Formative Studies and Analysis: Vehicle Parking Location Recollection

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CSC 318: Designing Interactive Systems for Users

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Executive Summary

As a conglomerate, we set out on a mission to discover the obstacles and difficulties people have with parking in large parking lots. More Specifically, we looked into the issues with remembering the location of their parked vehicles. This document will showcase the processes that were taken in order to go about completing our mission. This document consists of several sections including a more in depth look at the problem and which groups of people we are targeting, the field studies that were used to help analyze the problem further, experience map and Job stories, finally the appendices section completes the document.

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General Problem

The general problem that we're attempting to address is a common issue for many drivers; being unable to recall where they parked their vehicle within a parking lot. In particular, individual users may have issues locating their cars in large parking lots where there may not be any markers or memory aids to assist with memory recall. **Thus, we want to explore how we can help users locate their cars in large shopping mall parking lots when there are no markers around.** Our focus is on helping users relocate their cars with ease, and our research study involves investigating the variables that make this memory recollection task more difficult for users.

This research is motivated primarily by shared experiences between the researchers of this study. The members of our team have personally experienced the plight of being unable to remember where we (or an individual they were driving with as a passenger) parked after a long day at work or in school for some, and even just after a short time parked in a large parking lot for others. We reasoned that being direct stakeholders ourselves, we would be more invested in finding a solution to this problem.

Additionally, background research describing this problem was accidentally discovered by one of the researchers of this study, which sparked a further investigation into the problem space. For example, research done by The New York Times suggests that forgetting can help us form better understanding, and thus forgetting where you parked may actually be beneficial to us (Boser, 2017). While this seems unintuitive, the suggested reasons and explanations for forgetting where you have parked from a multitude of sources indicate that a lot of research and

resources have gone into this problem, and it seemed logical that with this being a common problem, it would be useful for many people if we were to develop a solution.

Our primary stakeholders and users include individuals who may park their cars in large parking lots for extended periods of time; specifically, retail customers and shoppers, commuters, students, event goers, and travellers.

The secondary stakeholders would thus include store and/or building owners, valet employees, urban planners, private transportation services and employees (e.g. ride share services such as Uber and Lyft), car rental businesses and venue parking personnel and parking management.

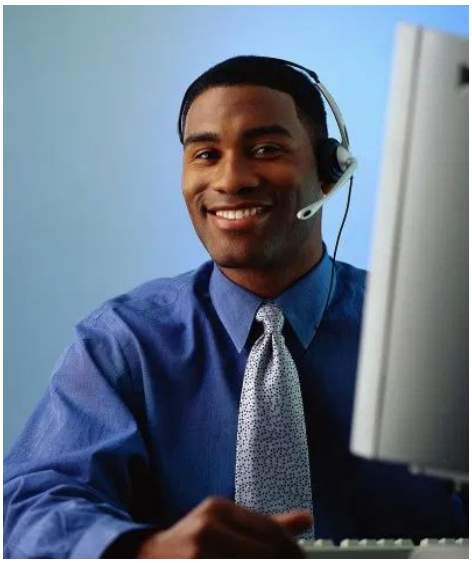
The tertiary stakeholders are investors in the solution, public transit operators and public transit management.

Works Cited:

Boser, U. (2017, July 1). ***Forgot Where You Parked? Good.*** **The New York Times. Retrieved from: https://www.nytimes.com/2017/06/30/opinion/sunday/forgot-where-you-parked-good.html**

Persona

A persona is a general representation of an important user group, created based on the collected data of the study. Primary personas demonstrate key user goals and/or characteristics, and the final solution should accommodate this primary persona before any other stakeholder.



Peter Parker

"Man, I just wanna hurry up and go home."

Demographics:

Age: 31.5 years old

Occupation: Technology Consultant at a Business Firm

Licensed driver in the GTA.

Roles and major responsibilities

- Full-time employee in an office
- Must be at work on time every morning
- Is responsible for his own well-being

Environment

- Lives too far to walk to work
- Cold parking lots, hard to walk in for a long period of time

Goals and tasks

- Goal: Make it to work on time, leave work as soon as he's finished, and run an errand at the local mall before going home.
- Task: Run a quick errand at the mall after work before going home for the day. Must park in the mall parking lot and remember where he parked when leaving.

Personality, habits and behaviour

- Drives to and from work alone
- Works long hours at work (9 plus hours a day)
- Can sometimes forget where he parked, because he's tired from his busy day at work
- Leaves his car parked in the office's large parking lot for 10+ hours
- Also leaves his car parked in the large shopping mall parking lot in his hometown while he runs an errand after work
- Drives a newly purchased car that's 0 - 5 years old
- Easily stressed due to stress of occupation.
- When unable to find his car, he uses the panic alarm button to locate it via sound.

Field Studies

The two field studies that we conducted were an interview and a questionnaire, both administered to our primary stakeholder group.

The first field study, the interview, was conducted relatively informally; our protocol was to conduct relatively quick interviews within the field, with the hopes of being able to capture a primary stakeholder's experience with this problem while it was happening. We created a small list of interview questions to ask our target participants, who ended up being students at a large university with expansive parking lots, shoppers at large shopping malls and retail stores, and event-goers at large venues. Our technique for this study was for our team to split up and individually informally interview as many primary stakeholders as we could, with the hopes of completing at least 20 interviews, while also asking follow-up questions. We were able to collect data from a total of 15 interviews. Our instruments were notebooks and writing utensils.

We piloted this first field study by conducting the interview on two university students who fell into the primary stakeholder category, but were in no way associated or involved in CSC318. Specifically, their feedback helped us identify repetition in our initial questions, and we used their feedback to refine the question list for the interview.

