Satsang Adhikari

101145635

COMP 3008

Assignment #3

Part 1: Interview

i) Interview Topic and Interview Questions

The topic chosen for this study is self-driving cars. While there are no self-driving cars currently on the roads, it is a highly-anticipated piece of technology looking to make a breakthrough in the automobile industry in the foreseeable future. Due to the fact that we know so little about self-driving cars, it makes an interesting topic of discussion with the general public to understand their opinions and concerns. The interview was conducted remotely with two participants. For anonymity purposes, the participants will be labelled P1 and P2.

Interview Question 1: Imagine that at this very moment you now own a self-driving car. What are some of the first things you would look for or try out?

Interview Question 2: Keep your current car in mind (if you don't own a car, think of any generic car) and tell me some of the things your current car has that you would also expect to see in your newly owned self-driving car.

Interview Question 3: In contrast to the previous question, what aspects of current cars do you hope self-driving cars would fix or do a better job at?

Interview Question 4: What concerns or issues do you have about self-driving cars being the dominant form of automobile on the roads?

Interview Question 5: Pick any one concern you mentioned from the previous question and provide any suggestion you might have to mitigate or prevent it.

ii) Summary of Main Points

During the pre-interview chat with the participants, P1 and P2 both express their enthusiasm for latest technologies, especially in the industries of smartphone, gaming, and PC. While they point out that they are not too familiar with the capabilities of self-driving cars, they are nevertheless excited to share their interpretations and what they would look for in this fascinating piece of technology.

Participant 1 (P1)

Taking their new self-driving car for a ride to a familiar location is the first thing P1 would do. They expect self-driving cars to contain basic utilities such as turn signals, horns, and cameras that are already equipped in majority of the modern cars. P1 highlights two major issues that they have with their current car: having to take one's eyes off the road when changing controls for AC, sound, GPS, seating; and the use of gas which produces high levels of greenhouse emissions. They hope that self-driving cars will eliminate these issues by establishing a voice-controlled system for changing controls and by opting for electric charging instead of gas to save the environment. P1 expresses concern about the appropriate "level of autonomous" for self-driving cars, or in other words, to what degree should the car be able to make decisions on its own. They question whether one's car will be able to safely handle an accident-bound situation where another car in the vicinity suddenly swerves, for instance. To ease their concern, P1 suggests that the driver has to hold onto the steering wheel at all times and look at the road, even if the car is moving on its own, as this forces them to be aware of their surroundings.

Participant 2 (P2)

P2 would firstly check how well the car handles busy traffic and common complicated driving situations such as four-way stops and lane-merging. While automatic driving functionality is the essence of self-driving cars, they mention that user should still be given the option to drive manually to harbour a sense of security. P2 believes that self-driving cars can eliminate the inconvenience they face with their current car of having to visit an auto-repair shop periodically for servicing. They suggest that self-driving cars should have a "self-diagnosis" capability: when the car starts to find issues with any of its parts, it can not only notify the user but also possibly propose to schedule a date and time during which the car can drive itself to a mechanic's shop, get repaired, and drive back home. As for their major concern with self-driving cars, P2 points out that even though AI may be better at driving than humans statistically, there is still a chance that it can get into an accident. Then they raise the question of who should be held responsible in case of an accident leading to death. Should it be the AI, or the driver, or the manufacturer, or multiple parties? P2 suggests that the manufacturer is at fault and must be financially penalized for failing to incorporate proper safety measures.

iii) Main Insights

The topic of self-driving cars has been circulating the technical community for the past few decades and it continues to be a subject of interest. People have various interpretations on the self-driving cars' abilities and features. The purpose of conducting these interviews is to understand some of these interpretations from the participants and identify any commonalities and differences in their mental models.

