

CONVERSATIONAL USER INTERFACE

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INTERACTION DESIGN STUDIO
ASSIGNMENT 3



TABLE OF CONTENTS

INTRODUCTION

METHODOLOGY

DOMAIN RESEARCH

COMPETITIVE ANALYSIS

SCENARIO DEVELOPMENT

EXPERIENCE PROTOTYPING

CONVERSATION MODELLING

REFINED SCRIPT



INTRODUCTION

In recent years, conversational user interfaces (CUIs) have become more popular. The most advanced offer an experience approaching fluent, spoken conversations between humans and machines. Spoken dialogue can benefit users in situations where their hands and/or their visual attention are not available, such as when driving a car or cooking in a kitchen. Conversational user interfaces are made possible by machine learning (ML) and natural language processing (NLP). Because of this, conversation itself becomes a “ready-to-use” design material for creating new human-computer interactions and new user experiences.

METHODOLOGY

Throughout the project, we followed the double diamond rule of a standard design process: We first run competitive analysis and domain researches for various driverless cars, existing conversational user interfaces, and embedded CUI on the driverless car; then we narrow down the conversational user interface technology to extract out its essential user experiences throughout the interaction. After that, we explored the potential ideas through our scenario write-ups, and then narrow extract out the final scenario through iterations.

DOMAIN RESEARCH

SELF DRIVING CAR

Self-driving cars have Lidar, Radar and Camera that act as the major sensory organs for the car to drive itself. The three technologies when combined can sense up to a range of two football fields. Amongst these three radar is the most important sensor as it detects the object in detail.

The new technologies open up a lot of new areas from which users can get good value.

Few areas where this technology will help:

- Less collisions by human error
- In providing a convenient transportation for the disabled
- In improving traffic conditions and congestion

CUI

- Natural Language Processing
 - Voice Recognition
- The CUI will be able to recognize each passenger’s voice and take appropriate action. Along with this CUI talks in a flowing conversation manner insted of taking single line commands.

COMPETITIVE ANALYSIS



Cortana is an intelligent personal assistant created by Microsoft. Cortana starts with basic functions like doing small tasks for the user for eg: setting reminders, finding facts, creating and managing lists and it gets better over time through learning the user's behavior. Microsoft partnered with Harman Cardon - a speaker company to build its hardware products.



Google Home speakers enable users to speak voice commands to interact with services through Google's Intelligent personal assistant called Google Assistant. A large number of services, both in-house and third-party, are integrated, allowing users to listen to music, control playback of videos or photos, or receive news updates entirely by voice.



Alexa is Amazon's digital assistant built into devices such as the Amazon Echo or Echo Dot. The Echo itself is a speaker with a built-in microphone. Alexa is Amazon's virtual assistant



Siri is an intelligent personal assistant, part of Apple's operating system. The assistant uses voice commands delegates services by connecting to a set of internet services.

SCENARIO DEVELOPMENT

We generated about 10 exploratory scenarios keeping into account the usability and usefulness of the CUI. The interaction was purely conversation based and did not involve any graphical user interface like car screens, laptop or mobile phone.

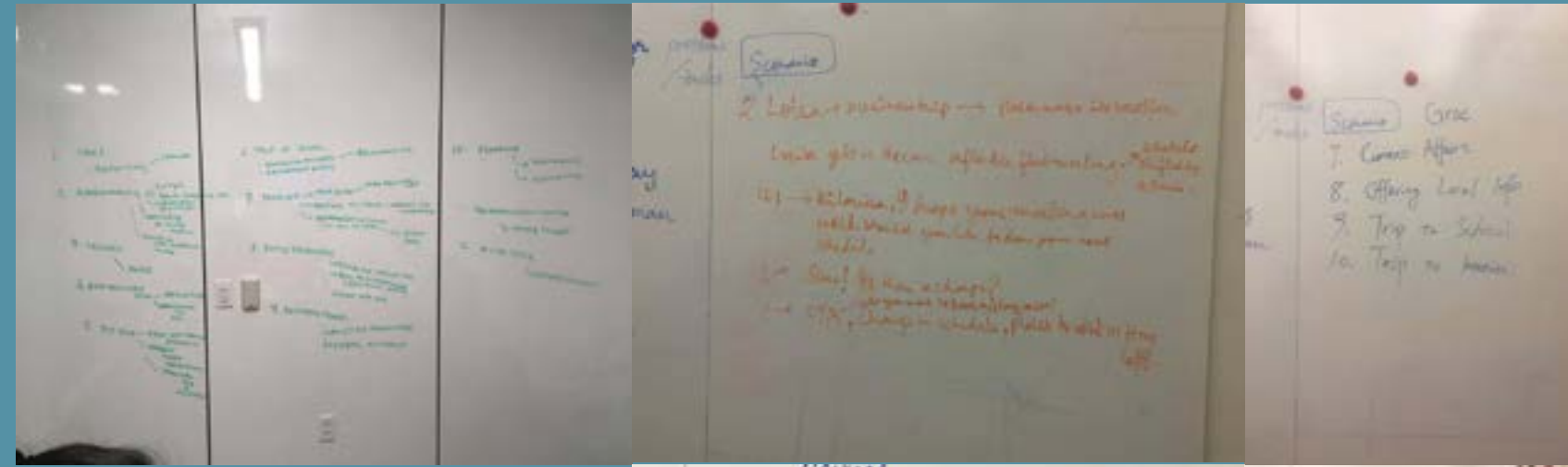
Following are examples of scenarios where CUI holds very important value