The protocol for this study was for each researcher to approach the stakeholder, explain the purposes of our study, ask for consent to interview and potentially record their responses, and

commence the interview. The interview itself consisted of four questions and researchers asked follow-up questions if needed.

We decided to begin our study with this format of study to begin with in order to get a more in depth understanding of the issues plaguing individual stakeholders (like customers, shoppers, etc.). We wanted to first understand their point of view and their current solution(s) in order to generate a better idea of the pain points and smaller issues that they face.

As a result, we acquired qualitative data from twenty stakeholders, which we used to begin narrowing down the variables that directly affected their memory recall. According to our data, we found that people find it difficult to recall the exact location of their parking often, and the most common type of parking lot in which this problem occurs is in large parking lots with little or no markers or landmarks to help designate a region or area. Based on our interview results, we defined a "large parking lot" as one with long parking rows, with "too many rows" (according to our participants), with no permanent signs, landmarks or markers around any given parking spot or region, and potentially one with multiple levels such as an underground parking garage.

The most common location or area that this problem occurred was most commonly reported as being a shopping mall, however, this may have been biased by the fact that the majority of our interviews, at least 14 of them out of 20, were conducted at Square One Shopping Centre in Mississauga, Ontario. We found that the most common way to recall where a car was parked was by using markers or landmarks around the parked car. This is why our definition of a large parking lot excluded ones with multiple markers and landmarks; because the problem seems to arise when there are no markers to designated any given parking space.

Finally, when asked to rate how difficult they found the task of navigating through a parking lot to be on a scale from 1 to 5 (with 1 being simple and 5 being extremely difficult), the average answer was 4, indicating a severe difficulty with navigating and orientation in this context.

The second study that we did was an online/electronic questionnaire, administered anonymously, that consisted of ten questions; 4 closed answer questions and 6 open answer questions.

As for the protocol for this study, the questionnaire described the the purpose of the study, and asked that the participants only answered the questionnaire if they were of legal driving age in Canada and currently drove a motor vehicle, in order to distinguish actual stakeholders from non-stakeholder participants.

Again, we piloted this field study by administering the initial draft of the questionnaire to two university students that were primary stakeholders, but had no affiliation with CSC318. Their feedback was similar to the first field study, and we adjusted our questionnaire accordingly.

After we created this questionnaire as a group, we administered this questionnaire to as many stakeholders as we could through means of email, instant message, and the internet, and to collect and analyze the data after two days of viral circulation on the internet (see 5. Formative Study 2 - Questionnaire Protocol in Appendices. As previously mentioned, the questionnaire was administered anonymously, and participants were asked to consider their answers carefully before submission (see 5. Formative Study 2 - Questionnaire Protocol in Appendices).

Our target participants were once again our stakeholders/users, and we used the online tool Google Forms to create our questionnaire and to display the data in a way that we could understand the results.

We chose to use an anonymous questionnaire for our second field study because we wanted to formulate a concrete representation of the demographics of our target audience and thus our users. We wanted to understand common behaviour and scenarios within this context and to understand the depth of the problem by getting more in depth examples of where and when the problem occurs from our stakeholders.

The results of our questionnaire provided us with both qualitative and quantitative data, from a total of 33 responses. The average age of the participants was 31.5 years old, whereas the median age was 24 years, and the mode was 20 years. This indicated that the majority of our participants consisted of a younger demographic, a group of "young adults" for the most part. In comparison with the mode and median, we believe that the average age might have been skewed by the outliers. The average age could be interpreted as an indicator of the age for which this problem generally and more noticeably affects the population, meaning that our solution and its medium needs to be applicable for the main demographic of young adults and millennials.

Another thing we noticed was that there was an outlier who reported being 100 years old. We assumed that the respondent was satisficing, as the upper age limit on our questionnaire was 100 years old, which was a possible flaw in our design, although this fact would have been unnoticeable unless somebody entered an age greater than 100. Thus, we wanted to make conclusions without the outlier and reconsider our audience. Hence, we recalculated the average,

mode and median excluding the outlier; the new average age was 28.7 years old, the median was 23.5 years old, and the mode remained the same value at 20 years old.

In addition, we performed a statistical Q-Test to ensure that we were accounting for this perceived outlier. The Q-test indicated that 100 years of age was not an outlier due to one of the other data points being 82 years old. However, we decided to continue to assume that 100 years was an outlier based on the nature of our questionnaire and based off of the rest of that participant's response appearing to have been the result of satisficing (see 7. Formative Study 2 Questionnaire Results, response number 3 in Appendices).

We also gathered that the majority (51.5%) of our participants were full time employees, which correlated with the average length of time per day their cars were left parked in one spot was greater than 7 hours (63.6% of participants reported leaving their cars in one spot for more than 7 hours per day on average, with 33.3% of participants leaving their cars for 10 hours or more); we inferred that the full-time employees would be leaving their cars for longer periods of time as they parked at or near their place of work for their entire work day. Moreover, students made up (27.3%) of our participants, which most likely added to the average total parked time due to students tending to commute or spending more time on their school campus then elsewhere.

One design flaw that we later identified was that this particular question (see 6. Formative Study 2 - Questionnaire, question #2) was a single choice, closed question. Thus, if the respondents wanted to pick more than one option for their employment status, they were unable to do so. This is a questionnaire design flaw as it limits our questionnaire's ability to accurately capture the employment status of our participants. For example, a student who is also a part time employee

would be restricted to choosing either “student” or “part time employee”. This indicates a response bias, especially for the “student” category, where students in particular may or may not choose to represent themselves as being employed or not.

