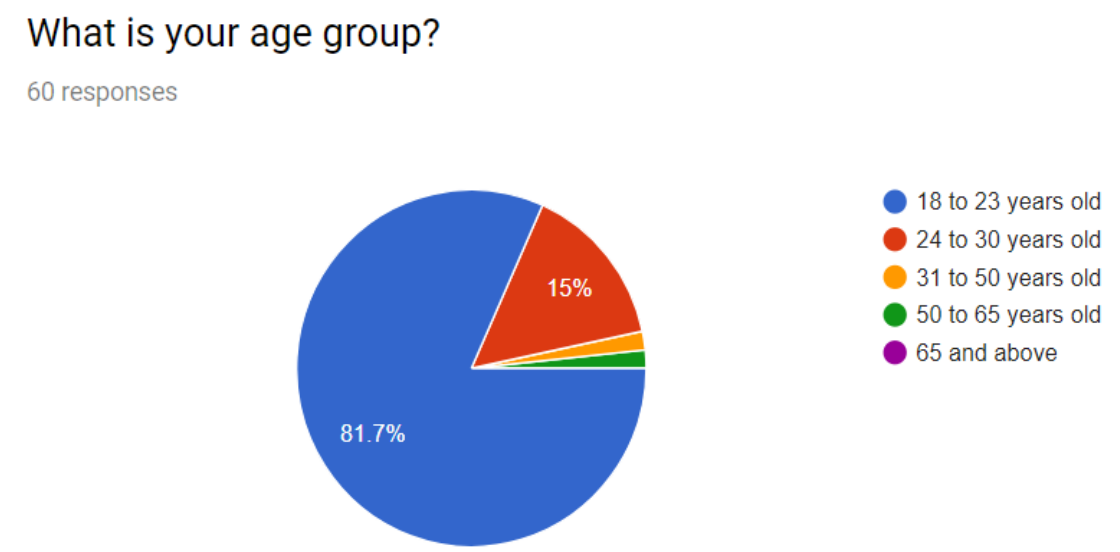

Figure 1 Age Group

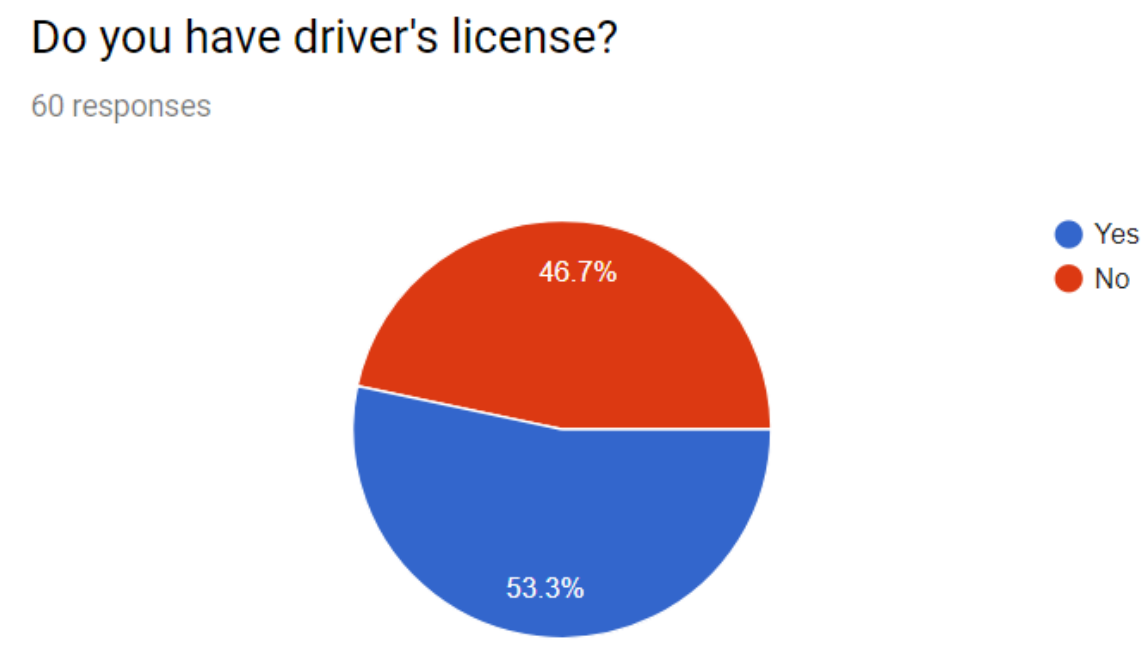

Figure 2 Owning a Driver's License

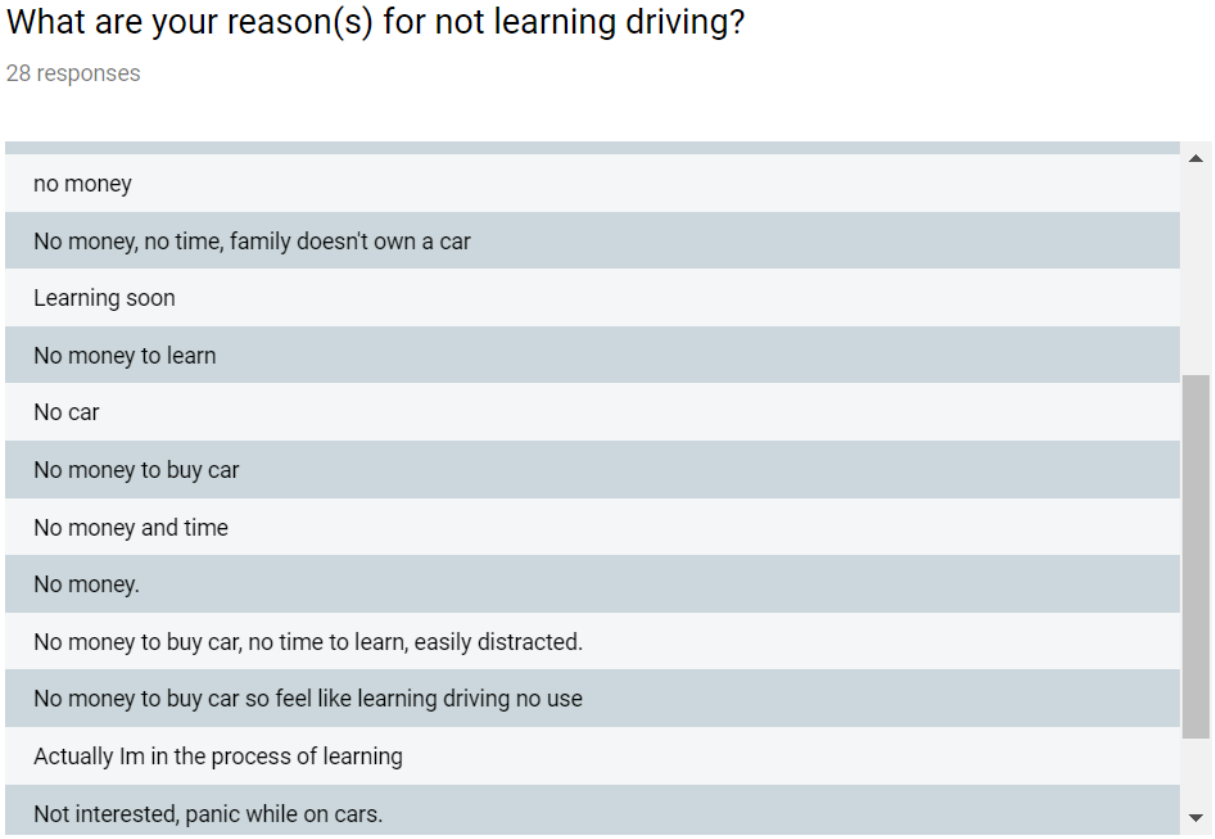

