1. Problem and solution overview

Although participating in a rideshare provides social and economic benefits, the logistics of coordinating drivers and passengers creates challenges that undermine widespread ridesharing. Message board methods like Craigslist and Facebook groups have limited search functionality and leave riders with uncertainty about potentially unreliable or even unsafe drivers. Additionally, users appreciate financial and economic cost for transit, but the existing message boards do not provide structured cost data. Our proposed Catch-A-Ride product differentiates itself from existing rideshare systems by providing a semistructured smartphone application that includes strong user profiles to instill community trust as well as advanced search functionality to better match drivers and passengers.

2. Paper prototype description, with overview shot and close-ups

Our paper prototype supports three main pieces of functionality, listing a ride, finding a ride, and reviewing a driver, all of which are described in detail later in this section. Our main interaction ideas include consistent next and previous buttons at the bottom of the screen during workflows and confirmation displays after each user input screen is submitted. The prototype was designed to run on a smart phone, thus our designs represent the constraints of an iPhone form factor.

Task 1: List a Ride

Start from the Main screen of the application which shows you the list of current upcoming rides that you are participating in (blank if you have none). Click on the ‘Drive’ button on the top left hand side.

The user is walked through the ‘list a ride’ wizard where each required piece of information is asked and confirmed. There are back and next buttons on each screen to indicate that nothing is final yet. These switch to yes and no’s on the confirm screens. The information that the wizard
gathers is - where the user will be starting from, where the user is going, which car the user will take, when the user needs to reach by, and the timing flexibility for the ride. Anytime the user inputs one of these, a status screen confirms the input so as to reduce the need for backtracking. Once all required inputs are collected a final summary screen is presented to the user. It explains the route, the time windows, confirms the car choice and makes sure the user knows what is happening next. The next button is replaced with a confirm button to indicate that this is the final step.

Also an advanced options/filters button is available to allow the user that’s offering a ride to further scope the audience they are willing to offer a ride to e.g. if they are willing to allow smoking or pets. By default the application sets these to be very open so as to allow for the largest pool of riders but can be tightened at the users request. Once the user selects confirm they return to the main screen where their newly listed ride is there for them to see.

Task 2: Find a Ride

Start from the Main screen of the application which shows you the list of current upcoming rides that you are participating in (blank if you have none). Click on the Ride button top right hand side

This shows a list of the posted rides in your area (which is automatically detected from your current location) you have the option to change the starting location. The list is sorted by earliest departure at the top and latest departure at the bottom. There is a button at the bottom for additional filters. Click the Filters button.

The advanced filters section allows you to specify details like departure date (note it's a drop down in the paper prototype but we plan to change it to a slider control) and time you want to leave. The minimum rating of the driver. If the driver needs to be affiliated to a group that you’re a part of (the user is able to associated themselves with various groups e.g. UW student, through their profile settings). Whether or not you’re comfortable with the driver being a smoker/not. You can also specify your preference for the gender of the driver, age group of the driver and # of people you’re willing to have in the car.Click Save on this page.

Now you’re back to a list of postings that match your specific criteria. You can select the posting that you want to get more info on and view the details of the offer e.g. driver’s profile, rating, affiliations, actual route that the driver intends to use, vehicle info etc.

You can hit Confirm to select this ride or Back to view more rides. Hitting Confirm takes you back to the first screen of the app and now this ride will show up in the list of active rides.

Task 3: Submit a Review

In the details screen for a ride are several important features. It communicated the status of the trip, shows the route, and provided the feedback mechanism. The map should also include the
current location and track with the user. The feedback is simply a set of empty stars next to various metrics. On clicking a star the rating is not saved. The ratings can be adjusted but do not all need to be filled out. The text is free form for the comment and is submitted on clicking rate. From then on the rate is disabled as there is logical “next” screen. The list of information presented should not be considered exhaustive as an actual implementation would no doubt reveal that much more information is available to be presented to the user. This is however a minimum feature set that at least needs to be shown.

3. Testing method

Participants
We interviewed 3 people - Traci, Max and Joe. Each of them were in the age group of our target audience which is between 18-35 years of age.

Traci  Uses Car2go and hasn’t owned a car in years. She would be interested in finding rideshares if she knew she could trust the driver.

Max   Frequently drives between Eugene and Seattle. He has offered rides before to communities in which he participates, for example classmates at his school. One of Max’s main motivations for offering rideshares is splitting the fuel cost.

Joe   Has offered rideshares to friends hundreds of times. He’s mostly interested in helping a friend and potential of better conversation with additional people in the car. He would be
interested in MPG and fuel cost info if it's possible to figure out.