Our data showed that the most frequented locations that our participants drove to were their place of work, with secondary locations tending to be school followed by places of entertainment like a mall and friends’ houses. We specifically included this question in order to gauge where our solution would most likely be used the most often. Another design flaw that we faced was that we were unable to ensure that the participants entered a specific number of places in this question, as it was just an open ended question. As a result, most of our participants responded with one or two answers, and we believe that having a more expansive list per participant would have given us more data.

The majority of our participants reported that they tended to drive alone on average, which, according to their responses to question #8, does not affect their recollection of where they parked. Conversely, while the majority of our participants also reported that driving with other people still does not affect their recollection of where they parked, several participants noted that having passengers either distracts them from remembering where they parked as they become engaged in conversation with their passengers, or helps them as they have another person to help with memory recall.

Our participants were also asked to describe their current solution (see 6. Formative Study 2 - Questionnaire, question #9), with which we discovered that an overwhelming majority described

using the panic alarm button/car alarm or similar on their car keys to alert them to the location of their car.

Finally, we included the final question (see 6. Formative Study 2 - Questionnaire, question #10) in order to gauge whether or not we should amend the concept of our problem space by redefining what we define as a difficult parking lot to remember where one has parked. We found that our definition was consistent with the reponses, and most participants even pinpointed shopping malls, multilevel lots and parking lots with no markers as being particularly difficult scenarios, just as we had discovered in the first field study.

Experience Map

An experience map is a visual representation that illustrates the flow of needs, wants, expectations and overall experience for a particular goal. It tracks a target user's journey and their experience when they stumble across the problem that is the focus of the study.

The problem in focus for our research study is recalling the location of a parked car in a large parking lot with no markers. The experience map that we built helped us lay out the blueprint of the experience of the user. The purpose of this map was to understand the user better and get an understanding of their needs, wants and expectations. We divided that experience into three main divisions: parking, walking, and returning. The key takeaways from each of the three sections of the experience are as follows:

1. **Parking:**
    a. **Key finding:**
        i. When a user parks his/her car they try to park as close to the exit or their destination, so they potentially don't have to walk a lot. At that time, their focus is not remembering the location of their parked car but to find a convenient parking spot.
        ii. When the user finally parks their car they look around for a marker to remember their car's location by. This might lead up to taking the user's

mental space and delaying them for their task at hand.

b. Key takeaway:

i. The potential solution to the problem should be potentially be of use to the user after they have parked their car since the feelings when they are parking the car is focused on finding the parking the car itself.

ii. It is important to the user to have something close by to remember their car's location by, since in a large parking lot, the car's location is simply not prominent enough. Hence, we will need to build something that's unique to the car and the user.

c. Highlight: Solution should be quick to use and not consume the user's time.

2. Walking:

a. Key finding:

i. If/when they user fails to find a significant marker to remember the parked location by, they rely on their memory to find their way back.

ii. While walking, the user's focus is not to remember how many rows they have walked or where the car is, they have other potential things to worry about such as making it to their destination in time.

b. Key takeaway:

i. The problem at hand, which is the focus of our research, only kicks in for the user for a split amount of time. The user barely loses any energy over it and does not put much thought into it at the time.

ii. Once the user starts walking away they have other things to worry about.

c. Breakdown:

i. The target user's attention span towards the problem is momentary,

ii. The problem might not be as big for the user.

iii. The solution should be very easy to use (just as convenient and more reliable as memory), since the user's attention span is not long lasting.

3. Returning:

a. Key finding:

i. The user starts out by walking around the parking lot to find their car. Meanwhile, it's hard at point to identify their own car from that of others due to similarity in car model, colour, etc.

b. Key takeaway:

i. Memory deems unreliable since after returning from the destination after a few hours, the easiest way to find the car is click the lock button on the car key and follow the sound.

ii. The user is frustrated and tired from walking around, the feeling when returning is to just quickly get into their own car and unwillingness to waste time finding a parked car.

c. **Highlight:**

i. Ideal solution should be unique to the car and the user.

ii. The solution should eliminate the feeling of frustration.

Overall, this map helped us understand target users better and track a user's journey. Furthermore, understanding the feelings and the thoughts of the user's at each step of the experience gives us a gateway into what feelings we wish to enhance for the user and what feelings and thoughts do we wish to eliminate from the user's experience. Additionally, it helped us explore the 'problems within problems' that the users face, most of which would have been missed otherwise without an experience map and layout of experiences. The map has also enhanced our understanding of the problem at hand and the key things we will have consider when coming up with the solution. The ideal solution will consist of the highlighted features and will be protected from the potential breakdowns and fall aparts. This material will be carried into the research and each of the subsections have the potential to be explored more in solution-finding phases of the research.

Job Stories

Job stories help researchers in understanding the problems that need to be solved. They come from the actual users of the solution and they expand on the reasons the users might be using this solution. They do not, however, assume anything about the solution, present or future.

The problem we are focusing on is memory recall regarding parked vehicles. Creating job stories helped us understand the details of the situation being handled.

1. When I park my car, I want to set a marker so that I can easily find it when I come back to find it.
2. When I park my car, I want to be able to tell my car apart from others so that I do not get confused when I come back to find it.
3. When I come back to look for my car, I want to take the shortest path to it so that I can easily get to my car quickly.
4. When I park my car, I want to park my car in a good spot (i.e. closest to the entrance) so that it is easier to get back.
5. When I'm trying to find my car, I want to see the marker as soon as possible so that I don't waste time trying to look for it.

Functional Requirements

1. The system has access to the user's location when they open the app.
2. The system must be able to automatically store the user's current location when the user selects the ‘save location’ option.
3. The system must allow the user to manually input their location if the user feels that the automatically saved location is inaccurate.
4. The system is able to provide a path with directions back to the user’s parking spot.
5. The system automatically deletes the saved location after the user reaches the car and selects the ‘Found my car’ option.

