Low-fi Prototyping & Pilot Usability Testing

ePa • Alice Z. Yuetong W. Liang Z.

Introduction

Mission Statement/Value Proposition

Parking Made Easy

Problem/Solution Overview

People are having a hard time finding parking spaces. We aim to solve the problem by creating new parking spaces, maximizing the usage of currently available parking spots and conveying these info to our users.

Sketches

Images of the 10-20 rough sketches

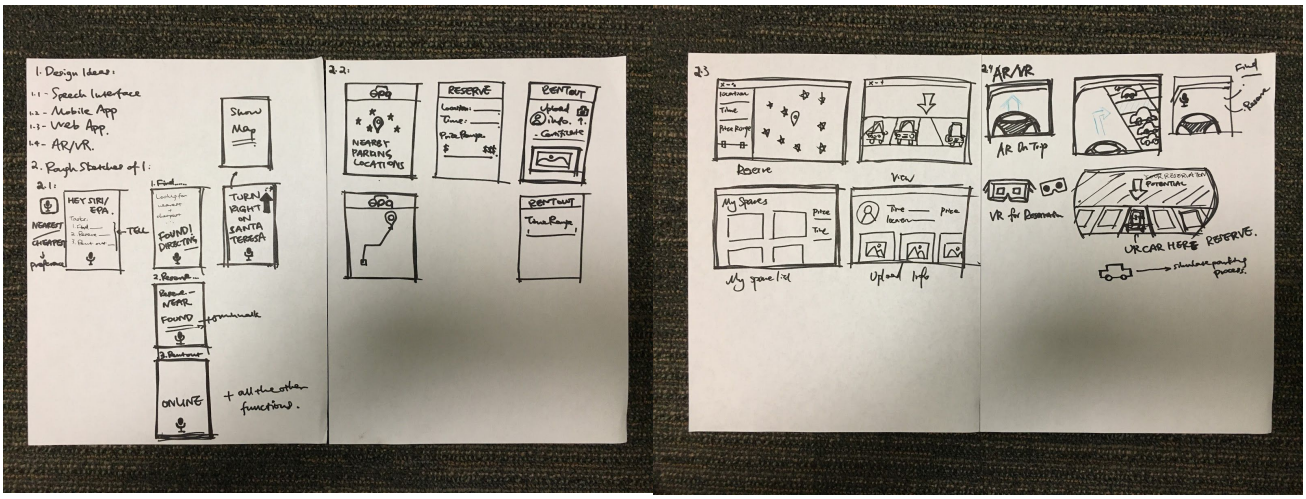


Fig.1 Concept Sketches

Top two designs storyboarded in more detail

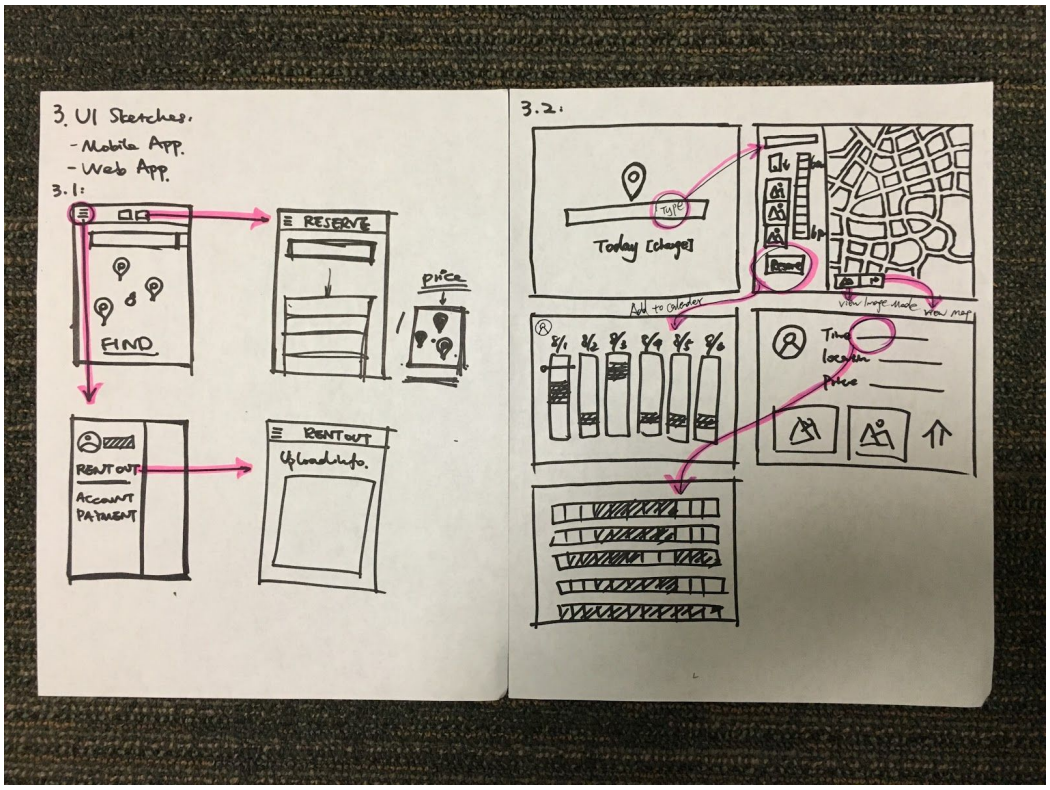


Fig.2 UI Sketches

Selected Interface Design

Storyboards for 3 tasks

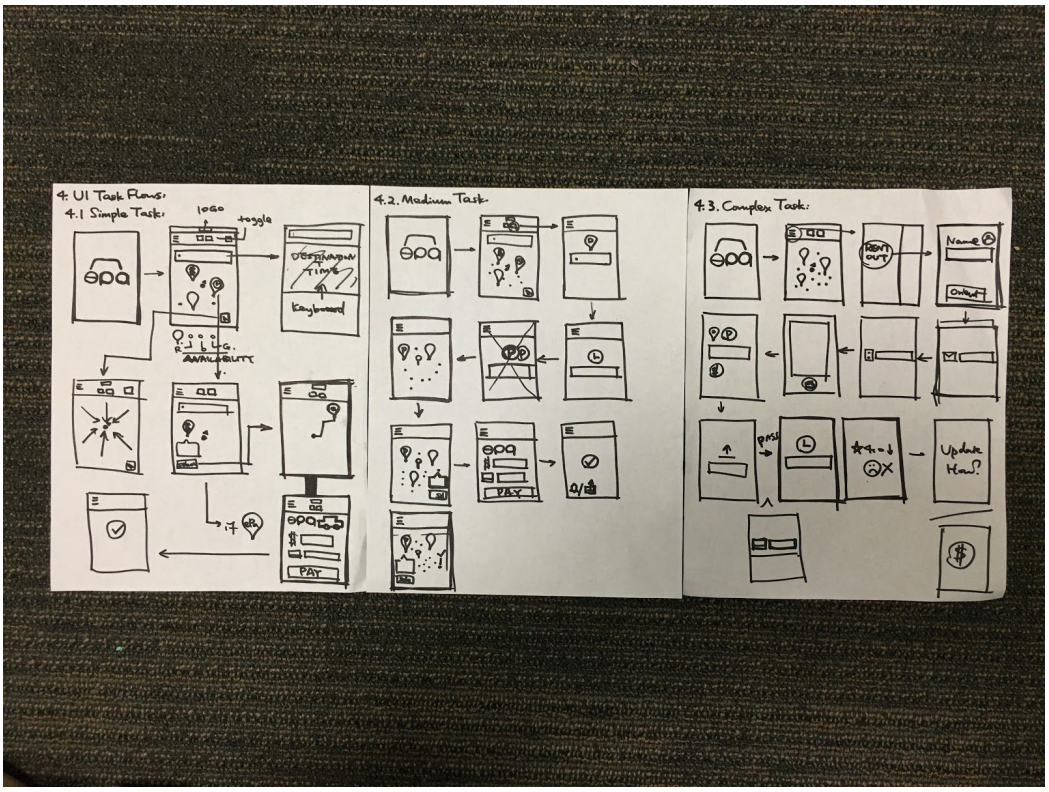


Fig.3 Selected Design

Reasoning for selection

We decided to build a mobile app, for the reasons listed below.

First of all, during the needfinding process, all the interviewees who drive to work acknowledge that they rely on Google Maps, hence their mobile phones to navigate while driving. And none of them mentioned using their laptops or any web apps in the car.

In addition, from the design perspective, web apps usually involve complicated UI components, which cooperate with one another to enable more complicated tasks. However, in the case of our tasks which are rather simple and straightforward, we believe mobile app is a better fit.

Last but not least, based on our intuition, we feel that the mobile platform has become the mainstream and is used by the majority of the population. Thus, a mobile app would be more suitable than a web app as it could best take advantage of people's current interaction habits and thus lead to better user experiences.

Mobile:
Pros: Convenient to use while driving; Access to GPS System and Location Service; It is with you while driving; Compatible with map, navigation and notification system
Cons: Hard to upload relevant files; Screen could be too small for effective viewing

Web:
Pros: Enough screen estate; User-friendly to action-intensive operations (e.g. uploading files); Compatible with PC-based productivity apps
Cons: Laptop is not easy to use while driving; Web app doesn't support messaging services.

