# **Phase III: A Study on Driver Information Technology and Information Delivery**

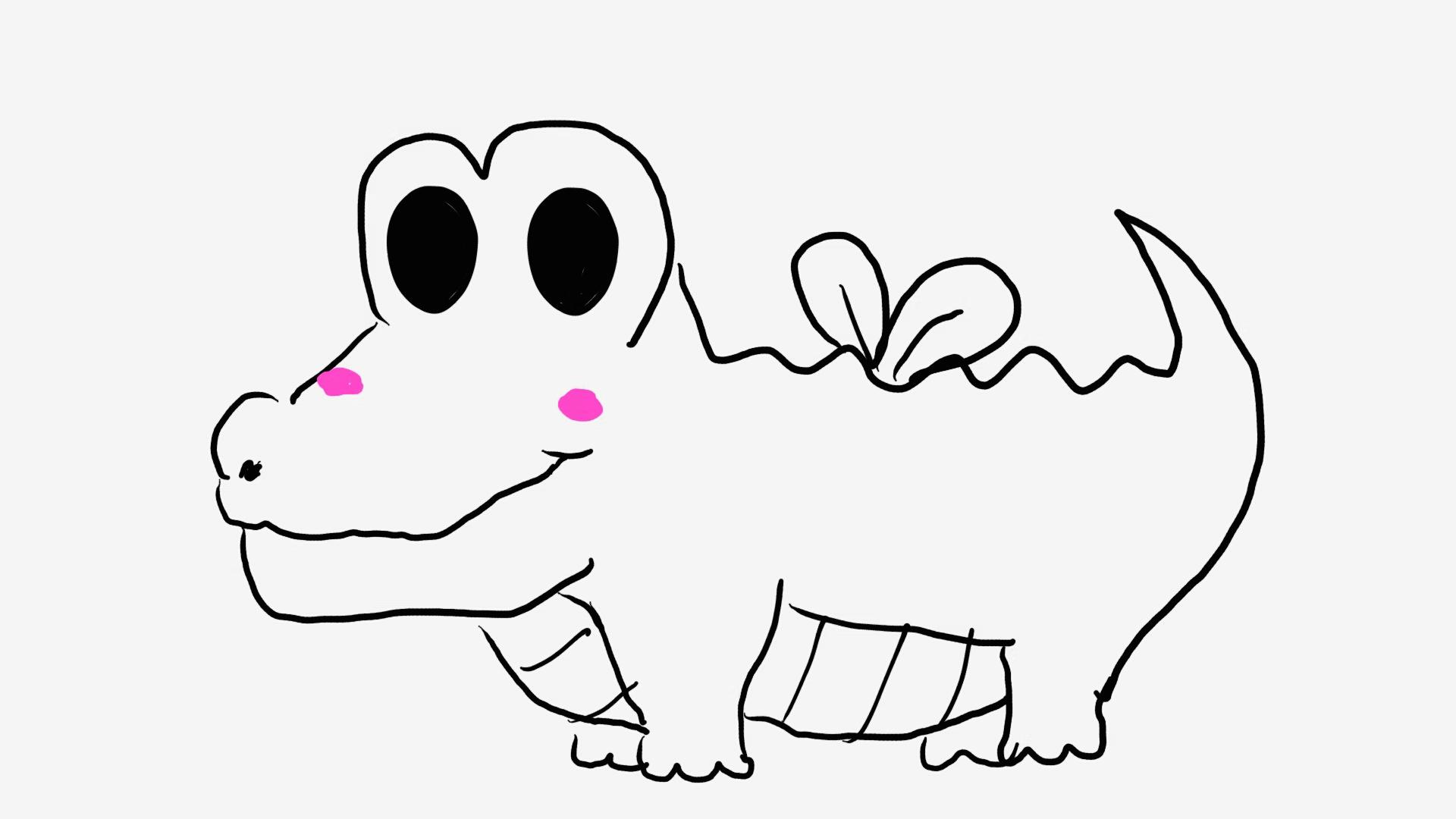
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## [CSC318]