Appendices

Table of Contents:

RESEARCH PROTOCOL

1. **Project Title**: e.g., “Interviews and Questionnaires of retail customers and shoppers, commuters, students, event goers, and travellers”.

2. **Investigators**: Names and email addresses of all members of the team.

1. Navya Gupta - navya.gupta@mail.utoronto.ca
2. Alana Hodge - a.hodge@mail.utoronto.ca
3. Aonushka Aeron, aonushka.aeron@mail.utoronto.ca
4. Vijayalaxmi Hiremath, viju.hiremath@mail.utoronto.ca
5. Mohamad Hamdy, mohamed.hamdi@mail.utoronto.ca
6. Artem Albert, a.albert@mail.utoronto.ca

3. **Purpose**: The purpose of our research is to understand individuals who may park their cars in large parking lots for extended periods of time to help us derive requirements for the design of novel interactive computational media that are intended to be useful to retail customers and shoppers, commuters, students, event goers, and travellers. A brief description of our design problem is: Investigating the challenges faced by car drivers when recalling the location of their parked cars.

4. **Process to be followed**: We will brief the participants about the purpose of the study, explain the consent form to them, and ensure that they sign the consent form. We will then engage the participants in a 10 minutes structured interview for formative study 1 and a questionnaire including 6 multiple choice/short answers and 4 long answers for formative study 2. We will also, with their permission, make observations as follows: make notes about their answers. We will conduct the interviews in parking lots and conduct the questionnaires electronically through trustworthy websites.

5. **Participant selection:** Participants will be chosen from the pool of car drivers. For formative study 1, they will be identified in person and selected if they are holding keys and walking towards parking lots. For formative study 2, they will be identified randomly and selected if they are of legal driving age. In general, they will be characterized by age, occupation status and geographic location.

6. **Relationships**: Our relationship to the participants may be described as follows: no relationship.

7. **Risk and benefit:** There will be minimal risk to the participants, for example that they feel that they have wasted their time. The only benefit will be to contribute to the education of the investigators. Participants are free to withdraw before or at any time during the study without the need to give any explanation.

8. **Consent details**: We will brief the participants about the purpose of the study, and explain the **attached consent form** to them, and ensure that they consent to participate and sign the consent form.

9. **Compensation**: Participants will receive no compensation.

10. **Information sought:** The information to be sought is described in the attached formative study 1 - interview questions, formative study 1 - interview protocol, formative study 2 - questionnaire and formative study 2 - questionnaire protocol.

11. **Confidentiality**: Information will be kept confidential by the investigators. Names or other identifying or identified information will not be kept with the data. The only other use will be to include excerpts or copies in the assignment submitted, but names and other identifying or identified information will not be submitted.

CONSENT FORM

Consent Form: Interviews and Questionnaires of retail customers and shoppers, commuters, students, event goers, and travellers

I hereby consent to participate in a research study conducted by Navya Gupta, Alana Hodge,Aonushka Aeron, Vijayalaxmi Hiremath, Mohammad Hamdy, Artem Albert for an assignment in University of Toronto Computer Science 318, *Design of Interactive Computational Media*.

I agree to participate in this study, the purpose of which is to investigate the challenges faced by car drivers when recalling the location of their parked cars.

I understand that

- The procedures to be used are interviews and questionnaires.
- I will receive no compensation for my participation.
- I am free to withdraw before or any time during the study without the need to give any explanation.
- All materials and results will be kept confidential, and, in particular, that my name and any identifying or identified information will not be associated with the data.

PARTICIPANT

Name (please print) _____

Signature _____

Date _____

INVESTIGATOR(s)

Name_____Signature_____

Interview Protocol

- Approach individual non-confrontationally and with respect
- Ask for permission to record video and audio
- If consent is given; we begin asking questions
- Ask any necessary follow-up questions
- Thank them for their time.

Formative Study 1 - Interview Questions

1. How often do you forget where you parked your car?
2. In which areas of the city do you tend to forget the place you parked your car?
3. What strategies do you use to find your car?
4. On a scale of 1-5 how hard (1 - very easy, 5 - very difficult) do you find to navigate your way through a parking lot?

Interview Questions

1. How often do you forget where you parked your car?
2. In which areas of the city do you tend to forget the place you parked your car?
3. What strategies do you use to find your car?
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Results of Interview

Participant 1	Question 1	Question 2	Question 3	Question 4
1	Once in a while	Square One	Look for landmarks/stores that I parked near. Use the panic button, wander around	4
2	Not Often (Maybe 1 in 100 times)	Shopping Mall parking lots	Take a mental image, remember the steps to the entrance or exit from where I parked. Maybe even check if there are any recognizable landmarks. I scan all the rows of parking spaces of where I think it is closest to.	4 (parking lots can get quite confusing especially in huge areas)
3	Not Often	Mall parking lots	I memorize the general area of where I parked. Walk around and look for it.	1
4	Never	Malls	Check my phone. Use a car alarm.	2
5	Occasionally	Airport Parking lot	Remembering any sign. Pause and think last time I was at the spot.	Depends on parking

				lot size
6	Pretty much all the time if it's not parked right in front of my house.	Downtown when looking for a spot to park for awhile, at school (UTM) in the parking lots, at the malls (Square One, Yorkdale, Stockyards)	Sometimes I take a picture of the area I was in, take a picture of the parking lot number, or just simply trying to retrace steps. Spam the car lock and unlock button and try to find it by sound.	3
7	Rarely	shopping malls with big parking lots	I just remember with my brain hahaha.. if there are signs like "3A" or something, i'll use that and try to remember it in my head. I use my car key and do the beep thing until I see/hear it	3
8	Rarely	mall parking lots	Remembering general location and looking for it	super easy
9	occasionally	big parking lots	Try to remember landmarks Use car lock sound/light or horn	4
10	Not often	large parking lots	I've already picked something distinct to the area when i parked like a row or tree Walk around making the horn sound	4