Prototype description & Images of all screens

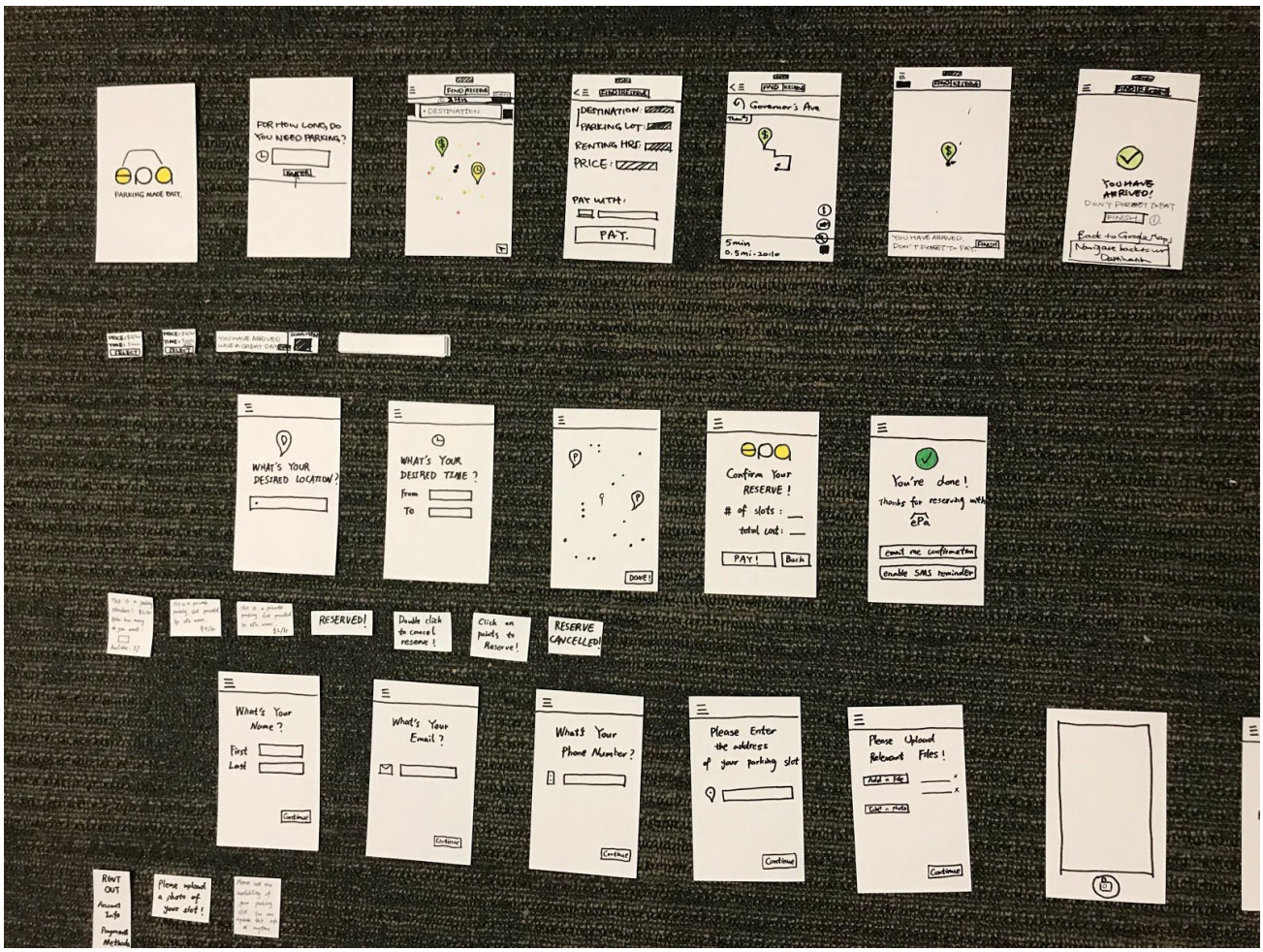


Fig.4 Low-fi Prototypes

Flow for simple task

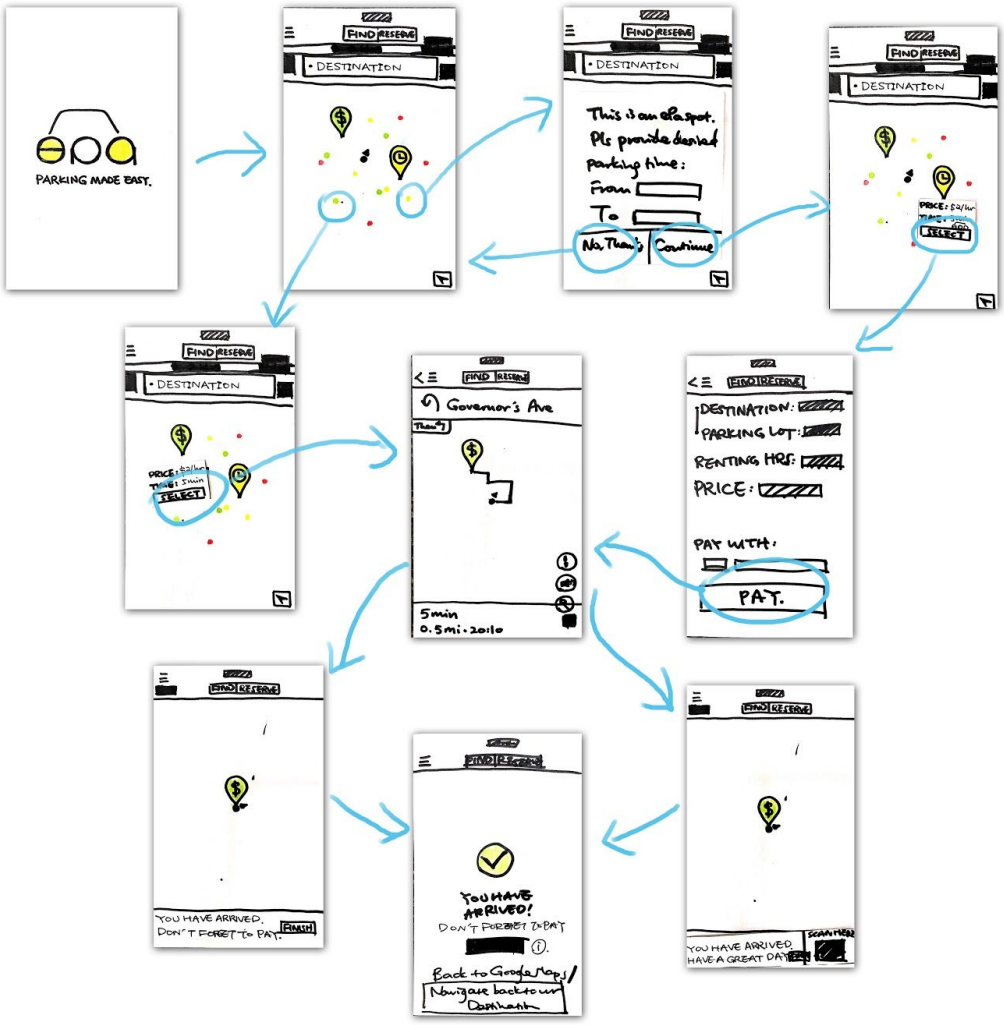


Fig.5 Flow for simple task

Flow for medium task

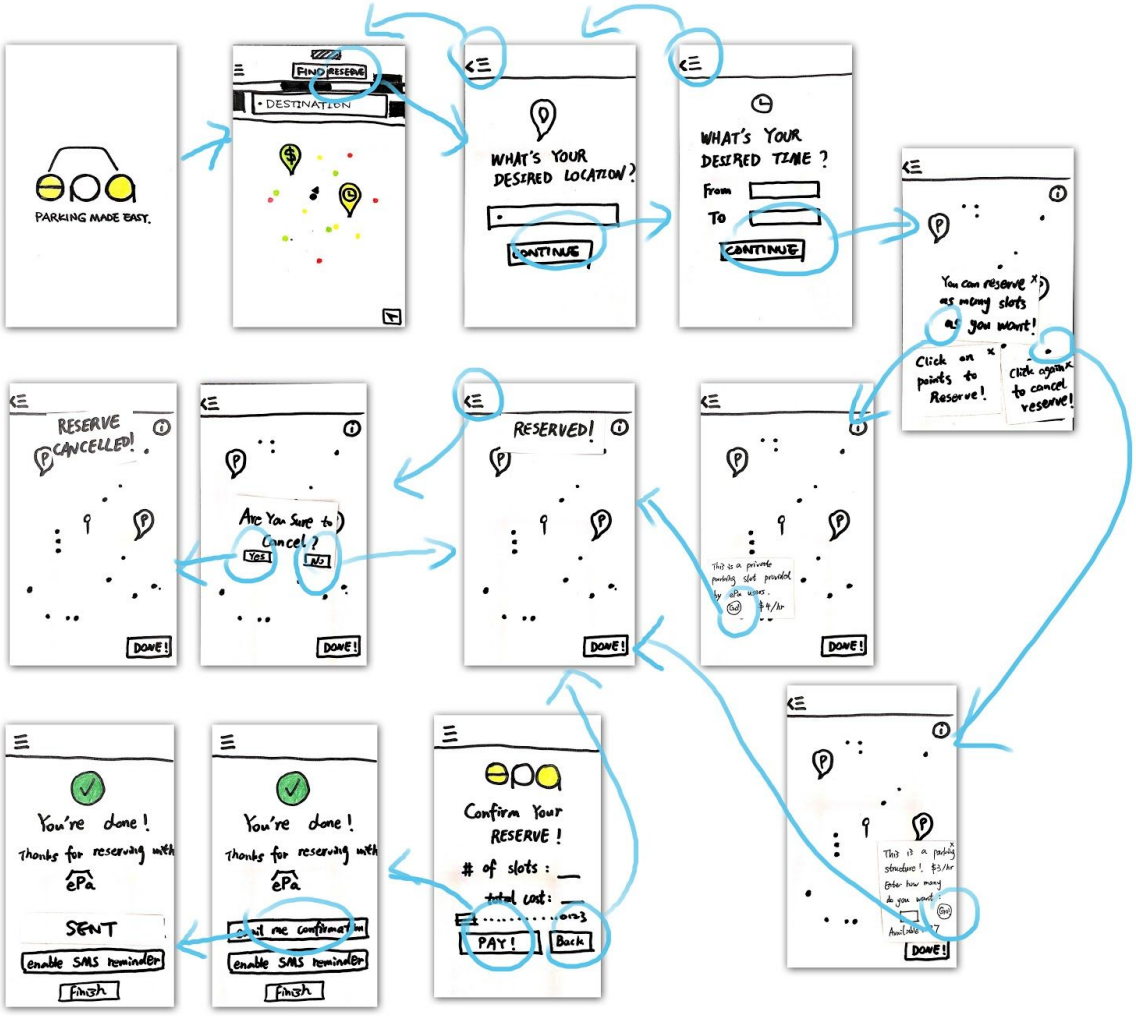


Fig.6 Flow for medium task

Flow for complex task

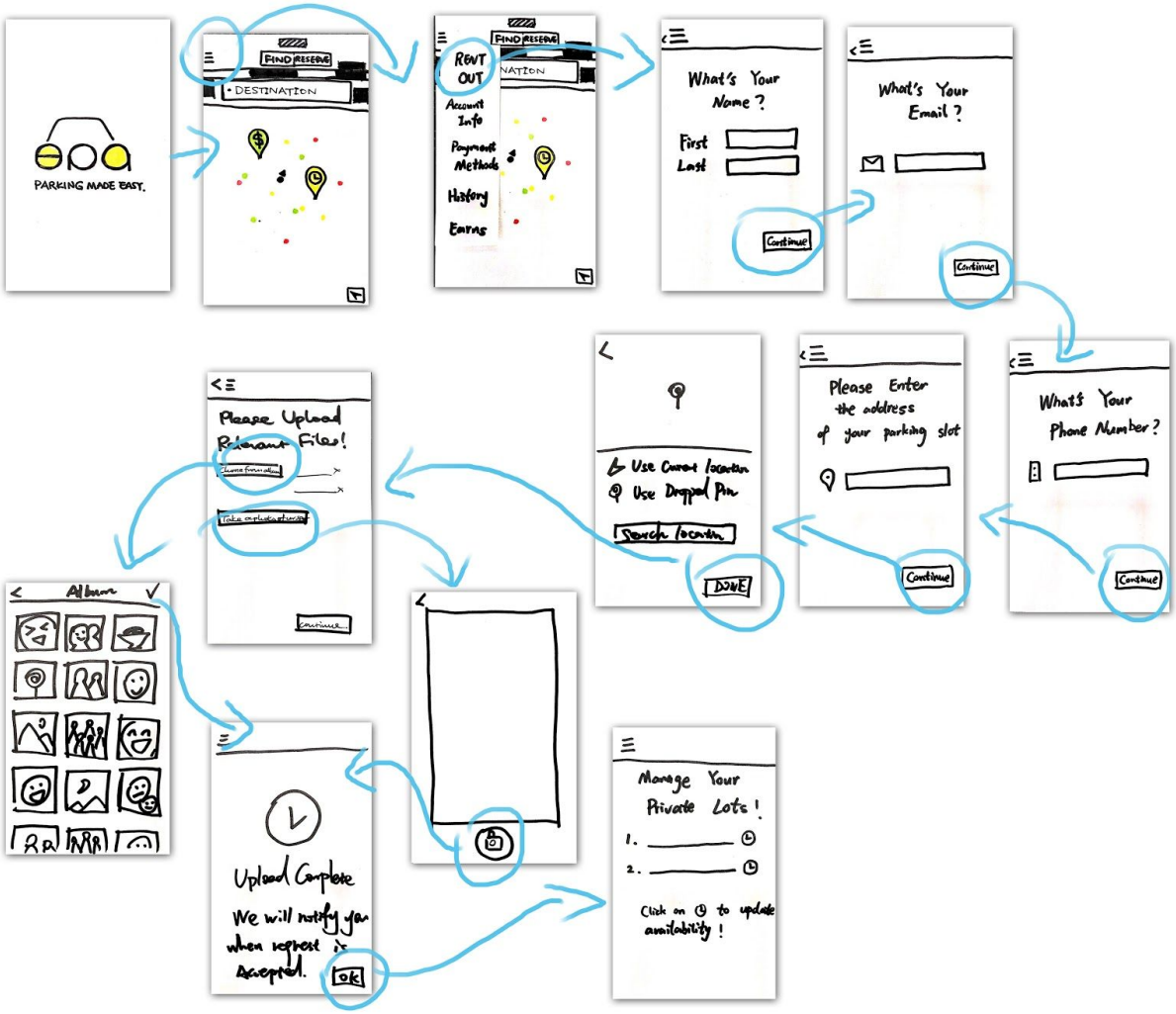


Fig.7 Flow for complex task

Method

Participants

Participant 1 is an employee at Eques who graduated in 2015. She currently lives in Mountain View and drives to work everyday.

Participant 2 is a Stanford student majoring in Mechanical Engineering.

Participant 3 is an infrastructure engineer at Google.

All participants are recruited through personal connections.

Environment

Participant 1: Coupa Cafe @ Y2E2
Participant 2: Dorm environment
Participant 3: Meeting room

Tasks

Task Demo