- Police patrollers identifying criminals
- Tourists with language barriers
- Parents picking up their kids from school of children
- Navigating blind passengers

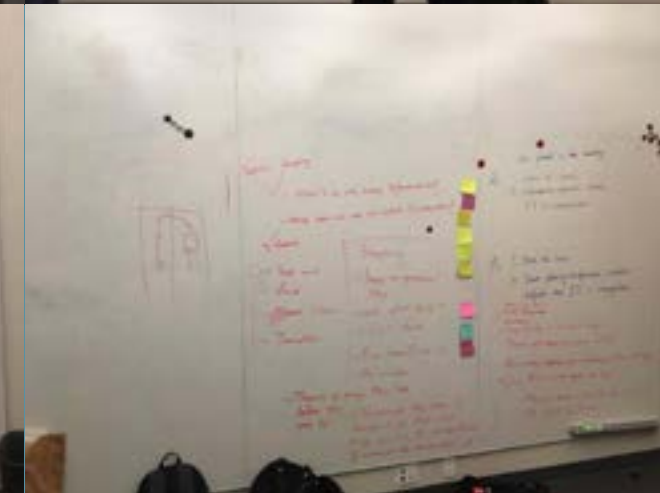
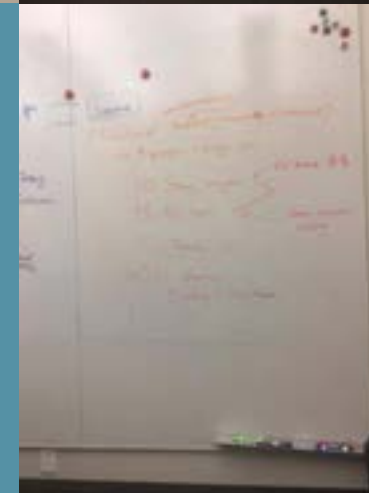
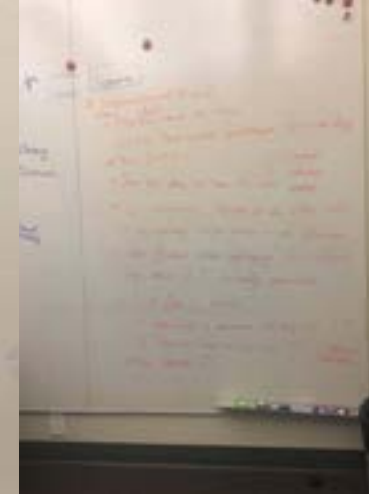
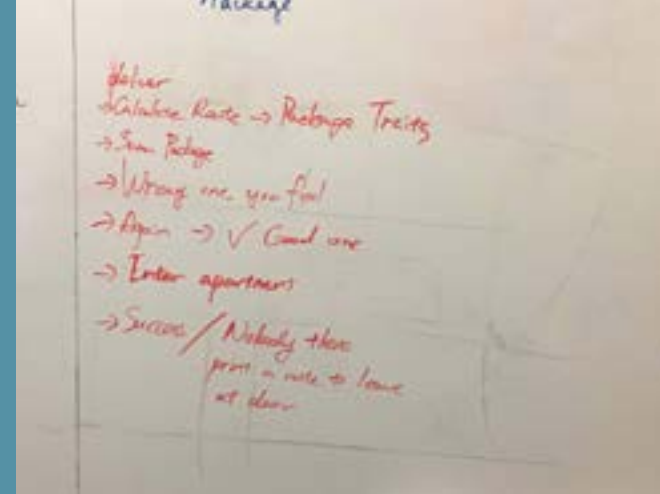
Helping travelers use the commute time efficiently

We narrowed down to the scenario of a Wildlife Safari after many iterations.

When the technology of conversational user interface is combined with the self-driving technology it can be used to create value for users in ways that were not possible before.