11	Often	Underground parking, multi-level parking, big parking lots with no distinct characteristics (int'l center, halton hills, plazas)	I try to remember which entrance I use. Walk around, retrace steps. (clicker distance an issue)	4 (all look the same. Don't think to look around at letters)
12	Sometimes	Malls and underground parking places. (big parking lots)	I try using landmarks or store fronts: which objects am I directly in front of beside. I walk around pressing the key fob, listening to my car. Distance is an issue.	3. It depends on the parking lot. (levels, marking, orientation).
13	Rarely	Sometimes at the mall - I forget which row I'm parked in.	I remember the route I take when I leave and usually trace back from there. I walk around in the general area and look for it. I know which lot it's in but not the specific location.	1
14	Not a lot.	At the mall or when I go skiing. Sometimes I get a little lost when I park far at the back of busy parking	I just notice how I leave and come back by memory. I walk to the next column. I know where I parked but I'm off by a row or something like that.	1

		lots with long rows. Especially if I'm away for a long time.		
15	Not that often. I usually park close to the entrance.	Parking lots with no features, like a big Walmart lot.	I remember the way I walk there. I walk in that general direction. If I can't remember where I parked, its usually close by where I think I parked, so I look there.	2

Questionnaire Protocol

- Post the questionnaire on noteworthy websites that tend to generate a lot of commentary and response (www.reddit.com, and www.discordapp.com) and send the questionnaire to any acquaintances that are willing to participate via email and text message.
- Explain the purpose of our questionnaire
- Make sure the participants understand that the questionnaire is anonymous.
- Ask participants to carefully consider their answers.
- Thank them for their time.

University of Toronto CSC318 Survey

This survey is for a User Experience Design Research course at the University of Toronto. The purpose of the survey is to investigate the challenges faced by car drivers when recalling the location of their parked cars. Please complete this survey only if you are of legal driving age in Canada and you currently drive a motor vehicle. This survey is completely anonymous. Please consider all of your answers carefully.

* Required

1. Please enter your age. *

_____

2. Please select your current employment status. *

Mark only one oval.

- ◯ Full-Time Employee
- ◯ Part-Time Employee
- ◯ Student
- ◯ Unemployed
- ◯ Other: _____

3. Please select the approximate age of your car. *

Mark only one oval.

- ◯ 0 - 5 years
- ◯ 6 - 10 years
- ◯ 11 - 15 years
- ◯ 15+ years

4. How long per day do you leave your car parked in one spot (on average)? *

Mark only one oval.

- 0 - 59 minutes
- 1 hour - 1 hour and 59 minutes
- 2 hours - 2 hours and 59 minutes
- 3 hours - 3 hours and 59 minutes
- 4 hours - 4 hours and 59 minutes
- 5 hours - 5 hours and 59 minutes
- 6 hours - 6 hours and 59 minutes
- 7 hours - 7 hours and 59 minutes
- 8 hours - 8 hours and 59 minutes
- 9 hours - 9 hours and 59 minutes
- 10 + hours

5. Please rank in order your most driven to locations, with 1 being the most frequented location. Example: 1. School, 2. Work, etc.. *