## The Design of Interactive

## Computational Media

## Project: Navi[GATOR]



GROUP 04: Navi[GATOR]

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**User Research Results**

**Summary of all research results**

To get a better understanding of the realistic demand for information technology when operating and driving vehicles, and to identify key areas of concern, our group conducted a 5-day session diary for 4 participants and 4 interviews as well as 10 questionnaires. The participants ranged from newbie drivers that just recently obtained their G licenses to very experienced drivers that have been driving for over 20 years. The information was particularly collected to identify the types of information that are desired by these individuals and to determine effective and unobtrusive methods of delivering this information. The main sources of information the participants have access to are GPS and radio, but for experienced drivers their own memory is sufficient.

The results suggest that in-car driving systems present a viable solution to increasing the accessibility and breadth of information to drivers in urban areas, the data suggests that 100% of respondents either don’t use in-car systems or are not satisfied with the current available technology, the majority of respondents are concerned with increasing driving safety, efficiency and they’re interested in adding more features to their current information system and most of them would like the information to be delivered visually.

The main problems noticed are finding an available parking slot and encountering unexpected road conditions which are usually inevitable. Also, drivers are concerned that driving information systems can be potentially distracting while driving, although it doesn’t affect experienced drivers too much.

Below is a list of needs that respondents are interested in: (sorted according to priority levels)

1. Help finding a parking slot, a gas station, a restaurant... etc.

2. Real time traffic information updates including traffic jams, car accidents, constructions etc.

3. AI helper that can understand multiple languages and allow customization of routes, detect fatigue, help prevent car accidents.

4. Display a stereoscopic scene in eyesight (for driving enjoyment purposes).

5. Tour recommendation.

According to the research results, the driving purposes are mostly about go to school/work and recreational activities as well as to go to remote /inaccessible locations.

The list above also addresses the main problems that most urban drivers are facing:

1. Finding a parking slot

2. Unexpected and usually inevitable Road conditions.

**User needs list:**

We will attempt to Cover:

* making the cost of the system affordable to normal urban drivers.
* providing a simple and easy-to-understand user interface
* providing real-time parking information: location of available parking slots, rates
* provide fast and easy payment methods for parking
* providing navigation information: weekly database updates
* increased visibility of the information system while remaining unobtrusive

We will not cover:

* audio-controlled functionality of the system
* driving assistance

**Stakeholder Descriptions**

**Instructors**: Central to guiding the direction of group members and the project. Take on administrative duties and provide feedback regarding current project developments.

**Project Members**: Core members of this project. Delegated duties include developing a user interface for the target audience of Group 10’s problem space. Responsibilities include research, planning, and development.

**End Users**: Target audience of drivers in urban areas. Product will be geared towards addressing the concerns and needs of this group. The product will be geared towards addressing the needs of the greatest number of urban drivers possible. This includes new and experienced drivers, and technologically literate and illiterate drivers, of any age. Urban drivers, long-distance drivers, occupational drivers, transport agencies.

**Indirect Users**: Pedestrians, public commuters, and the general community will benefit indirectly from increased driving safety, satisfaction, and performance.

**Personas**

**Phil McRoy**

Phil McRoy is a 3th year political science student of University of Toronto. He spent two years in

UBC before he transferred to U of T. He likes getting involved in deep discussions with others

who share the same interests with him. Phil loves bodybuilding. He goes to the gym every single

day of the week in hopes of becoming a professional bodybuilder. He likes arguing with people on

Facebook about politics and talking to people he doesn't know while riding the bus. In addition, he

likes to open up discussion about the latest fitness trends and provide his own opinions to the best

fitness practice. He had a 4-door Toyota Corolla with in-vehicle GPS. Because he is new in

Toronto, he mainly relies on GPS to find accurate route for him.

He lives off-campus. Normally, he wakes up at 8:00 A.M. And then he drives his car to School.