Description of User Study Environment

Max was interviewed at his home shortly after completing a long trip up to Seattle, WA from Eugene, OR.

Traci and Joe both live without cars and were not planning any long trips so their interviews were held in coffee shops.

The screens were placed in front of the participant and they used a pen to select and write input.

Description of Tasks

We refined our three tasks with specific context for the final inquiry:

I. You rode your bike down to Portland for STP (Seattle To Portland) this year. Your partner drove your SUV down to pick you up. Now as you are driving back you want to offer a ride back to Seattle and have 2 spots in the car. You’re leaving on the 23rd of Nov from your hotel - 506 SW Washington St. Portland, OR - 97204. Use the Catch-A-Ride app to post your ride offer

II. Your rode your bike down to Portland as part of STP this year. Now you’re looking for a ride back. Use the Catch-A-Ride app to find a ride back home to Seattle

III. You’re 5 mins away from reaching home - use the Catch-A-Ride app to give feedback on your trip

Procedure followed for the User Study

The three of us sat one next to and two across the table from the participant. The person directly across from the participant acted as the computer. The one diagonal acted as the primary note taker and the the one seated next to the participant was the interviewer. During the course of the three interviews each of us sat in each position by cycling through. The interviewer gave the overview of the problem and answered any questions the user had before starting. At this point a notebook containing our list of tasks was handed to the user and the testing began.

The note taker recorded the interactions and helped the computer resolve behavior of the system when the user did something none of us had foreseen. T
The three users ended up having very different personalities when it came to actually running the prototype that the interviewer had to deal with. For Traci she was very worried about not knowing what buttons did and continually asked us what something did. The interviewers’ task was to encourage her to press the buttons to find out without explaining the intended functionality of the actions. Max was incredibly detail oriented while he found several inconsistencies in the copy text, he needed encouragement to overlook the small inconsistencies and continue on. Joe took great liberties with the pen and note card format of the experiment and practically rewrote every page. The interviewer was tasked with acknowledging the design flaws but continuing to keep him on task. These three styles of interview informed much of what can be drawn out in results and presented the interviewer unique challenges.

**Test Measures**

Through the user experience study we were looking to see if the application prototype covered the types of data and addressed the concerns that users wanting to participate in a rideshare would have.

The number one concern that people have is safety - how do you trust the person, potentially a stranger, while embarking on a rideshare journey? We wanted to test how effective providing a rating system for each driver would be. We also wanted to find out if integrating with the GPS on the phone and providing information during the journey e.g. where you are currently w.r.t. the planned route and the ETA to the final destination would help quell some anxiety that the riders have.

In addition we wanted to measure the ease of use of the prototype. Is the wizard for posting a ride intuitive? Did it cover all the data that drivers want to convey? How easy is it to find a ride? Is the rating system and showing affiliations of the driver e.g. Student at UW useful?

**4. Testing results**

We found that our tasks needed to be clearer - users would get tripped up about planning a trip from Portland to Seattle while they were still in Seattle. Some of the confusion stemmed from the fact that this was a contrived exercise for the user. But it was also because most riders and drivers would only post/look for rides 48 hours prior to the actual trip. We also needed to be clearer in the task about what date it was that they were posting vs date of travel.

The first task - Post a Ride - all users were able to complete with ease. They didn’t seem to want
an indication of how far along they were in the wizard e.g. 3 of 5. Confirming the car was identified as somewhat redundant to most users.

The second task - Find a Ride - 2 of the 3 users were unable to complete and the 3rd user found it difficult as well. Perhaps a wizard for this task would help. The option ‘Change location’ wasn’t clear. In the list of results they weren’t sure whether the titles were specifying the destination or starting points - perhaps we need to explicitly call both out. In the filters section we allowed them to change the location and also specify filters e.g. smoking allowed which confused some users. The users also called out that they would like an option from this listing/advertising to see the detailed profile of the driver e.g. all the comments that have been posted for this driver, history of the rides etc.

For the third task - Provide Feedback - all users were able to complete this task with ease. In the detailed view of the ride - we allowed the user to provide feedback as well as view the summary/current status of the ride - this confused one user. Perhaps we should have these as explicit views/pages.

We found that both the drivers were intrigued by listing of MPG and disappointed that cost estimates were not provided. We did talk about this while creating the prototype (hence listed the MPG) however didn’t give it the weight/importance that we should have (hence didn’t provide the option to derive the $ amount that the driver was seeking from each rider based on this info). This is something we will definitely fix in the final prototype.