6. Enter your average number of passengers (not including yourself). *

7. If you are driving with other people, how does it affect your recollection of where you parked your car? *

8. If you are driving alone, how does it affect your recollection of where you parked your car? *

9. What do you normally do when you can't remember where you parked? *

10. In which parking lots do you tend to forget where you have parked your car? *

Timestamp	Please enter you	Please select yo	Please select the	How long per da	Please rank in or	Enter your avera	If you are driving	If you are driving	What do you nor	In which parking lots do you tend to forget where you have parked your car?
2020/02/17 6:39:	20	Student	6 - 10 years	10 + hours	1. School, 2. Hor	1	I am good at rem	I am good at rem	Press the lock bu	At Square One sometimes, at Loblaws, Walmart, if ever. Shopping centers mostly.
2020/02/17 10:07	20	Part-Time Emplo	0 - 5 years	0 - 59 minutes	1. school 2. work	1	N/A	N/A	Use the car alarn	mall
2020/02/17 10:2(	100	trapper	15+ years	10 + hours	5	3.4	a	b	c	d
2020/02/18 12:14	21	Part-Time Emplo	0 - 5 years	8 hours - 8 hours	1 school 2 work	0	Helps	I try to remember	Walk around mal	Large flat ones
2020/02/18 12:28	22	Part-Time Emplo	0 - 5 years	8 hours - 8 hours	1.407 carpool lot	1	in no way, i park	in no way	i remember. do n	none
2020/02/18 1:01:	20	Student	0 - 5 years	0 - 59 minutes	1. Store, 2. Movie	1	It does not	It does not	Head in the direc	Weird shaped ones, curved parking lots etc.
2020/02/18 1:42:	21	Student	0 - 5 years	3 hours - 3 hours	School	0	smaller streets th	easier to access	walk the route i c	shopping malls
2020/02/18 1:49:	20	Student	0 - 5 years	7 hours - 7 hours	1. School 2. Frier	0	It could make my	I can usually rem	I turn on my car v	In new/unfamiliar parking lots.
2020/02/18 2:58:	26	Full-Time Emplo	0 - 5 years	10 + hours	1. Work 2. Work	0	It doesn't	I'm always lost	Walk around	Mall
2020/02/18 3:58:	32	Full-Time Emplo	0 - 5 years	10 + hours	1. Shopping, 2. K	2	Doesn't	Doesn't	Use the remote k	Enormous lots that do not have clear signs, or ones with similar identifiers between different floors.
2020/02/18 4:36:	50	Unemployed	0 - 5 years	1 hour - 1 hour a	Gym, pool, groce	1	Doesn't	I usually take a p	Take a picture of	Mall
2020/02/18 6:17:	32	Full-Time Emplo	6 - 10 years	10 + hours	1. Work 2. Super	0	It does not affect	It does not affect	Press the panic b	Shopping centre or supermarket.
2020/02/18 6:20:	22	Full-Time Emplo	0 - 5 years	1 hour - 1 hour a	1. Gym, 2. Fast fi	0.25	Little effect	Little effect	Recall the path ta	Large open air
2020/02/18 6:39:	32	Full-Time Emplo	0 - 5 years	8 hours - 8 hours	1. Work 2. Gym 3	0	Not Applicable	It does not.	I locate the exact	Shopping malls (specifically multi-zone indoor parking lots at shopping malls)
2020/02/18 6:56:	34	Full-Time Emplo	0 - 5 years	10 + hours	1. Work 2. Weed Dealer 3. LCBO/Beer St	1.5	Depends how mu	Depends how mu	Take the bus hor	Malls, work, lcbo
2020/02/18 7:10:	39	Full-Time Emplo	11 - 15 years	7 hours - 7 hours	work	0	no	no	walk? check loca	none
2020/02/18 7:55:	22	Full-Time Emplo	6 - 10 years	10 + hours	work	1	it usually doesn't	it doesn't	never happens. b	none
2020/02/18 8:28:	51	Full-Time Emplo	6 - 10 years	10 + hours	1 go train 2 relati	0	Does not affect	Does not affect	Use car alarm	Multi level lots
2020/02/18 9:37:	19	Student	6 - 10 years	0 - 59 minutes	1. School	1	It doesn't, as I do	I never drive alor	This never happe	Large ones with few landmarks.
2020/02/18 9:50:	26	Full-Time Emplo	6 - 10 years	4 hours - 4 hours	Work	1	Somewhat hamp	Never forget	Walk around	I dont
2020/02/18 10:25	22	Full-Time Emplo	11 - 15 years	8 hours - 8 hours	Work, Communit	1	The number of pa	The number of pa	Check the areas	Work parking lot, other commonly visited lots (grocery store etc.)
2020/02/18 11:10	21	Part-Time Emplo	0 - 5 years	0 - 59 minutes	No car? There sh	0	N/A	N/A	Always take a pic	None - car is not mine
2020/02/19 12:39	18	Student	15+ years	5 hours - 5 hours	1. School 2. Erra	0	I tend to forget w	I pay more attent	Walk through the	Parking lots with multiple floors or very large parking lots
2020/02/19 4:54:	17	Student	0 - 5 years	5 hours - 5 hours	1 School 2 Super	0	It does not affect	It does not me	Check maps app	Which is far away from the entrance
2020/02/19 11:52	27	Full-Time Emplo	6 - 10 years	10 + hours	1. Work, 2. Frien	1	It doesnt	It doesnt	Retrace my steps	Multi storey car parks
2020/02/19 12:25	20	Student	15+ years	3 hours - 3 hours	1.School 2.Work	1	Usually harder to	Easier then wher	Go to the genera	My school lot tends to be the worst
2020/02/19 1:29:	35	Full-Time Emplo	0 - 5 years	8 hours - 8 hours	Work	0	no	doesnt	panic button	i dont
2020/02/19 8:37:	26	Full-Time Emplo	6 - 10 years	10 + hours	1. Work	0	It does not	It does not	I have never faile	I do not forget where I parked. What kind of idiotic survey is this?
2020/02/19 10:22	47	Full-Time Emplo	6 - 10 years	8 hours - 8 hours	1. Work 2. Shopp	1	no effect	no effect	go through the pa	places i have not been before with large parking lots and a few landmarks
2020/02/20 10:2(	82	Full-Time Emplo	6 - 10 years	0 - 59 minutes	1. Work, 2. Broth	1.3	I always rememb	When I drive alor	Well I usually hea	Definitely at the brothel, that place is packed
2020/02/20 7:21:	25	Part-Time Emplo	0 - 5 years	8 hours - 8 hours	1.work	0	occasionally it ca	it doesnt	retrace my steps	large ones
2020/02/20 8:45:	17	Student	11 - 15 years	7 hours - 7 hours	1) Mall 2) grocery	0	Not affected, per	Not affected.	Hit the lock butto	Parking garages, side street parking

S0 Planning Meeting - Jan 27

Please jot down one or two ideas for a problem for the group to explore by Tuesday Jan. 28th at 6pm.

Navya:

- Solving the problem of Tangled Earphones,necklaces - Takes a picture of earphones or necklaces and the app shows exact route on how you can untangle them
- An App which shows where exactly empty parking lots are located on a screen in the beginning or something.
- An app which has a live telecast of how busy groceries are and how long it will take to finish shopping
- An app which shows the fastest way to get all grocery items in grocery store

Viju

- An app that shows restaurant availability and being able to book a table online for a specific date/time.
- An app that plans out energy-saving routines for you based on the area you live in (e.g. do laundry at this time on this day, reminds you to turn off lights when it detects lights are on past a certain time/during the day)

Artem

- An app for transit users who like to read or sleep during their commute, that notifies you to let you know you're approaching your stop.
- An app that remembers where you parked using location services or LAT/LONG, and then directs you back with a compass.