Sometimes he has trouble finding the building he needs to go, because he often got the building name

without specific building address. He needs to use his phone to find the address , then types it in his

GPS system which really distracts him while he is driving. Moreover, sometimes there are several

roads with traffic jam near his home which makes him late. So he wants a voice guided system

which can give him advice to avoid traffic jam and provide the best route for him. Moreover, he

wants his guided system can provide him accurate routes with a rough description since sometimes

he only knows building’s name.

Mcroy loves his life in Toronto. He thinks that after he finishes his degree , he will try to find a

job in Downtown and stay here.

**Christine Campbell**

Christine Campbell is a 18 year old University of Toronto student in her first year of Computer

Science. She lives on residence so she has a lot of time to socialize with others on campus.

She did not drive a lot on weekdays , but she often leases a car on weekend and go traveling with

her friends. Christine spends a lot of time on her phone everyday. But she did not use it while she is

driving, because she has a car accident which was caused by distracted driving. She likes using

GoogleMap while she is traveling to a place she is not familiar with.And she thinks that parking at

school is really expensive and inconvenient, so normally she parks at public parking area.

**Alex Smith**

Alex Smith is a Bioinformatics instructor at the University of Toronto. He is happily married, and

commutes daily to the St. George campus. So he need to drive a lot on weekdays. And he likes to

come to school early and prepare his lecture before class starts. Alex is very passionate about the

subjects he teaches and wants to ensure that students are able to understand the topics better and

inform them about the latest research and developments in bioinformatics. Sometimes traffic jam

will ruin his plan and makes him late for his lecture. Moreover, he always parks at school if it is

available. However, the parking area at school is full sometimes, so he has to find other areas which

are normally far away from school to park which makes him unhappy. During the weekends,Alex

likes to go hikings in the woods and fishing.

**Curious Kevin**

Curious Kevin is 21 years old computer science student studies in the best university in Toronto.

He got his driver’s license 2 years ago and he always drives since he lives in North York. Kevin’s

dad bought Kevin a Mazda 6 that doesn’t have a built-in GPS. Kevin loves his car and he’s always

willing to hanging out with his friends by driving. He likes new technology as a computer scientist.

Kevin goes to school by driving on days he has afternoon classes. He has a lot of assignments

to work with every week but he always waste a lot of time finding a parking spot that is cheap.

Even though sometimes he find a spot, the parking meter is not working thus he has to find some

other places. Kevin feels really hard to drive when it is snowing outside and traffic becomes poor

at that time. Kevin enjoys riding but those problems obsess him.

Kevin tries to find a good GPS but so far he has to use Google map since he is not satisfied with

the GPS sold in the market. And he also wants to find a better way to pay parking fees. He is

looking for new technologies that can solve these issues.

**Professor Jane**

Jane is 45 years old and teaches English in a university in downtown. She has driving experiences

for 20 years. She has to drive to work as her family lives uptown. She uses GPS to drive but

sometimes it lead her to get stuck in a traffic jam. Jane loves to learn new technology even

though it always takes her a long time to figure out how to use them. Jane has trouble finding

parking spot when she visits a new place. She wants some technology that can help her.

**Writer Paul**

Paul is 30 years old writer that works at home. He recently bought a new car and just got his

driver license 1 month ago. He found it helpful to drive around and get inspiration for his novel.

However, as a young driver, Paul is not familiar with road conditions nearby and he has no idea

where to park when he leaves his home. So he is looking for something that can provide all the

information he needs.

**Lost Larry**

Larry is a navigationally challenged driver in a big, winding city. Larry would like to have a navigation system that can correctly navigate around detours, rather than try to bring him around in a circle. More so than that, Larry would love to have a smarter navigation system that can identify and update him about roadblocks and traffic, so that he can be warned in advance.

**Scenarios**

**Curious Kevin**

One day, Kevin is hanging out with his best friend Tom. They decide to go to a Ramen restaurant

located on Dundas Street. Kevin knows several parking spots near the restaurant. However by the

time they reach there, all the spots are taken. Kevin knows there is a park nearby but the fees

are really expensive. He doesn’t know where else to park and it seems like he will be forced to pay exorbitant parking fees.