Figure 3 Reason for not learning driving (Non-drivers)

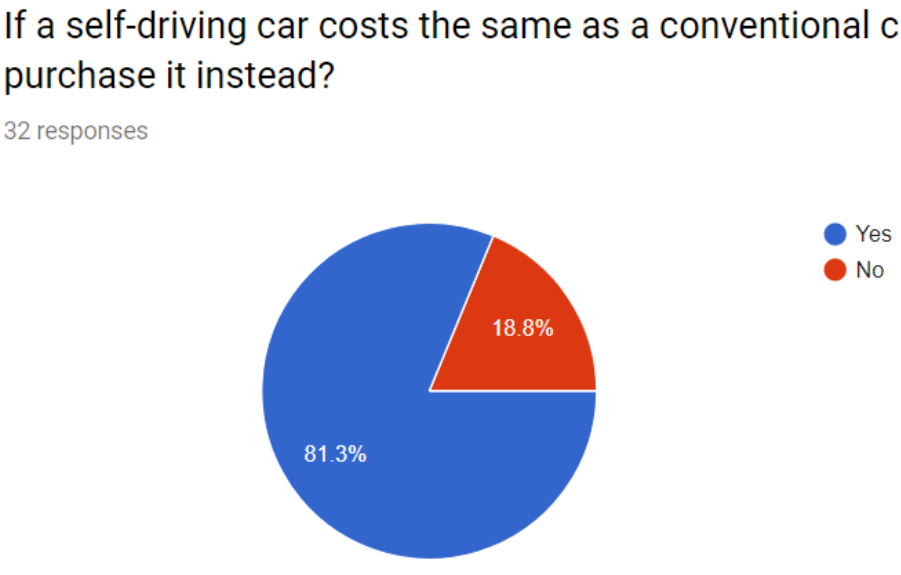

Figure 4 Willingness to buy a self-driving car (Drivers)

Why?