Alana

- An app that helps you organize your clothing/closet, and makes recommendations on an outfit based on your style and the weather outside.
- A GPS app that lets you add in multiple stops/detours in a trip, so that you can see your total ETA time for running errands, for example.

Aonushka

- An app that provides students a way to support one another -- this is done by a simple platform that allows students to share their failure stories and hence creating an environment that accepts failure

Presentors: Alana, Mohammed

S1 Planning Meeting - February 4

Feedback and Solutions:

- In general, the presentation is clear and easy to follow. I would suggest the team use less text on the slides for future presentations because currently, the slides are too overwhelming with so much text.
- I think the team needs to first find more concrete contexts of situations where users are in need of support in finding their cars. It seems that there are a lot of contextual sensibilities of how they encounter such situations (e.g., special events, special rules, the layout of the parking lot, etc.).
    - Solution: Trying to find a more concrete scenario is essential for this problem space.
        - You park at a concert venue, and are forced to leave it in a very large parking space for at least a few hours.
        - You park your car in a large parking lot that has no sections/indications/lot numbers of a region in the lot
        - Somebody stole your car and you need a tracker to find it
        - After a night of heavy drinking, you wake up in an unfamiliar location, and are not sure where you last left/saw your car.
        - At Wonderland, the parking lot coordinators designate specific parking lots for new arrivals, and then close off certain sections of parking when the sections are full. To do this, they need to know immediately how many cars are parked in the lot, and how many spaces are free.
- For this problem space, it may also be hard to get enough insights through interviews, because interviewees may just forget a lot of important details of the situations they were in. Maybe try to think of better data collection methods that could ask more from participants (e.g., even come up with certain tasks and ask the participants what they would normally do and why).
    - Potential Instruments:
        - Questionnaires
        - Focus Groups
        - Field Survey
- The team can also consider not designing for end-users but instead for event organizers or other stakeholders.
- Also include parking features for high level organizers(?)
    - E.g. Parking Lot map/layout with available spots

S1 Presentation Planning:

Requirements:

1. Initial problem statement describing what your team will be exploring
2. Design of formative study #1 (target participants you will study, instruments you will use, and protocol you will use to conduct the study)
3. Draft of formative study #2 (what method you will use, initial ideas of what you want to study in the 2nd study)

Answers:

1. Initial problem statement describing what your team will be exploring

Our focus is on helping users better locate their cars with ease. Individual users may have issues locating their cars in a parking lot, in which there may not appear to be any markers available or near by to assist in memory recall. Event managers and organizers, as well as parking coordinators need to immediately know the fullness of the lot, the empty spaces available and, on occasion, the specific spots that are full/vacant.

2. Draft of Formative Study #1

Target Participants: students at a large university (UTM), event goers, airport parking/valet, mailpersons
Instruments: Notebook + writing utensils, audio/video recording device
Protocol:

Individuals

- Approach individual non-confrontationally and with respect
- Ask for permission to record video + audio
- If consent is given; begin asking questions
    - "Did you drive a car to get here?"
    - "Do you know exactly where you parked your car?"
    - "How do you remember where you parked?"
    - "What do you do when you can't remember where you parked?"
    - "In your experience, how often do you forget where you parked?"
    - "Are you ever unsure of how to get back to your car, even if you know where you parked?"
    - [If they have difficulty finding their car] "Where do you tend to forget where you parked your car?"
- Ask any necessary follow-up questions
- Thank them for their time.

3. Draft of formative study #2

What method you will use: Questionnaires

Initial ideas of what you want to study in the 2nd study:

- As parking organizers, what is the solution to customers/clients being unable to locate their cars?
- What concerns do parking organizers have?
- How do organizers manage parking logistics? (e.g. keep track of cars, lot fullness, etc.)

Parking Organizers

- Approach individual non-confrontationally and with respect
- Ask for permission to record video + audio
- If consent is given; begin asking questions
    - "Have you ever had trouble locating a customer's car? / Have you ever had a customer tell you that they cannot find their car?"
    - "If so, what was your solution to the issue?"
    - "In your experience, has it ever been necessary to know the amount of cars and locations of cars in your parking lot?"
    - "If so, how do you manage the parking record(s)?"
    - "What are common issues that arise when managing these records?"
    - "How often do these issues arise?"
    - "Do you have any concerns about parking organization in general?"
- Ask any necessary follow-up questions.
- Thank them for their time.

Presentors: Alana, Mohammed

S2 Planning Meeting - February 11

Preparing to Survey

1. Determine the goals of the questionnaire - know what you're trying to learn about
    - We're trying to learn about the pain points for individuals who attempt to relocate their cars after parking in large parking lots such as grocery stores, amusement parks, school/universities, etc., and understand makes the process of relocating their cars inefficient.
2. Develop questions & data collection method for the survey
   Add remarks to indicate changes
    - "Did you drive a car to get here?"
      Navya - I think we should generalize this instead of specifically saying here because the TA said to generalize the problem and then based on feedback narrow it down
      So we could just ask "Do you drive"?
      Viju - "Do you drive?"

- "How often do you forget where you parked?"
  Aonushka - A little bit leading by mentioning forget
- "Where do you tend to forget where you parked your car? "
- "When you're ready to leave or move your car, how do you remember where you parked?"
- "What do you normally do when you can't remember where you parked?"
  Navya - Same as question above
- "Are you ever unsure of how to get back to your car, even if you know where you parked?"
- On a scale of 1-5 how easy/hard do you find to navigate your way through a parking lot?