**Writer Paul**

Paul is going to his best friend-Jack’s house. It is snowing outside and Paul is getting stuck in a

traffic jam. The GPS told Paul to stay in the traffic jam since there is no other route. Paul feels like

there has to be a better route that he can take but he is not sure if the road condition will be

better.

**OG Yang**

Three months ago, OG Yang and his girlfriend drove to a restaurant located in urban area in Toronto. Even though they arrived at the restaurant quite early, it took them nearly one hour to find an available parking slot. Finally, Yang had to park his car at a place far away from the restaurant and had to reset the parking meter every hour. Both he and his girlfriend felt annoyed about that. If there is a useful information system, Yang thought this problem could be solved easily.

**Dave**

Dave is a hospital worker who’s commutes to work on a daily basis. Today, he’s encountered many aggressive, frustrated drivers due to increased traffic. He feels that the highway isn’t very safe, given that drivers in front of him keep abruptly stopping, and other drivers keep weaving in between cars. Dave always takes the same route to work, and he’s not very familiar with alternative routes. Dave is trying to decide if he should stay on what looks to be a gridlocked highway, or if he should risk driving on residential streets. He’s not sure what would be faster.

**Design Requirements**

**Specific Problems to be addressed:**

Find a parking slot in heavy traffic areas is a headache to most drivers regardless how many years they’ve been driving, to find a parking slot usually spends a lot of time and drivers have to drive to a far place from the desired destination and then have to walk back to the destination. And the way to pay for the parking fee should also be simplified, an online transaction is always faster.

**Design principles:**

* **Low interaction level/Ease-of-use**

Our system should focus on simple interaction like a clicks, swipes in order not to distract a driver too much while driving. Gestural, simple and fast.

* **Learnability**

The smart built-in AI should be able to track the past parking slots that the driver usually park in and select them as preferred choices. And it should also learn about at what time the driver usually park his/her car and remember which parking areas are usually not busy at that time.

* **Visible navigation**

The parking guide should be visual simply because of safety, it should keep the driver focusing on driving while giving the guide instead of the traditional GPS which mostly only show the guiding route on the GPS system instead of right in the driver’s sight, this can sometimes lead to distraction.

* **Only present a few choices a time**

The choices shouldn’t be too various, it should be limited to the available parking slots near the desired destination, because no driver wants to park far away from desired destination then walk a long distance back even they can find huge number of parking slots.

* **Real time information updating**

The system maintains a database which should be updated in real time in order to get in control of the available parking slot, this is extremely important as it’s the core functionality which allows all other functions to operate correctly.

* **Easy-payment**

Our system should allow for easy and efficient payment methods, and support remote parking time extension and parking slot reservations.

**User needs:**

* make the cost of the system affordable to normal urban drivers.
* simple and easy-understanding user interfaces
* real-time available parking slots
* fast and easy payment methods
* weekly database update
* visible navigation

**Environmental requirements:**

Our product can be used on any urban-road-used four-wheeled vehicles. It works under all common whether and road conditions because it is installed as assistant interface device in user’s vehicle. In addition, our product works in any cities with a satellite map signal all over the world - it will download the current area’s traffic status and give correct traffic information and optimal suggestion based on the analysis on it.

**Functional requirements:**

This system will be able to recognize current vehicle location, obtain current vehicle and driver’s status and download city’s traffic information such as map, important construction locations and road conditions. Analysis would be operated based on received information and give driving suggestions such as driving behavior, traffic condition and best route. This system should also allow users to set their personal configurations like routing pattern and automatic response pattern. When connected to a cell phone, this system would allow driver to respond to a calling without taking his cell phone or just block that call as driver’s wish. This system should be able to find nearby parking space and give reliable suggestions while parking.

**Technical requirements:**

Our system should be used for drivers, for whom it is inconvenient to control our product. Therefore our system should support voice control such that drivers could order the system without their concentrate leaves the road. Another important technology need to be supported is information signal, which could provide real-time traffic information so that our system could correctly analyses the traffic situation and give a reliable notification to the driver. GPS is considered to be an available option.