Thank you for taking the time helping us testing our product, ePa. ePa is a mobile app that aims to help people improve their experiences with parking. In this demo, we will ask you to do a series of three tasks. Before we get started, please sign this consent form.

Background Information

We would like to gather some background information about you. Where do you work / attend school? What is your occupation? Where do you live? How frequently do you drive?

Directions

Please interact with our paper prototype as if you were interacting with an actual application. Yuetong will be acting like a computer as you work through our prototype. Feel free to explore the app in the way you want! Do not worry if you think you make a mistake -- all your actions are valuable to us and we will improve our design based on your response. Alice will help you work through some basic workflow to facilitate your using experience. Liang will act as an observer throughout the process.

Task 1

Imagine that you're driving and it's hard to find a parking place nearby. Show me how to use our app to find a nearby parking slot.

Task 2

Imagine that you're at work but you want to reserve 10 parking slots near your house, on Friday night 6pm~12am for an in-house party.

Task 3

Imagine that you have a house with three private parking slots, but you only need one of them. You can use our app to rent-out the other two to make some money.

Procedure

For each user testing session, Alice acted as the facilitator to explain and demo the process to the user. Yuetong helped assign tasks, updating the paper screens as the user attempted to navigate through our prototypes in order to accomplish these tasks. Liang observed and took notes throughout the process.