For the opening question, both participants give parallel responses. When we buy a new smartphone, for instance, it is in our instincts to play around with it and explore its possibilities. Their responses indicate the same for self-driving cars; to take it for a ride and assess the driving experience. One mentions that they would attempt to jump in front of the car suddenly to observe whether it reacts within an appropriate amount of time. The other points out that there are bad drivers and hazards on the road, therefore the car's AI must actively scan its surroundings for signs of danger, especially in the intersections. It is clear that safety is the biggest priority for both participants, and rightly so, since their lives depend on the quality of the safety measures put in place.

The more thought-provoking of the two responses for the second question is the expectation for self-driving cars to give the driver the ability to take the wheel and drive as they do with their current car. The participant states that they "don't trust AI with everything" because there might be situations which the car is not programmed to handle. It would be unreasonable to think that technology will always work. We experience abrupt shutdowns, battery drain, and software issues on our devices. It is not far-fetched to assume the same for self-driving cars, therefore having an ability to drive manually provides a safety net for all drivers.

The third question also collects similar responses from the participants. It is common knowledge that distracted driving often leads to accidents. Most, if not all, of the current cars require the driver to take their eyes off the road when changing controls for AC, songs, GPS, etc. This is a dangerous practice, as pointed out by one of the participants, which they hope will be eradicated through a voice-based system. The other participant's concept of "self-diagnosis", which allows self-driving cars to proactively identify any issues and drive itself to the repair shop, is very

interesting as well. They mention that this will alleviate the hassle of periodic visits to the mechanic, however it can solve a far greater problem. A driver may be unaware that they need to take their car to the mechanic which can potentially endanger themselves and others on the road. Once again, we see that safety is the prevailing theme in the responses.

It will likely come as no surprise that the concerns expressed by the participants all have to do with the driver's safety. Self-driving car is not simply another piece of technology like a smartphone or a console. It absolutely must not have any safety flaws, thus people would understandably have questions regarding its safety measures. One of the thought-provoking concerns brought up by a participant is regarding the degree of freedom that self-driving cars should be given in terms of making decisions. To quote the participant, "If a nearby car suddenly swerves, can my car handle it safely on its own?" The solution that the participant comes up with is to somehow ensure that the driver is holding onto the steering wheel and observing the roads as this forces them to stay alert. This goes hand-in-hand with the other participant's idea of giving drivers the ability to drive manually at any time to add an extra layer of protection through attentiveness.

There seems to be a trend of thought between the participants in not being fully dependent on the AI for decision-making. This trend ties in with the overarching theme of safety which is prevalent in all of their responses.

iv) Reflection on the Process

This study provided me with a valuable learning opportunity to further develop my interviewing and analyzing skills. The previous assignment proved to be very helpful as it allowed me to properly set up the interviews as well as better prepare my interview questions. Therefore due to the right planning, the entire process went smoothly as anticipated. My questions were able to bring out intriguing interpretations on self-driving cars from the participants. As the interviewer, I faced some obstacles while taking written notes of the participants' responses. At times, they would go over something very quickly without allowing me to write it all down for which I would ask them to repeat themselves. Other times, they would give very brief answers to questions for which they would be asked to elaborate. The reason I opted to take written notes, as opposed to typing on a laptop, was to ensure there were no keyboard-typing sounds to distract the participants. To conclude, this project was a great experience for me in terms of expanding my interviewing skills as well as learning more about various perceptions of self-driving cars.

Part 2: Requirements Representation

i) A New Software Project

I was designated to work on AliExpress.com for my previous assignment. AliExpress.com is an e-commerce website which allows users to buy and sell products. The proposed software project falls under the same general domain as AliExpress, however it has a humanitarian aspect to it.