**Usability requirements:**

After we conducted our user research, we believe that our system should be intuitive to use. It will have short user guide and visible multi-language manual. All interfaces and layouts should be easy to understand and straightforward. User only need to take 10 ~ 20 minutes and will master the product.

**Short Form Creative Brief**

**Project Objective:**

To create a multi-city parking information system that provides urban drivers with real-time parking information on parking availability and parking rates. The system will implement a payment system that will support extending parking time remotely. The system will be able to be installed in most vehicles and will also also be available as an application for smart phones. It will provide multi-language support and weekly database upgrades.

**Key Personas:**

**Alex Smith**

Alex Smith is a Bioinformatics instructor at the University of Toronto. He is happily married, and

commutes daily to the St. George campus. So he need to drive a lot on weekdays. And he likes to

come to school early and prepare his lecture before class starts. Alex is very passionate about the

subjects he teaches and wants to ensure that students are able to understand the topics better and

inform them about the latest research and developments in bioinformatics. Sometimes traffic jam

will ruin his plan and makes him late for his lecture. Moreover, he always parks at school if it is

available. However, the parking area at school is full sometimes, so he has to find other areas which

are normally far away from school to park which makes him unhappy. During the weekends,Alex

likes to go hikings in the woods and fishing.

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dad bought Kevin a Mazda 6 that doesn’t have a built-in GPS. Kevin loves his car and he’s always

willing to hanging out with his friends by driving. He likes new technology as a computer scientist.

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to work with every week but he always waste a lot of time finding a parking spot that is cheap.

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other places. Kevin feels really hard to drive when it is snowing outside and traffic becomes poor

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the GPS sold in the market. And he also wants to find a better way to pay parking fees. He is

looking for new technologies that can solve these issues.

**Key Scenarios:**

**Curious Kevin**

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located on Dundas Street. Kevin knows several parking spots near the restaurant. However by the

time they reach there, all the spots are taken. Kevin knows there is a park nearby but the fees

are really expensive. He doesn’t know where else to park and it seems like he will be forced to pay exorbitant parking fees.

**Key Principles:**

Ease-of-use: Our system should be easy to learn and manipulate . Real-time: Our system should allow drivers to have real-time access to parking information - including parking slot availability and rates. Easy-payment: Our system should allow for easy and efficient payment methods, and support remote parking time extension.

**Experience Map**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Entice** | **Enter** | **Engage** | **Exit** | **Extend** |
| **People** | **Urban drivers** | **Urban drivers** | **Urban drivers** | **Urban drivers** | **Urban drivers** |
| **Context** | **Driving for daily activities(work,food,shopping etc)** | **Unsatisfied about current system of navigation to park vehicle** | **Heard about a new application/device for finding parking spots** | **Spend a long time finding a parking spot in downtown** | **planning on finding a parking spot on next destination** |
| **Thinking** | **would like to spend less time on parking** | **Have a destination, and heard of the new application/device** | **The destination,and the interface of the app/device** | **Easily find the parking slot and pay the fees in a convenient way** | **When they need the system again, the interface will be available** |
| **Feeling** | **Annoyed with lack of parking spots in urban area, complex steps to pay fees and extend** | **Willing to try some new solutions, since there is no such plugin/function for current devices** | **Satisfied with new app/device, but still need more practice with it/them** | **Happy with the new method of successfully parking** | **Relieved that they will save their money and time** |
| **Action** | **Finding parking slots with eyes and past experience/ old devices** | **Finding parking spots with new application/devices that provide efficiency** | **Finish parking and paying** | **Leave the vehicle and do their work** | **Driving for next the time with pleasing experience** |
| **Touchpoints** | **GPS,Google Map and other in-vehicle devices** | **Tutorial/instruction to the use new application/device** | **The new interfaces of the application/device** | **Simply close the application/turn off the device and reuse them next time** | **Next destination or driving experience** |