Describe Study

Pilot Test & Improvements

We obtained simple, but valuable feedback from conducting a pilot run of our evaluation process. The pilot participant had a harder time understanding what the app and tasks were than navigating the UI. This is because they were rushed to begin tasks with very little context. The improvements were to provide more context about the app and its purpose, create short stories introducing each task, and explain tasks more precisely. This yields better data as real world users would already have all this contextual information from downloading the app.

Participants

The participants we surveyed were labeled P1 through P6. Although the total number of possible participants was limiting, we tried to get an accurate makeup of our potential user base. Within this, each user was intended to represent one type of a typical user.

Methods Used

With each participant, we began by giving some context about the app and creating stories about each task to be completed. This ethnographic portion of the research is comprised of the following tasks:

1. Use hourly-based parking
2. Subscribe to lease-based parking
3. Create a listing

Participants were asked to complete each task with as little guidance as possible. Our evaluation method is mostly qualitative as explained in the evaluation plan. However, we wanted to include quantitative information to support the analysis. Therefore, we recorded benchmarks during our ethnographic research:

- Time for participants to complete each task
- Error committed by participants while completing each task

The ethnographic portion was followed by interview questions directly related to the participant's experience with our app. The interview questions were as follows:

1. What were your thoughts on the overall design of the prototype?
2. Did anything strike you as particularly confusing, and why?
3. (If the user made an error) Why do you believe you made this error, and did you find the error straightforward to correct?
4. Based on your experience with the prototype, would you be inclined to use the finished product? Why or why not?

5. Do you have any other questions or concerns regarding the design and concepts outlined in the prototype?

Data Sources

We created a spreadsheet to help us record data from each evaluation. It contains tables to write task times and error counts per participant. These represent our quantitative data.

For our qualitative data, the spreadsheet has a section to record interview questions and most relevant takeaways from each interview. This helped us gather qualitative data easily and efficiently. For our own use, we also created audio recordings of each evaluation.

Figure 1 below shows the evaluation setup of Participant 5 completing **Task 2**.

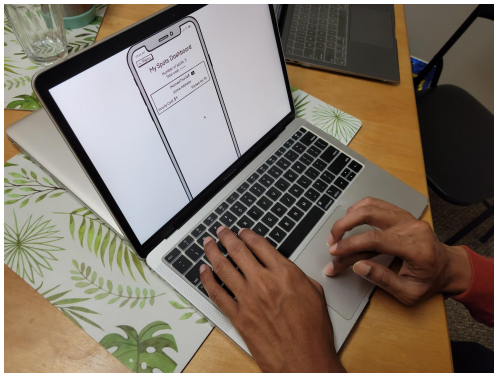


Figure 1: Participant 5 completing **Task 2** after subscribing to a lease-based parking in the Parking Dashboard.

Analysis Process

Our analysis consisted of two main parts. First, we have our quantitative data. This encompassed the direct measurements, namely the number of errors made per task and the time taken per task. While this was informative, it merely complemented the more significant qualitative data. This covered everything performed in the ethnographic research, and everything said in the interviews. This had a huge amount of data, with participants saying a wide variety of issues and opinions. From this, we had to focus on issues repeated from several participants. This showed a trend, and would likely repeat among a user base far greater than our participant pool.