The project is titled *We Are One Big Family (WAOBF)*. It is a mobile application with two sets of users: one set of people in a neighbourhood who are in need and request for support; and another set of people who look to support those in need. The most important connection between AliExpress and *WAOBF* is that both platforms allow its users to purchase service as well as offer service. However, *WAOBF* adds a humanitarian aspect to the e-commerce domain. This project encourages people to help out in their community and look out for one another, hence why the project is named *We Are One Big Family*.

ii) Scenario

Joe lives in a neighbourhood within Barrhaven, Ottawa. One day, he unfortunately slips on his icy driveway and he is taken to the hospital. When he returns home after two weeks of recovery, he finds that he is having difficulties doing things he used to be able to do. He opens the *WAOBF* application on his smartphone and puts in a request to pick up groceries for him from the local market. Alex, a support person, sees Joe's request and chooses to accept it. Alex can view Joe's profile information including his home address so he knows where to deliver the groceries. At this point, Joe is notified that Alex is helping him and he is also able to see information about Alex from his end. Joe's credit card details are stored within the application which allows for swift payment to Alex once Joe's request is completed. Then, Joe can give a rating to Alex and likewise Alex can give a rating to Joe. Providing high quality service is very important for support persons such as Alex as it leads to gaining favourable ratings and receiving recognition in the community. Being easy to work with is very important for requestors like Joe so they continue to receive support from the community.

iii) Persona 1

Joe — Requestor with temporary physical disability

Independent | Hard-working | Caring

Motivations

- Maintaining positive relationships with his neighbours
- Offering help to those in need around him
- Getting help from his community when in need

Age: 60
Work: Accountant
Family: Single with no kids
Location: Barrhaven,Ottawa,ON

Fairly comfortable with using mobile applications

Frustrations

- Not being able to do things he used to be able to do
- Loneliness
- Technology that is "all over the place" and hard to figure out

Personality

Introvert — Extrovert

Thinking — Feeling

Sensing — Intuition

Bio

Joe is an accountant by profession working at a firm for almost 30 years. He will be retiring soon and looks to spend his retired life in the countryside. He has been living alone for the entirety of his adult life, but he had a Golden Retriever to keep him company. A string of unfortunate events recently occurred in Joe's life: his Golden Retriever passed away; and Joe slipped on his icy driveway and fractured his spine. Joe's acquaintances describe him as a thoughtful and caring person. Joe is aware of the ever-growing presence of smartphone technology and wants a service in the form of an app that allows people in their community to look out for one another, especially during times of hardship.

iv) Persona 2

Alex — Support Person

Problem-solver | Understanding | Organized

Motivations

- Applying skills and strategies learned from his study program to help people in his community dealing with problems
- Keeping in touch with people around his community, especially whom he has helped in the past, to maintain positive relationships
- Initiating food drives and fundraiser events in his community

Age: 23
Work: Casual Uber driver
Location: Barrhaven,Ottawa,ON

Studying Social Service Work at Algonquin College

Very comfortable with using mobile applications

Frustrations

- Seeing some people's lack of empathy and kindness
- Mobile applications that don't provide adequate documentation or help pages for users who are unfamiliar with the platform

Personality

Introvert	Extrovert
Thinking	Feeling
Sensing	Intuition

Bio

Alex is an undergrad student getting a diploma in Social Service Work at Algonquin College. He also works on the side as an Uber driver. Alex is praised by his peers and instructors for his **interpersonal** skills and his ability to problem-solve. He is actively engaged in his community. He also stays in good shape by going to the gym and biking regularly. He maintains a near-perfect 4.9/5 rating in his Uber driver average rating for providing excellent service to his passengers. Mobile technology is an integral part of his everyday life as it is needed for his Uber rides, for his studies, as well as for keeping up to date with local community events.

v) Persona Importance and Impact

The two personas of Joe and Alex were designed to capture both types of users for the project.

Joe is an important example of a user for this project because he is among a set of users who are in need of desperate support. Although the persona of Joe is fictional, his situation can definitely be reality for someone in the real world. Joe mentions his frustration with technology that are not easily navigable and hard to understand. Therefore, the designers for this project must take this into account and properly apply the design heuristics to ensure users like Joe are fully comfortable with using the mobile application.