32 responses

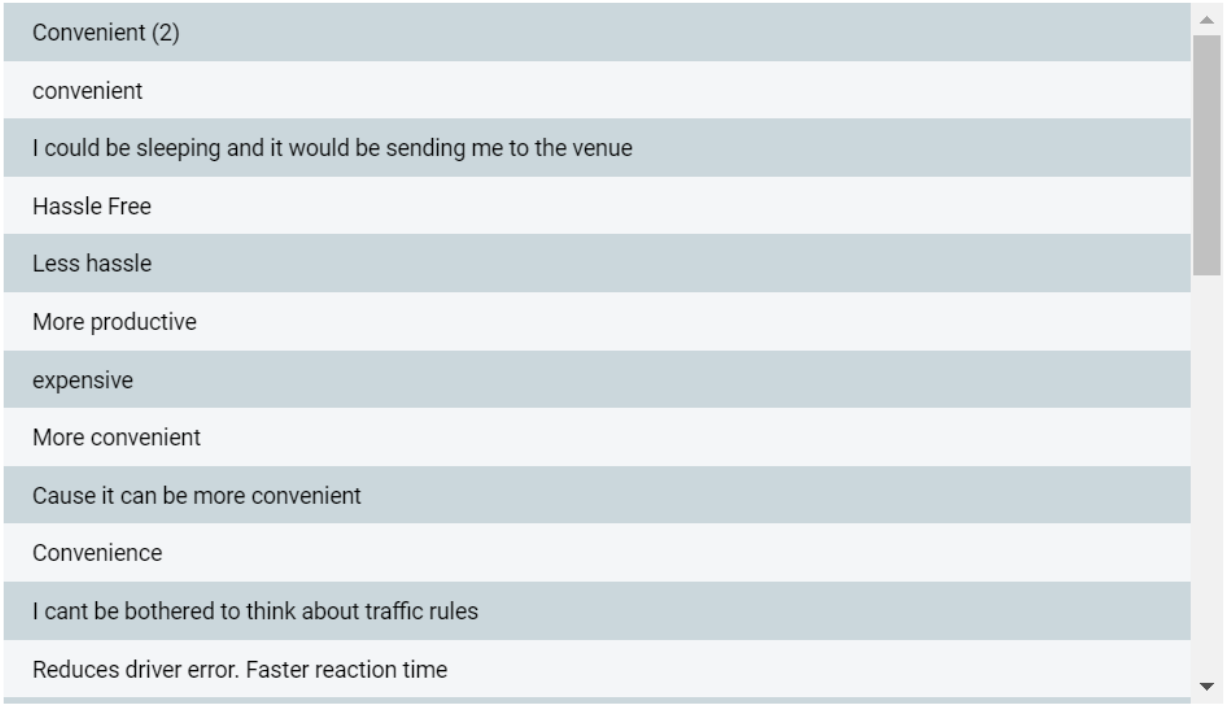

Figure 5 Reason of not buying a self-driving car

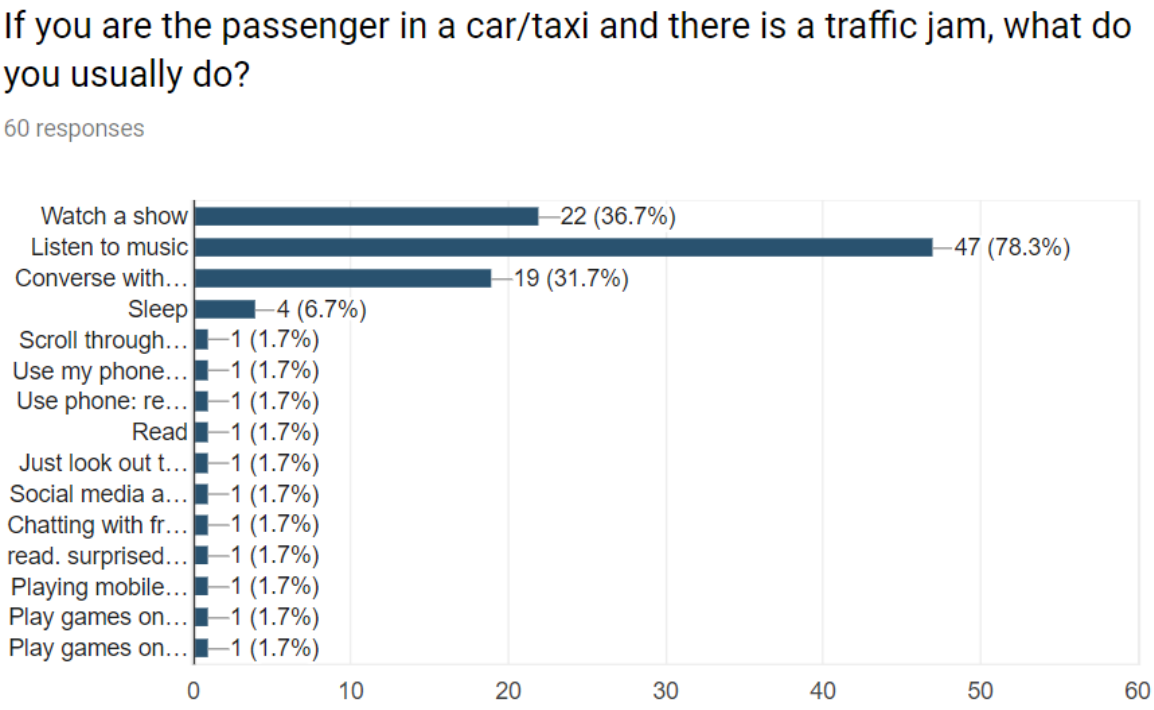

Figure 6 What to do when stack in a jam

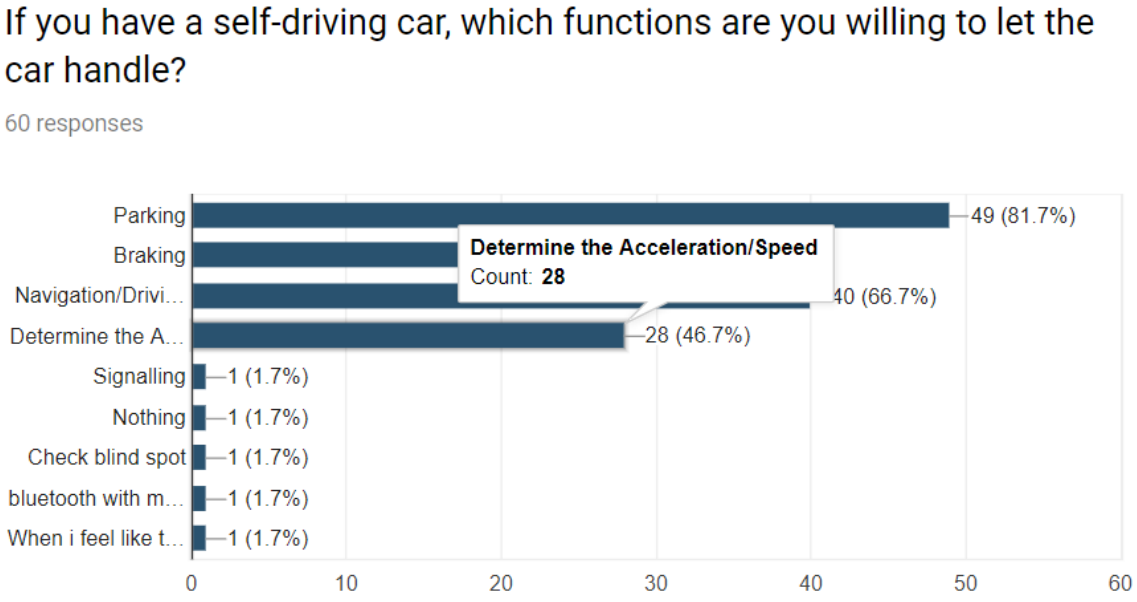

Figure 7 Functionality on self-driving car

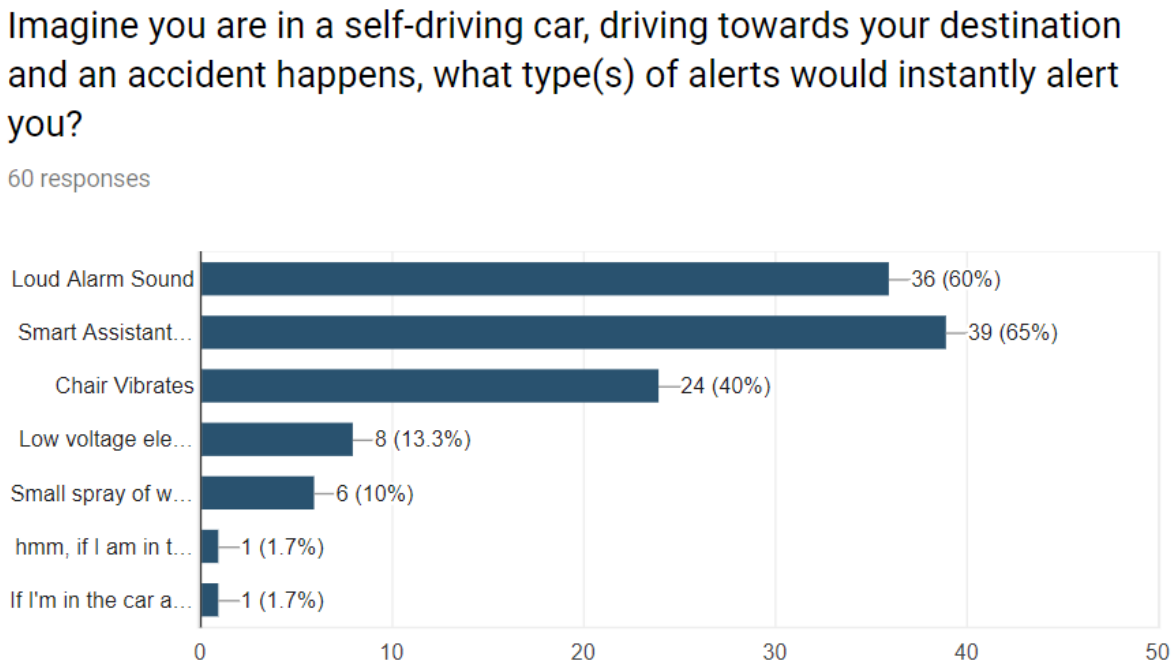

Figure 8 Tools to wake you up when involved in an accident

Figure 9 Fear about self-driving cars

4.2 APPENDIX B

5

Interviewee A: Non-driver	
Why did you not get a license?	- Cars are expensive - Easily distracted - Prefer to be the one driven or take public transport because if I am a passenger, can listen music watch show do my work
Are you willing to own a self-driving car?	If self-driving car is existing, or establish 3 to 5 years. I will buy, if does not cost too much.
Why 3 to 5 years?	When self-driving technology just intro/become mainstream, will have lot of issues. I will only change to that technology when it's stable and safer.

What is the main issue of your concerns?	- System glitches - What if self-driving cars are not fully adopted by everyone and i get into accident due to others' [who do not own a self-driving car] carelessness