Test Measures

When conducting our tests, we tried to evaluate how users who have never seen the product or heard about the product concept before interacted with ePa. Our goal is to have a product that is intuitive, efficient to use and requires as little text, explanation, and trial-and-error as possible. To assess the level of completion of this goal, we used the following criteria:

- Contradictions in behavior and anything the testee did differently than what we thought was the "correct" interaction path. This helped us see where the user's attention was drawn and replace our intuitions with theirs.

- Where user got stuck was another important indicator. We want the app to be as smooth and frictionless as possible. If the person had to stop, that means they had to think about what to do which is a sign of an incorrect assumption about the location of specific functions and flow of the product. The less time a person stopped to think, the better.

- Points of confusion where the interviewee looked up to ask one of us for guidance. If our app was perfect, they'd do everything without having to turn to us, looking for hints or clues. We also took into account the effect of artificial confusion on user's behaviors.

Last but not least, we made a log of critical incidents which were then assigned severity ratings. Relevant data are shown in the "Results" section.

Team Member Roles

Alice Z. - Facilitator
Yuetong W. - Computer
Liang Z. - Observer

Results

Participant 1:

The user in general enjoyed the overall experience of carrying out the 3 tasks on our app. For the simple task, user was confused over the icon and coloring on the main screen. Facilitator had to step in and guide the user in order for the testing session to proceed. However, she was pleased with the "navigation back to your destination" feature. For the medium task, guided by the intuition built from the previous task, user directly typed in the destination which eventually led to a wrong task flow. User also indicated that it was hard to distinguish between reserved and unreserved states. In addition, user suggested that it would be nice to be able to reserve all the desired parking spots at once instead of reserving them one by one. Last but not least, for the complex task, she was confused by the "relevant files" feature and decided that it would be more desirable to know what those files were. User also suggested that it would be

useful to look up the prices of parking spot near user's current location to determine if renting out the parking spaces would actually be profitable.

Participant 2:

The user in general really enjoyed the experience interacting with our prototype. To be more specific, she found no difficulties in finishing task III (rent out own parking spot) -- even no difficulty in figuring out 'Rent Out' button inside the pull-out menu. She just followed the working flow and finish the desired task. For task II (reserve future parking spots), she also found it intuitive. The only difficulty is that she didn't notice the toggle switch between find and reserve, so she didn't know how to begin. However, such difficulty results from the 'low-fi' nature of our prototype, so we don't think it would be a serious problem.

Her using experience was worse for task I (find nearby parking spot). First of all, she found the initial screen (filled with available spaces of different colors and symbols) quite confusing, and she didn't know how to interpret these symbols to make her choice. She also found it very inconvenient if she need to enter the reservation time -- especially during driving. These are things that we may consider to clarify and simplify in the future. She also suggested that the "time" shown on each parking spot could be defined in a better way -- currently, we define the time to be the driving time necessary to reach there from current location, but as she argued, users may care more about the walking time between parking spot to final destination.

Participant 3:

Our third participant lives and works in Mountain View. His average commuting time to work is 15 minutes. He also drives to visit his friends from time to time. And he enjoys driving to hiking. As a frequent driver (3-4 times a day on average), he found parking a pain especially in the city area.

For the first task, he misunderstood the "cheapest choice" icon as an indication of higher price. And he didn't understand the meaning of the clock icon. But he said it is easy to remember if the meaning of the icons are taught once. When it came to the part of picking parking time, he said that he doesn't want to type too much while driving. So he recommended us to have a prefilled (current) time. He also suggested separating 2 hour parking and long time parking since those are the two main categories in real life.

For the second task, he didn't have too many comments besides that the interface should be optimized for people that only want to reserve 1 spot.

For the third task, he was a little bit annoyed that he needed to go out to take pictures of the parking spot. He described it as unnecessary and sometimes impossible if he is not at home. Then he recommended to have a rating system for the private parking spots. He also pointed out there are more complicated flows after renting out that we haven't designed yet.

Discussion

Overall, we believe that our UI flow is reasonably easy to follow. We didn't observe many unintended uses of buttons and navigations. The first task seems to be the most straightforward one. The reservation and renting out part are not that intuitive because 1) People don't yet have the mindset to reserve parking in advance or rent out their private parking spots; and 2) the reservation has many similar yet unmerged steps to the first task.

All users provided new insights and suggestions to user experience design. Specifically, for the first task, our users suggested to use a system to automatically calculate the most reasonable price based on the location and specific time period. They also emphasised optimizing the UI by minimizing the time required to look at the screen and reduce the time of entering necessary information since driving requires focus on the road.

For the second task, one of our user suggested to automated the process more by giving less information to the user at each immediate step. Another user suggested to optimize the flow for our main user group, which, in his opinion, are those reserve no more than one spot at a time. We also got many suggestions on making the reservation more flexible. They specifically requested the feature to change reservation time quickly since traffic jam is pretty common in bay area while parking is often very time sensitive. One of our user also loved the dropped pin feature and suggested us to add the same feature to the first task.

For the third feature, most feedbacks we got are details that we should add. Some examples are notifying the owner of the space when cars enter or leave the spot, introducing rating system to the spots, and providing relevant services like towing when necessary.

In conclusion, the first two tasks can be largely combined to make it more intuitive for the users. The third task should support more detailed features. The missing relevant guiding information, conflict between intuitions of "find" and "reserve" features and the complicated reservation process will also be taken into consideration in the next phase.