Alex is an excellent example of a support person because he has experience with solving people's problems through social work, providing quality service through Uber rides, along with being a caring and positive person. Such support persons usually receive favourable ratings and are recognized in their community for their commendable work. Alex would likely affect the interaction design as he mentions his frustration with mobile applications that have unhelpful documentations for how to use the platform. The designers for this project must also take this into account so users like Alex effectively receive proper help when needed.

Note that the requestors are not limited to users like Joe who suffer from disabilities (whether temporary or permanent). Anyone can make use of it. As an example, a person coming back from vacation can request a support person to clear out snow from his driveway before he arrives. The ultimate goal is to establish a supportive community through mobile technology.

Appendices

i) Consent Forms

Carleton UNIVERSITY
Canada's Capital University

Consent Form: Sample

NOTE: ITEMS IN RED WILL BE EDITED BY THE STUDENTS

Title: COMP3008 Assignment 3 Project – **Interview + Persona/Scenario**

Date of ethics clearance: October 20, 2021

Ethics Clearance for the Collection of Data Expires: October 31, 2022

Project clearance number: CUREB-B Clearance # 116358

This project is being completed as part of COMP3008, an undergraduate course in Computer Science at Carleton University. This study aims to *assess the usability of a computer user interface.*

This project is about **conducting interviews on a specific technological topic,** and you are invited to take part in a research project. The information in this form is intended to help you understand what we are asking of you so that you can decide whether you agree to participate in this study. Your participation in this study is voluntary, and a decision not to participate will not be used against you in any way. As you read this form, and decide whether to participate, please ask all the questions you might have, take whatever time you need, and consult with others as you wish.

This study involves one session lasting approximately 20 minutes. During the session, you will be asked to *complete some tasks on a computer system, provide your opinion of the system, and offer feedback. Data may be collected through observation, questionnaires, interviews, or tools to measure user actions on the interface (e.g., timing information).*

If you provide explicit consent at the end of this form, the researcher will audio-record this session to help with note-taking, so that they can more fully converse with you. The audio recording will only be used for this purpose, and it will only be heard by the researcher. If using video-conferencing, you may turn off your camera. The interviewer will inform you before starting to record. If you do not wish to be audio-recorded, the researcher will take written notes of your comments instead.

Your data will be kept confidential and none of your personal accounts or data will be accessed. In reporting, it will be associated with an anonymous username (e.g., P1, P2).

Participation is completely voluntary. There is no obligation to participate. There is no compensation if you do choose to participate.

You have the right to end your participation in the study at any time, for any reason, up until one week after the session. To withdraw, simply tell the researcher; no reason or explanation is necessary. If you withdraw from the study, all information you have provided will be immediately destroyed.

Most sessions will be completed remotely by video-conference. If you chose to video-conference, you and the researcher will agree on a mutually convenient platform. These platforms may have servers in countries outside of Canada and any data transmitted through them are subject to the laws of their respective countries. For example, Skype and Zoom have servers in the US and would be subject to US law. "In-session" data, such as the audio, video and chat transcript from the interview, will be stored locally on the researcher's computer.

Due to safety reasons, you can only complete the user study session in-person if you live with the researcher.

All research data, including the audio-recording and electronic notes will be password-protected. When the analysis is completed, any paper copies of data (including any handwritten notes) will be kept as securely as possible by the researcher. Data will only be accessible by the researcher and the research supervisor.

Since this is part of a class project, data will be kept until the end of the course. All data will be securely destroyed by **June 2022.** Electronic data will be deleted, and paper copies will be shredded.

This research has been cleared by Carleton University Research Ethics Board-B (Clearance #116358).If you have any ethical concerns with the study, please contact Carleton University Research Ethics Board (by phone at 613-520-2600 [ext. 4085] or by email at ethics@carleton.ca). During Covid, the Research Ethics Staff are working from home without access to their Carleton phone extensions. Accordingly, until staff return to campus, please contact them by email.