How do you think self-driving car benefits you?	It will be like a car where you don't have to ask someone to drive you around, but at the same time i can do my own stuffs
What kind of functions are you expecting?	- Self driving - Navigation - Must have emergencies measures - In the event i am not alert of the accident, the car should be able to make its own decisions [for safety purposes] - Not logical if buy a self-driving car and I need to learn how to drive
What kind of entertainments are you expecting?	- Watch show or listen to music - Preferably connect to Wi-Fi

6

Interviewee B: Driver	
Why do you want to learn driving?	Convenient to have a license. If company give me a car to drive, I won't lose the opportunity. It is a life skills. Won't be bound with office jobs, can use driving as an income.
Do you face any difficulties when you get license?	When I was learning manual. Could not coordinate clutch with gear.
How long since you got your license?	2 years
How often do you drive? > 3-5 times a week or less?	Seldom, sometimes only twice a month
Because you drive so infrequently, do you have any fears? [E.g. after 1 month of not driving]	Fear of accident
What kind of accident you were involved in, and the severity of the accident?	2 accidents: first one driver too sleepy and hint into my cars, second: too sleepy and almost hit a bus
Do you think in the event of emergency if there was a system in place to alert you in the surrounding such as voice alert or a navigation assist system it would aid in your driving and safety	If signal right, and the car will have voice system to let me know that there is a car at the right side. So do not cut right lane.
In other words, GPS that have computer vision.	Best is measures that will help me for parking.

if you have a self-driving car, considering you are feeling sleepy. What features u are willing to let the car take over?	Not braking, if there's a tree in front might not be able to detect on time. Acceleration if I am able to toggle the speed.
Do you have any fear of self-driving cars, at the current technology	Cos we know how technology are vulnerable so not confident with the technology and have bug, casuing accident. If sports car, wants to drive on my own.
If a self-driving car is more expensive than a convention car, would you buy?	No. If thats the case, I would prefer driving and get the feel of driving. No point in getting a self-driving car if I can grab / take public transport at a cheaper rate.