3. Determine a representative sample of users to survey

Presentors: Alana, Mohammed, Navya

A1 Planning Meetings

Questionnaire Preparation:

1. Determine the goals of the questionnaire:
   a. Demographics of target audience
   b. Common behaviour, scen\arios, experiences
   c. Understand the depth of the problems
2. Develop questions and data collection method for the survey
   Description of study and goals + explanation
3. Demographics - background
   - Age
     - Single-Choice answer
   - Occupation
     - Open-ended
     - Include examples
   - Make and approximate year of their car
     - Open ended short answer
     - Last one must be numerical (numerical range)

   Close ended
   - Locations that they tend to drive to
     - Ranking question
     - Pick at least one
     - The last option is "other", which must be filled out if it is selected.

- How long per day on average do you think you leave your car parked in one spot?
    - Scale (drag)
- For your most frequent location choices, do you tend to drive with other passengers?
    - Yes or No
    - If "YES", how many passengers on average?
        - Select a number (drop-down)

Open ended

- In which parking lots do you tend to forget where you've parked your car?
- If you are driving with other people, how does it affect your remembering where you parked your car?
- If you are driving alone, how does it affect your remembering where you parked your car?
- What do you normally do when you can't remember where you parked?

Analysis of Results:

1. Age:

   Q Test: 100 - 82 / 100 - 17 = 0.2169 < 0.260 for 90% CI. Therefore, we cannot say with 90% confidence, that 100 is not an outlier.

   Average age: 31.5 years

   Median Age: 24

   Mode Age: 20

   What does this tell us:

   - Because the mode is 20, what we can extract from the mode alone is that the majority of our respondents were 20 years old. The median age came out to be 24 yrs old, this information indicates that our survey participants consisted more of the younger population.
   - Another thing we noticed was that there was an outlier who reported being 100 years old, we are assuming the respondent was satisficing.
   - The average of respondents of this questionnaire was 31.5 years, in comparison with the mode and median the number might have been skewed by the outliers. The average could be interpreted as an indicator of the age for which this problem generally and more noticeably affects the population.
   - In our particular case, we believe the data to be skewed by the outlier, we wanted to make conclusions without the outlier and reconsider our audience. Hence, we recalculated the average, mode and median excluding the outlier.
       - Average Age: 29

    - Median: 22
    - Mode: 20
- When we tried using Q-test, it indicated that 100 years of age is not an outlier due to one of the data points being 82 years. However, due to the nature of our study we assumed that 100 years is an outlier based off the nature of our questionnaire, where the upper age limit for that particular question was 100 exactly, and based off of the rest of that participant's response appearing to have been the result of satisficing.
- Overall, the data is useful in identification of our target user demographic.

2. Employment Status
- Majority was full time employees
    - Tells us th
- Minority was persons who are unemployed
- If the respondents wanted to pick more than one option, they were unable to do so due to this question being a closed question with a single answer allowed. This is a questionnaire design flaw as it limits our questionnaire's ability to accurately capture the employment status of our participants. For example, a student who is also a part time employee would be restricted to choosing either "student" or "part time employee". This indicates a response bias, especially for the "student" category, where students in particular may or may not choose to represent themselves as being employed or not.

The division of tasks:
1. General Problem - Alana
2. Field Studies - Alana
3. Experience Map- Viju
4. Job Stories - Aonushka
5. Design Requirements - Navya
6. Appendices - Navya
7. Title Page and other documents - Mohammad

	Parking		Walking	Returning	
Doing	Parks car in large parking lot.	Look for a marker to remember parked car's location by.	Walk from parking lot to destination.	Looking for parked car after returning from place of work.	Walks around parking lot based off memory.
Thinking	Large parking lot and car's location is not prominent.	Find a marker close to the car.	Failed to find a markers, other things to worry about.	Where did I park my car when I came here a few hours ago..	Maybe I parked in this row.. or this row...
Feeling	I hope I can get back to my car with ease when I return	I wish I find something significant to remember my parked car's location by.	Oh no! I will just have to use my muscle memory to get back to my car later on.	I am unsure where I parked and ah! so many cars look like my car.	I think I am going to be here for a long time.
Metrics	**Closeness of marker to parked car.**		**Distance from parked car to the nearest exit door to destination.**	**Ease of finding parked car.**	

Who Did What - A Breakdown

Navya Gupta

- Design Requirements (15 minutes)
- Appendices (1.5 hour)
- Planning for S0, S1, S2 (An hour each)

  Total: 4 hours, 45 minutes

Alana Hodge

- Planning for S0, S1, S2 (An hour each)
- Part one - general problem statement (Two hours)
- Part one - Persona building (One and a half hours)
- Part two field studies and analysis (Two and a half hours)
- Compilation of final report (45 minutes)

  Total: 9 hours and 45 minutes

Mohamad Hamdy

- Planning and presenting for S0, S1, S2 (30 minutes each)
- Report Editing Construction (30 minutes)

  Total: 2 hours

Aonushka Aeron

- Planning and performing tasks for S1, S2 (30 minutes each)
- Part 3 -- Experience Maps: Research and Planning (45 minutes)
- Part 3 -- Experience Maps: Designing Experience Map (3 hours)
- Part 3 -- Experience Maps: Key finding, key takeaways, writeup (3 hours)
- Part 1 -- General Problem, Persona building (30 minutes)

  Total: 8 hours 15 minutes

Vijayalaxmi Hiremath

- Planning and performing tasks for S1 and S2 (30 minutes each)
- Part 1 - General Problem, Persona Building (30 minutes total)
- Part 2 - Field Studies (15 minutes)
- Part 4 - Job Stories (2 hours)
- Final Editing (30 minutes)

  Total: 4 hours, 15 minutes