Appendices

Test notes

Participant 1:

Task I

Clock icon is unclear - 3

Yellow parking lot represents ePa spots - unclear - 3

Pre-stored payment method - By default - don't want to do selection and add new payment method - 1

"Navigation begins now" - prefer built-in map - 1

Scan here - unclear - 1

Pleased with "Navigate back to your destination" - San Francisco trip - NICE! - 0

Task II

Reserve - destination - prefer typing in destination first and reserving afterwards - 3

Reservation button - unclear - 1

Don't make instructions look like ads - 1

Put instructions on the very first opening screen - 1

If single - other spots disabled, if multiple - other spots are still active - 0

(Prefer selecting all the desired parking spots at once)

Use color change to signify change in state - 2

Pay at which stage? Right after reservation or pay only at the time of spot usage - 1

Task III

Prefer type in home location first, and look up the prices of parking spots around + Price of parking spots + Give price estimation + user decides if that is acceptable - and the system decides on the final rent price - 3

//Combine basic info screens

//Feel that drop pin is inaccurate - prefer typing in the home location

//Difference in location between parking spots and home location - info unclear

//Parking spot location - hard to use

What are some of the relevant files - 3

//Confusion over the "History"

Other Thoughts

Google Maps - currently provide some parking options - use

Product orientation - Airbnb feel

Participant 2:

Task I

Parking lots in different conditions - unclear - 3

//After navigation - forcefully exited

Can't think of the reservation time right on spot - too much effort while driving - 2

(Changing the reservation time)

No need to show destination at the payment screen - 1

Time from pop-up screen - both destination to parking spot & from current location to parking spot - 3

Time issue - the time shown should be the time from destination to the parking spot - 3

Task II

Customer's intuition - not to use the toggle switch between find and reserve - 1

(Email the parking spots to those travelling together)

(Parking spot price increase at popular hours)

(Traffic jam - function of "cancelling" and "changing reservation time" - cancelling over SMS - parking is more time-sensitive issue)

(Reservation - A small amount of upfront payment - and the rest of payment later)

Task III

//The 'Continue' button at the same position

//Sub-tasks - initiated by different function entry points

Participant 3:

Task I

Clock icon - unclear; all the dots - unclear as well - 3

The one with the dollar sign seems to be more expensive from intuition - 3

(From now(Functionality) (by default) (3 hours from now))

Don't want to type in the time - 1

Select the spot - update and then select again - that's not good - 3

A bit agitated over having to pay before actually parking at the spot - 2

Nice feature - navigating back to destination - 0

//Back to Google Maps / Finish

Harder for a day than for 2 hours or a short period of time - 2

4 hours intended - settle for 2 hours - reflect the time constraints of other spots - 2

Show available time on top of the available parking spots - 2

Icon on the side - choose your time - filter out - 2

2 hour / unlimited - binary - coloring the dots can be helpful - 2

Task II

//Not many people reserving

//People don't think about reserving parking spots for others - think friends can figure that out - can use ads

(Same thing with the time - from now blah blah)

(Location - current location functionality could be nice)

Ooohhhhh - optimizing for multiple parking spots realization - perceived to be less frequent than single parking spot reservation - 2

//A lot of things can be simplified

//Assume people come in to reserve single parking spot

Task III

Pull-out menu intuition - correct & intuitive - 0

Reservation - use drop pin - 1

Annoying - since need to go out to take pictures of the parking spot - is it necessary? - make it as easy as possible (maybe take a picture later? Show benefits of uploading a photo) - reminder - 3

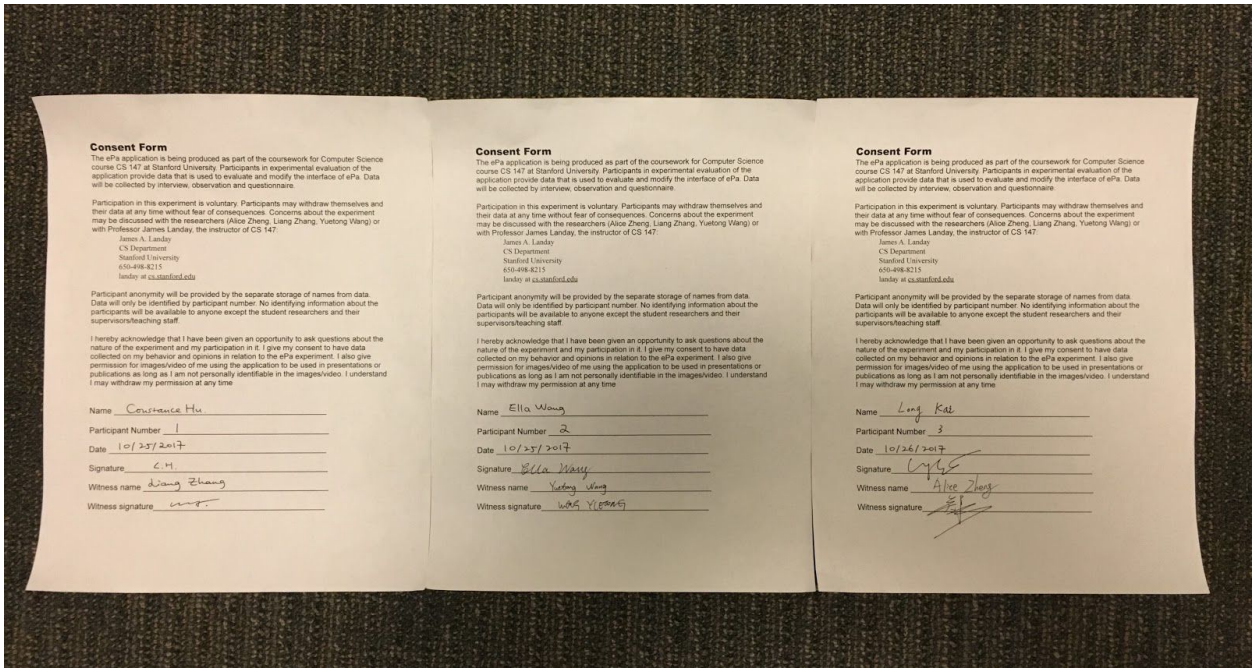
(Complicated - notify when there is a parking - calendar management - parking management)