On the Homepage of the application, we found that none of our users used the “See Next Ride” button and instead they directly selected/clicked on the ride entry listed. We also found that each of the users identified the trip i.e. the ride entry listed by looking for the title of the trip.

While researching a ride, users (riders) were interested in viewing additional information on the driver’s profile when viewing the summary/description of a particular trip. They wanted to see information such as the age of the driver and a link to all the driver’s reviews and affiliations. This was also true for users that were offering the ride i.e. the driver wanted to be able to accept/deny the rider by viewing the profile of the rider.

We also found that keywords throughout the UI should be better phrased, for example ‘Confirm’ on our ride request screen confused participants.

Overall it took some time for the participants to get used to treating the paper prototype as a computer screen e.g. it wasn’t intuitive which parts of the screen were clickable.
5. Interface revision sketches

I. Many users, especially drivers who are primarily motivated by sharing the cost of gas, were disappointed when they noticed all mileage and distance information necessary was present but the cost calculation wasn't displayed. So we this revision adds display of the total cost of the trip based on a calculation involving distance and EPA estimated MPG.
II. Users asked to be able to see detailed view of driver profile while viewing the advertisement/listing of the ride. This would give them access to all the verbose feedback that has been provided for this driver (history of rides). We decided to provide the link to this page - but the actual page is ‘under construction’ placeholder.
III. Remove ‘See next ride’ button from home page. None of our users actually used it and since the top result on the home screen is equivalent to this button, it has been determined to be redundant.
IV. When viewing the list of available rides, many users were unclear that the city listed was the destination and it led to understanding of the page. We decided to fix this by including the origin and destination instead of just destination. Even if the origin city is repetitive information, it will serve to drive home that these pages are centered around a common starting point. The left of the photo below shows the previous design. The right of the photo below shows the extra origin information in the list of available rides. Also note that the filter and ‘Change Location’ buttons reflect the design changes discussed on the previous page (item #5 below).
V. Users found the filters panel from our earlier designs, shown on the left below, too confusing as it contained functionality for two different tasks - change location and specifying additional filters for pets, smoking, and luggage. The middle and right panels show our revised design which separates location changing from the other filters.
6. Video or Interactive prototype overview

a) Scenarios for 3 tasks

i. Task 1

Click Drive to start the driving flow.

Click “Use Current Location” to fill in the text boxes for where are you leaving from?
Doing this sort of geolocation is buggy so allow the user to confirm.

Show map confirming correct input.
Where are you going? Type in address manually.

Confirmation map.
Choose car.

Confirm car and pricing information.
Pick date and departure window.

Finalize.
Confirm everything up to this point.

Fill out optional listing information. Specifically add a bike rack.
Confirm your entire post. Notice your public profile also appears.

Task complete and now shows up on the main screen.
ii. Task 2

Click ride to start the ride finding process.

Long list of rides, try filters.
Several filters available.

Choose bike rack and confirm.
List is much better now, click the ride to Seattle.

All sorts of information is available including reviews and rider profile. Click Confirm.
Ride is now displayed on main screen as riding. Done.

iii. Task 3

Click on the completed ride.
Various info about the ride at the top. Rate the driver.

Fill out the entire form.
Ride is gone from view. Done!

b) Tools used to prototype

To build our video prototype we used a smartphone camera and recorded one of us clicking through each of our representative tasks. One of us was the cameraman, one was the actor and the other the computer. The computer was responsible for keeping the state of the system up to date as the task was completed. This was done primarily with post it notes to overlay update information onto the base paper prototypes. The actor was also responsible for controlling our advanced paper scroll technology. The video was taken in three takes, once per task and supplemented after with one additional take when inconsistencies in the process were noticed. The footage was edited in iMovie, this was chosen due to the platform being incredibly simple for quick cutting and editing while also allowing for more power if needed. Once complete it became clear that the simple editing was sufficient.

i. How the tools helped

The paper prototype helped to be able to quickly change and tweak the prototypes. Some errors that were noticed during user testing were easily fixable on the fly. This helped to move the process forward at a much faster pace. Creating alternatives and having discussions within the group and with potential users was simple. One user took our prototype and crossed out almost everything on it, replacing it with his version. This turned out to be incredibly valuable feedback that would have been impossible to get in any other manner.
The video process helped show inconsistencies in the copy text or defaults that might have been confusing users, and certainly caught us as a group while developing it. Fortunately a quick post it note here or there, these were all fixed. The video prototype is also the first time anyone was able to see the system without any lag between the screens. While this did not reveal any glaring issues, for working so long on a laggy prototype it was very rewarding to see.

ii. How the tools didn't help

Some interactions are impossible to emulate with paper prototypes. Check boxes and form fields are easy. Sliders are hard. In order for sliders to really be useful they must update the surrounding information in real time. With a human computer adjusting things this just cannot be done.