Results

Figure 1: Time per task for each participant

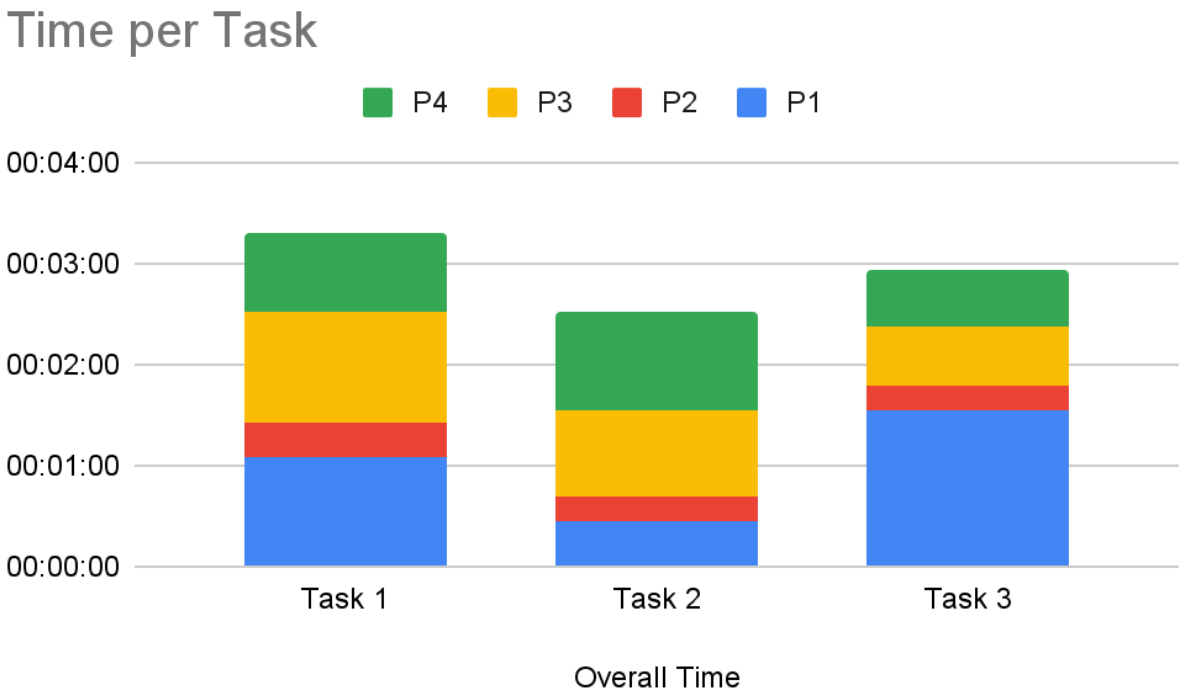
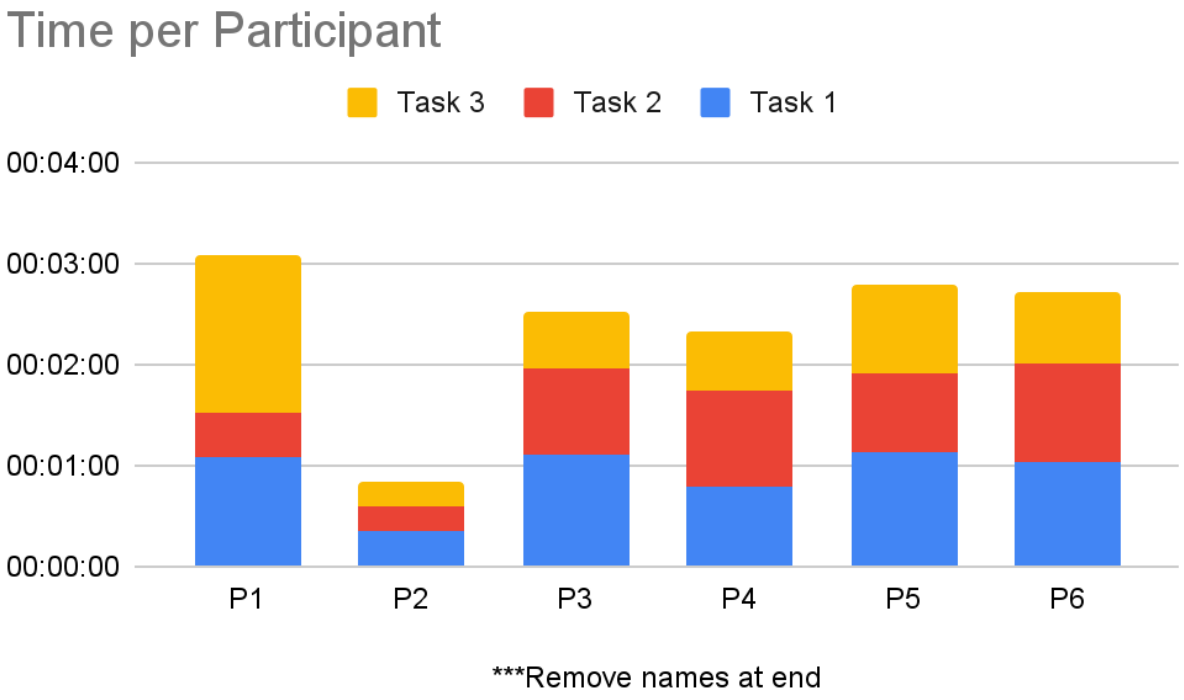


Figure 2: Time participant for each task



Our study consisted of a combination of qualitative and quantitative data results. The quantitative data can be fully illustrated in the graphs shown in figure 1 and 2. The qualitative data gathered from both ethnographic observation and interview questions is as follows.

One participant, Participant 4, expressed confusion regarding the difference between leased-based parking and hourly-based parking. The confusion directly impacted their ability to complete task 1 and 2. Participant 1 and 5 encountered difficulties while trying to create a listing. Participant 1 mentioned a lack of enjoyment in the listing creation process, while participant 5 also experienced confusion during task 3.

Participants also raised concerns related to the map and main menu of the prototype. Some participants found the main menu to be visually appealing but felt it lacked clear directions and immediate access to desired functionalities. Participant 1 expressed dissatisfaction with the current emphasis on the map in the layout and proposed relocating the “create listing” option to the homeowner dashboard. Participant 3 encountered confusion during Task 1, as they expected to find parking listings directly on the map, which caused difficultly in understanding the Task 1. Participant 4 also raised concerns about the potential confusion between the lease duration and the listing’s creation date.