(Rely on customer reviews - bad ratings? - customer service)

//Depend on the first task - the most frequently used one - optimize the first one
//People unaware of the follow-ups

1. Relevant guiding info. missing
2. For the first task it should be extremely simple (since it's during driving) -- deal with time slot, default value
3. Reserve view too complicated -- pop-up info annoying, multiple reservation confusing (maybe default to one reserve??), toggle spot not intuitive, user prefer not to have a separate pop-up screen for each reservation
4. Conflict between intuition of "find" and "reserve" - including multiple spots selection, destination selection

Consent forms



Consent Form

The ePa application is being produced as part of the coursework for Computer Science course CS 147 at Stanford University. Participants in experimental evaluation of the application provide data that is used to evaluate and modify the interface of ePa. Data will be collected by interview, observation and questionnaire.

Participation in this experiment is voluntary. Participants may withdraw themselves and their data at any time without fear of consequences. Concerns about the experiment may be discussed with the researchers (Alice Zheng, Liang Zhang, Yuetong Wang) or with Professor James Landay, the instructor of CS 147.

James A. Landay
CS Department
Stanford University
650-498-8215
landay at cs.stanford.edu

Participant anonymity will be provided by the separate storage of names from data. Data will only be identified by participant number. No identifying information about the participants will be available to anyone except the student researchers and their supervisors/teaching staff.

I hereby acknowledge that I have been given an opportunity to ask questions about the nature of the experiment and my participation in it. I give my consent to have data collected on my behavior and opinions in relation to the ePa experiment. I also give permission for images/video of me using the application to be used in presentations or publications as long as I am not personally identifiable in the images/video. I understand I may withdraw my permission at any time

Name Constance Hu

Participant Number 1

Date 10/25/2017

Signature C.H.

Witness name Liang Zhang

Witness signature

Consent Form

The ePa application is being produced as part of the coursework for Computer Science course CS 147 at Stanford University. Participants in experimental evaluation of the application provide data that is used to evaluate and modify the interface of ePa. Data will be collected by interview, observation and questionnaire.

Participation in this experiment is voluntary. Participants may withdraw themselves and their data at any time without fear of consequences. Concerns about the experiment may be discussed with the researchers (Alice Zheng, Liang Zhang, Yuetong Wang) or with Professor James Landay, the instructor of CS 147.

James A. Landay
CS Department
Stanford University
650-498-8215
landay at cs.stanford.edu

Participant anonymity will be provided by the separate storage of names from data. Data will only be identified by participant number. No identifying information about the participants will be available to anyone except the student researchers and their supervisors/teaching staff.

I hereby acknowledge that I have been given an opportunity to ask questions about the nature of the experiment and my participation in it. I give my consent to have data collected on my behavior and opinions in relation to the ePa experiment. I also give permission for images/video of me using the application to be used in presentations or publications as long as I am not personally identifiable in the images/video. I understand I may withdraw my permission at any time

Name Ella Wong

Participant Number 2

Date 10/25/2017

Signature Ella Wong

Witness name Yuetong Wang

Witness signature WANG YUETONG

Consent Form

The ePa application is being produced as part of the coursework for Computer Science course CS 147 at Stanford University. Participants in experimental evaluation of the application provide data that is used to evaluate and modify the interface of ePa. Data will be collected by interview, observation and questionnaire.

Participation in this experiment is voluntary. Participants may withdraw themselves and their data at any time without fear of consequences. Concerns about the experiment may be discussed with the researchers (Alice Zheng, Liang Zhang, Yuetong Wang) or with Professor James Landay, the instructor of CS 147.

James A. Landay
CS Department
Stanford University
650-498-8215
landay at cs.stanford.edu

Participant anonymity will be provided by the separate storage of names from data. Data will only be identified by participant number. No identifying information about the participants will be available to anyone except the student researchers and their supervisors/teaching staff.

I hereby acknowledge that I have been given an opportunity to ask questions about the nature of the experiment and my participation in it. I give my consent to have data collected on my behavior and opinions in relation to the ePa experiment. I also give permission for images/video of me using the application to be used in presentations or publications as long as I am not personally identifiable in the images/video. I understand I may withdraw my permission at any time

Name Long Kat

Participant Number 3

Date 10/26/2017

Signature

Witness name Alice Zheng

Witness signature

Fig.8 Consent forms