Researchers' contact information:

Name Satsang Adhikari
Department Computer Science
Carleton University
Email: satsangadhikari@cmail.carleton.ca

Supervisor contact information:

Sana Maqsood
School of Computer Science
Carleton University
Email: sana.maqsood@carleton.ca

I agree to participate in this user study: ✓ Yes _____ No

I agree to be audio-recorded: ✓ Yes _____ No
(If you only want to be audio-recorded while video-conferencing, please turn off your camera)

I agree to be video-recorded: ✓ Yes _____ No
(If you only want to be audio-recorded while video-conferencing, please turn off your camera)

Aryan Zaman _____ 3/2/2022
Signature of participant Date

Research team member who interacted with the participant

I have explained the study to the participant and answered any and all of their questions. The participant appeared to understand and agree. I provided a copy of the consent form to the participant for their reference.

_____Satsang Adhikari_____ __03/02/2022_____
Signature of researcher Date

Due to safety reasons, you can only complete the user study session in-person if you live with the researcher.

All research data, including the audio-recording and electronic notes will be password-protected. When the analysis is completed, any paper copies of data (including any handwritten notes) will be kept as securely as possible by the researcher. Data will only be accessible by the researcher and the research supervisor.

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Researchers' contact information:

Name Satsang Adhikari
Department Computer Science
Carleton University
Email: satsangadhikari@cmail.carleton.ca

Supervisor contact information:

Sana Maqsood
School of Computer Science
Carleton University
Email: sana.maqsood@carleton.ca

I agree to participate in this user study: ✓ Yes _____ No

I agree to be audio-recorded: ✓ Yes _____ No
(If you only want to be audio-recorded while video-conferencing, please turn off your camera)

I agree to be video-recorded: ✓ Yes _____ No
(If you only want to be audio-recorded while video-conferencing, please turn off your camera)


Signature of participant

2022 March 2
Date

Research team member who interacted with the participant
I have explained the study to the participant and answered any and all of their questions. The participant appeared to understand and agree. I provided a copy of the consent form to the participant for their reference.

___Satsang Adhikari_____
Signature of researcher

__03/02/2022_____
Date

ii) Interview Notes

P1:

1. go to a store and see how well it can go
   try to do obstacle course
   ↳ try to test its safety by jumping into car suddenly to see how the car reacts.

2. cameras around car when turning makes it easier
   turn signals, horn, basic features all cars should have

3. have to take my eyes off when changing controls → dangerous
   not voice-activated like self-driving cars
   good for the environment with charging instead of fuel

4. level of autonomous → environment can change, driver's intuition is different than robot.
   if a car suddenly swerves, how would car handle it? would it be safe?
   how would electric parts function in the cold?
   human brain more complex than robot. will it can solve from its previous experience and observations? will the car be able to do this?

5. autonomous →
   driver has to hold the wheel (driver has to pay attention) and look at the road

P2:

1. how it can handle busy traffic, complicated situations, check safety
bad vs good drivers on road — how does AI handle both

2. it should have the ability to change to manual
sense of security → I can take over when there is danger
rare situations AI can't handle
don't trust AI with everything

3. better self-diagnosis → notify about parts that are broken / need replacement
have the feature to have seats to rotate for family
Schedule to drive to mechanic when you are not using it.

4. even if statically AI is better at driving, what if there's accident.
if AI gets in accident, who is responsible?
AI? driver? CEO? → AI
crash b/w self driving car and human

5. if AI causes accident, financially penalize the company for failing to incorporate proper safety measure

iii) Sources for external images

Stock photo for Joe image - https://bit.ly/3vD3Qpm

Stock photo for Joe accountant - https://bit.ly/3pXwz4H

Stock photo for Joe dog - https://bit.ly/3HAKKSV

Stock photo for Alex image - https://bit.ly/3HI4fZM

Stock photo for Alex studying - https://bit.ly/3Ki6XXA

Stock photo for Alex support - https://bit.ly/35IRp0e

Stock photo for Alex driving - https://bit.ly/3CcggWo