Despite these usability issues, the overall concept of the app received a mixed reception from participants. Participant 2 and 5, appreciated the parking concept, particularly in terms of saving money and simplifying daily activities such as finding available parking spaces. They also expressed interest in leasing out their parking spots for additional income. However, other participants mentioned that the app did not align with their needs as they did not encounter parking issues in their daily lives or had access to free parking. Concerns regarding the legitimacy and safety of parking spots and potential fraudulent activities were also raised by participants, indicating a need for enhanced security measures and user trust-building strategies. Participant 5 found the overall design of the app to be simple and straightforward, with some initial confusion during Task 1. Participant 6 appreciated the app's simplicity and intuitiveness, emphasizing the usefulness of the rating system and suggesting the inclusion of a "My Profile" section for enhanced user experience.

Discussion

Our data was rich with information, and thus allowed us to draw many conclusions. While we cannot be certain our assumptions are correct, they do allow us to uncover potential issues. We also have learned what participants are responding positively to features and concepts, and should be well preserved in the final product. To complement the analysis we included graphs to illustrate a few quantitative data points. This can be viewed in the two graphs given above. Time per task is given in figure 1**.** This illustrates the total time taken to complete from our 6 participants added together. This is intended to give the reader an idea of which tasks took longer than others. Our second graph shown above, labeled figure 2**,** illustrates the total time taken per participant. This is the total each participant took to complete all three tasks. This is intended to give the reader an idea of the variability of the time taken depending on the participant.

Firstly, we can see a clear general issue with the perception of the main menu. While participants thought the menu was straightforward and clean, it did not immediately direct users to where they were expected to go. In more depth, it is clear the map and unused whitespace takes up too much of the menu view. A good solution to this would be to have all menu buttons on the top or bottom of the screen at all times. As there is nothing cluttering up the menu currently, there is no need to hide core functionality behind a single button. Furthermore, the user location arrow should be deemphasized, as it has no functionality other than showing user location. This could be accomplished through changing the color to a duller color, and shrinking the size. All of these factors likely contributed to the higher overall time taken from task 1 from task 2, as they are otherwise somewhat similarly time consuming tasks. This would be because after the first task, the participant would have learned where functionality is.

Secondly, we see a pattern of participants being confused about the application's listing system; Participants were confused about aspects of leased based parking, hourly parking, and their differences. We did not emphasize any difference between the two, and thus participants were confused about the distinction. We should have these two types in two separate menus, or the concept itself should be changed. For the latter, this could mean short term parking would simply become leasing a parking space for a short period of time, and long term parking would be leasing of the same parking space for a longer period of time. The application could have the option to "auto-renew" short term parking to provide longer term parking. If homeowners originally wished to only have hourly or leased based parking, they could simply set a minimum or maximum time for lease periods that suited them, while still allowing drivers to choose precisely how long they intend to stay within those bounds. To offer equivalent pricing, there could be a 'bulk purchasing' feature, where two days would be lower in cost per hour than a single hour. Participants were also confused more generally with our listing system, particularly with how to create a listing. This would likely be confusing to many, as it is in a separate menu from viewing listings. A clearer way to create a listing and charging system must be used.

Regarding the overall concept of our application, we received mostly positive, but a surprisingly large portion of negative feedback. This was unexpected, as we were anticipating an almost

universal positive response to a low cost parking alternative. Most participants said they liked the concept and would use the application. The reasons given were typically regarding saving money, along with making certain activities easier, as you could see available parking in advance. Participants also said they liked the concept of leasing out parking as a way to earn money. As for the negative reviews, some said they have never had issues with parking, and thus had no desire to use the app. This was either because their simply did not use their car often, or already had access to free parking. For example, if a user only uses their car for grocery shopping our app would serve no purpose. There were also concerns about the legitimacy of the parking spots and the app in general, even with theoretical security features and utilizing government-provided verification systems. People were still concerned that spots could be unsafe or entirely fraudulent. A loose correlation appeared; where participants who spent more time using their vehicle, were more interested in the application. It is clear our application concept doesn't appeal to certain demographics, which would be important from an advertising and design standpoint. However, due to the prevalence of vehicles, the small sample size of this study, and we would carefully assume that there is a market for this product. Larger tests should be conducted to verify this claim.

Study Limitations and Reflections

We have learned that, as with any small sample size, the potential for entropy due to the unpredictableness of human interactions and opinions is great. While all participants had interesting ideas, some of which have been included in the final results, other participants would say precisely the opposite. Thus the analysis portion was difficult; participants varied dramatically in their responses, making any trend either unclear or with very low correlation. These contradictory statistics would likely be reduced with a much larger sample size, and many more studies.

Additionally, we did not take into account the large divide between demographics. We expected the effect on our data of those who had cars and those who did not, and those who owned houses and those who did not. We did not, however, expect those who owned vehicles, and used them often, to not have interest in the application, and to have generally negative perceptions of this application. While this isn't truly a study limitation, these expected limitations were taken into consideration while designing the application, and thus affected our overall study.