Task 1 relied heavily on a user flowing through a wizard. With the “speed” of our “computer” being so incredibly slow it is impossible to gauge if information was presented to fast or too slow. Any sort of pacing decisions cannot be made with this technology. Using the video helped to finally see what the pacing would be in a final project but because it is done by a trained user with specific goals it does not help to learn how a new user would react to the strength, style, and speed of questions.

c) What was left out and why

Only a couple of features were not used or shown during the video prototyping process. One of these occurs during task 2. When shown the list of possible rides, they all originate from the users current location. There is a feature to be able to change the origination point incase the user is planning ahead but is not at the origin point quite yet. This was part of the user tests but during the tests the users had trouble remembering where they were versus where they were trying to go versus where they were in the test. For simplicity this was left out of the video although it is also one of the changes from the original prototype to the video. For a reference sketch please see section 7.4.

A major feature of the system that has never been part of any designs but would be critical to a production system is the user login and profile flows. These were left out on purpose as they solve a complete separate problem space. We claim that an interface focused on ad hoc ride sharing is dependant on a strong user profile system but that a profile system is independent of any ridesharing implementation decisions. Therefore, for reasons of scope and focus the entire project has run simply assuming all users were logged in and had already filled out strong user profiles. Users had no issue with this during testing and that validated our claim that these are two separate systems.
9. Summary discussion of project and lessons learned

This section starts with the discussion of learnings specific to users of a potential software implementation of the Catch-A-Ride application. After those points, this discussion broadens to our newly learned understanding of how the paper prototype technique and iterative design process serve more general purpose usages than just the application that we investigated. Finally, we wrap up by identifying some areas where this project’s process left uncovered issues that might impact a real implementation.

Specific to potential Catch-A-Ride users, we learned several themes relevant to designing this type of application. First, users show clear segmentation into advance planners and last minute schedulers. Planners are the users that prefer to finalize their transit arrangements more than a day in advance. These planners will research multiple options and might wait until the ideal rideshare appears in the system. The other segment of users, last minute schedulers, realize just an hour or two before the trip that offering a rideshare might save on fuel costs or reduce boredom during the trip given the addition of a traveling companion. One common theme with both of these user types is the challenge that current location and overall geography present with testing an application like Catch-A-Ride. The universal confusion about where tasks occurred combined with the user’s current real-world location presents one of the trickiest parts of testing a paper prototype of Catch-A-Ride.

Outside of our specific application, we learned a few key points from the paper prototype process. First, the prototypes were surprisingly effective tools to get participants motivated to draw on the design and suggest other improvements. Participants did feel enabled to change the interface, which might not be true with software mockups. Second, the process helped scope our end project. Specifically, we started by attempting to work on an application for vanpools, employee carpools, and craigslist-style rideshares. After our interviews and design iterations, our final project focuses solely on craigslist-style rideshares. Finally, our initial and final reports included a total of 6 interviews. Each interview gave us actionable feedback and it’s reasonable to assume that at least one more iteration of the paper prototype process would be productive by generating a couple more areas to improve in the design. Overall, we found the paper prototype process to be a useful tool applicable to other projects.

Finally, we did identify some areas that this paper prototype process didn’t help us uncover in the Catch-A-Ride application. First, assuming we had a software implementation, we may have feedback about a sluggish UI, app crashes, or similar issues that cause users legitimate frustration. Second, with our focus on making it easier for a human to use the application, we effectively ignored the human-to-human aspects of our rideshare system. Specifically, without a payments implementation and real-world user generated reviews of other users in the system, we have a huge risk that the social aspects of this project just wouldn’t work. The app might be easy to use, but real people might not like the softer social aspects of the system. Finally, we have a concern that users might have fundamental interaction differences between a paper
prototype and a software implementation. Power users might be less likely to explore advanced features of the paper prototype due to the prototype’s inherently slower nature. New users presented with a specific task during an interview might end up behaving differently than during an unsupervised new install of the application. Overall, we do see value in developing a software mock-up very early in this design iteration and prototype process, although the specific timing of switching from paper to software could be highly dependant on the project.
10. Appendices (as many pages as necessary, include references in the main text to the appendices)