12 SCENARIOS



EXPERIENCE PROTOTYPING

An in-class experience prototyping was conducted in the courtesy of another group. They looked at our write up, discussed about it for three minutes, and then acted out the scenario. Through their performance, we can see how this may not be a good fit into the real life scenario. For example, a tour guide for foreign user may not be very helpful, as a typical traveller, after traveling such a long distance internationally, may not want to end up getting stuck in an in-car sightseeing in general. Plus, our use case is not really addressing how we are facilitating the foreigners with their language barriers, and does not sound very different from an in-car Amazon Alexa.

Iterations

We realized that our scenarios

are mostly written to showcase the vastly diverse activities it can support, instead of how our CUI is being considerate for the user demand. Henceforth, we use the following two statements as our guideline:

We investigated into activities where a CUI will be a huge boost - activities that do not require a huge cognitive load on the user, but is critical for the CUI to come in and take over.

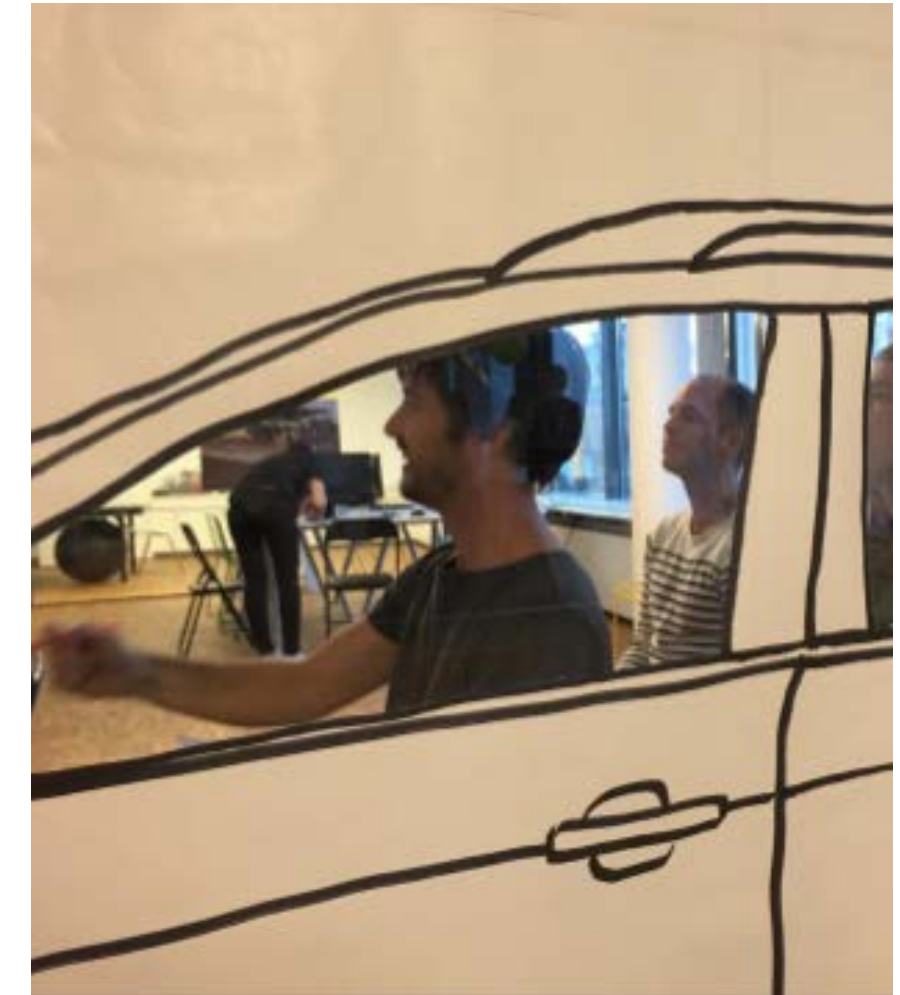
We also don't want our CUI to be merely another Alexa in the car. We want the CUI to control the car with the input it receives. The input can be a query from the passenger, or an environmental stimulation.

With that in mind, and the feedback we received, we iterated through many other ideations.

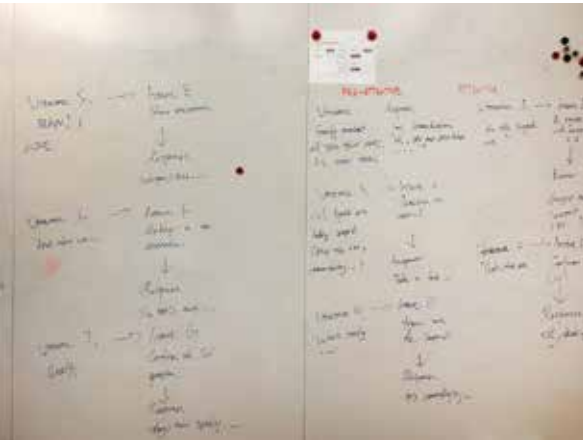
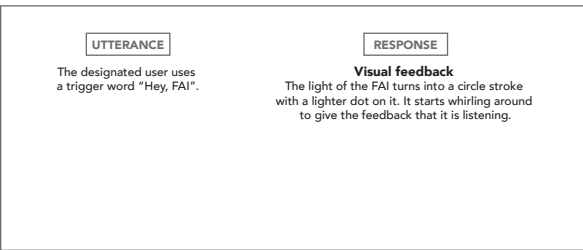
We came up with a tired user taking a nap on the driverless car, and was waken up by the CUI for an important decision making: animal migrating across the road, reroute or not? Through the class feedback, we realized that the CUI is unnecessarily waking the user up for a trivial decision making, and thus add a third guideline:

The users should have their own goal in the car, and all the CUI's purpose is to facilitate whatever goal the users have.

This leads us to our final scenario: **the safari.**



CONVERSATION MODELING



<p>UTTERANCE 1(Rose) "Daddy! Look at that Zebra! What is he wearing?"</p>	→	<p>INTENT Get the answer she wonders.</p>	→	<p>ERROR RESPONSE No response due to non-designated command</p>
<p>UTTERANCE 2(Max) "Hey FAI! What is that black thing on the Zebra?"</p>	→	<p>INTENT Get the answer he wonders.</p>	→	<p>ERROR RESPONSE "Are you referring to the band on the neck or the stripes?"</p>
<p>UTTERANCE 3(Max) "Yeah I mean, the band."</p>	→	<p>INTENT Confirmation to what CUI said.</p>	→	<p>RESPONSE "That's for newborn Zebra so that the Safari officials can track their growth. I also tracked the herd using the embedded radar. Let's move ahead to locate other animals."</p>
<p>UTTERANCE 4(Sensor) Computer vision gets the view of the leopard.</p>	→	<p>INTENT Inform the users the nearby animals.</p>	→	<p>RESPONSE "I can sense a Leopard around the herd in the bush."</p>
<p>UTTERANCE 5(Rose) "Leopard! I want to see the Leopard!"</p>	→	<p>INTENT Express the excitement, tell the CUI to bring her to the leopard.</p>	→	<p>ERROR RESPONSE No response due to non-designated command</p>
<p>UTTERANCE 6(Sensor) Computer vision knows the optimal distance to observe the leopard.</p>	→	<p>INTENT Inform the users to see the animal.</p>	→	<p>RESPONSE "We will stay in close distance with the leopard. Please focus on the right for optimal observation."</p>
<p>UTTERANCE 7(Sensor) The car arrives at the perfect spot for the observation.</p>	→	<p>INTENT Give users the tips for an optimal Safari experience.</p>	→	<p>RESPONSE "We will stop here for a while, please enjoy your view. Also, please turn off your flash if you want to take pictures."</p>
<p>UTTERANCE 8(Rose) "Woh.....I am so happy! That is all I wanted!"</p>	→	<p>INTENT Express the amazement to see the leopard.</p>	→	<p>ERROR RESPONSE No response due to non-designated command</p>

SCRIPT

Context:

It is the autumn of 2030. Self driving cars are common for personal use and they have CUI embedded which has learned about the user's attitude and behavior. Max is on a jungle safari in Serengeti, Tanzania with his daughter Rose. It's a sunny day, and they are sitting in a self driving car, which has special lateral windows and an open ceiling. The CUI designates Max as the trip controller over their kid.

Foreground:

#define ambient sound = [wind blows, tires grind on the grass and soil]

(starting scene, car moving in the middle of zebra herd, big ambient sound, horse sound)

The CUI can sense the motion of the animals and guide the vehicle around them so the passengers can see them. The vehicle slows down around the animals to not scare it. Max sees a band around one of the Zebra. The car can camouflage itself with the surroundings and has a bulletproof glass.

Rose: Daddy! Look at that Zebra! What is he wearing?

Max: (Max pointing to the window) Hey FAI! What is that black thing on the Zebra?

CUI: Are you referring to the band on the neck or the stripes?

Max: Yeah I mean, the band.

CUI: That's for newborn Zebra so that the Safari officials can track their growth. I also tracked the herd using the embedded radar. Let's move ahead to locate other animals.

(Car travels ahead and comes to a slow speed)

CUI: I can sense a Leopard around the herd in the bush.

Rose: (same) Leopard! I want to see the Leopard! (everyone gets alert)

CUI: (same) We will stay in close distance with the leopard. Please focus on the right for optimal observation.

(Travels. Car gradually comes to a stop.)

CUI: We will stop here for a while, please enjoy your view. Also, please turn off your flash if you want to take pictures.

(Rose jumps around to get a closer look)

Rose: Woh.....I am so happy! That is all I wanted!