a) All forms handed out to participants
b) Raw data

- Joe
  - T1

  - Drive. Use current location. 506. Next.
  - Back.
  - Why show current for where you are going?
Writes Home address.
  ● “What if I don’t want to give address?”
  ● City Neighborhood
Yes.
Uses current loc (Doesn’t see current location was a button.)
Next. Yes.
Next on car select.
  ● Wants miles, est time. Likes these as much or more than a map.
  ● Thinks confirmation is redundant.
Next.
  ● Order should be where. when, then pick car.
Next.
  ● Likes confirmation.
  ● Fit of map odd.
  ● Calc gas needed.
Title: Portland to Seattle
Comments: 2 spots available.
Allows pes. Wants to give more info.
Drop down. Not unlimited, large, many bags. Next.
  ● Additional side trips.
  ● Additional stops
Post.
  ● Identify as yourself on home screen.
  ● How other people see you.

○ T2
  ■ Ride. - Ride Request?
  ■ Not where are you? Where are you going?
  ■ Clicks Seattle. Oh...filter button? “Put at top.”
  ■ Don’t even like filter.
    ● Should I ask the bellingham location.
  ■ Enters portland address. Many bags.
    ● S____ filters -> Find ride. Call to action.
  ■ Now clicks seattle.
  ■ Confirm vs Request Ride
    ● Does he even like/agree with me?
    ■ Providing paths.

○ T3
  ■ Should know where I am. Prompt “have you reached?”
    ● Clicks his ride.
  ■ Trip summary.
  ■ Comment should wait till trip is done.
  ■ “Is this what happened?”
  ■ End trip.
- Would like to see more profile or history.
  - Experience
    - Never offered to groups.
    - Organic carpools.
    - Usually to help a friend of a friend.
    - Gas, more interesting.
    - Age range and gender are important.

- Traci
  - T1
    - Press Drive
    - Clicks address and types in.
    - Yes
    - Types portland address.
    - Quickly yes, yes, yes.
    - Toggles _____
    - Yes.
    - Clicks drop down
    - 2 bags
    - Allows pets. Types “two people” into text box. Post now. “Ok”
  - T2
      - “Maybe the can drop me off?” Eugene.
    - Fill out address but they might not be able to pick up.
    - I don’t like any of them.
    - Back. Done.
    - “Not waiting a week for a ride"
    - Not clear these are to a location.
  - T3
    - Clicks ride.
    - Clicks driver text. Clicks both stats.
    - Fils out comments.
    - No save.
    - End trip.
    - Done.

- Experience
  - No car
  - No craigslist
  - Car2go, Registered zipcar but never user.
  - Noticed ratings
    - Comments? No comment in profile.
    - More info?
  - Like mpg.
  - Why no bike rack drop down.
Extras

- Task somewhat confusing.
- Who is driving, why am I not driving, where am I?
- Need to use my address

Max

- T1
  - What's STP?
  - Home page - read the Task again
    - Is it Portland to Seattle vs Seattle to Portland?
  - Click upcoming
    - Wasn't sure it's a button.
  - Drive - what does it mean? If I'm going to drive?
  - Clicks Drive (not sure what it would do)
  - Uses address immediately (vs clicking on current location). Suggestion - "Use icons instead of words"
  - Interactive maps wanted. T1 #3
  - From field of the wizard- presses current location
  - Leaving from - home came up, was confusing
  - "While I pick a car, can I specify how many spare seats there are?
  - Today's date on the time pickers was confusing but I changed date sliders (for time) was easy.
  - What was the reason the MPG was shown? Does it know how much $ to ask for? On trip - maybe the app should put in how many miles the trip is.
  - "Free car pool" - In the detailed section, wasn't sure if I should put town to info in the comments section. Wasn't sure if he should put all details like on craigslist.
  - Summary page should have the comments section which is confusing! Pls fix.

- T2
  - Ride button. Check.
  - Missed the "nearby rides from Seattle" initially.
  - This page really confused to user.
  - Hot do I get to date?
    - Hits filter to check for date.
  - Types Monaco address
  - Didn’t put date (but forgot that's what was needed)
  - Not the list is from portland
  - This is scrollable - need to put scrollbar
  - 24th clicks buttons (though wants to travel on the 23rd)
  - Hits confirm
  - Where the confirmed phrase “Riding to Seattle.”

- T3
  - Understands to select ride.
- Driver and car rating were good - maybe one for general atmosphere
- Comments put comment here
- End trip right?

- Experience
  - Only option to Craigslist - su_e.
  - I have offered rides before - no one has taken it, email to people at work, or at school.
  - Sharing $ for the trip
  - Trust factors - same office (school). Not strangers.