

ParkCare

“A Safety-Focused Parking App”

Final Case Study

DSCI 556, Group 2

Alain Tamazian; Dhruvil Trivedi; Saumya Shah; Tirth Patel

14th Dec 2022

Table of Contents

Introduction	2
Problem Statement	2
Value Proposition	2
Research	3
Customer Discovery	3
Customer Validation	6
Competitive Research & Analysis	7
Feature Definition & Prioritization	11
Designing Key Experiences	12
Design Iterations	17
Prototype Development	17
User Research Study	22
Interactive Prototype	27
Business Model Canvas & Lean Canvas	35
Reflections, Recommendations & Next Steps	36

Introduction

ParkCare is a safety-focused parking app, which is currently under development – having just completed an MVP. From August 2022 onwards, we conceptualized this idea by studying and researching our target customers and competitors. This case study covers all current and future work on ParkCare, starting with its inception and navigating up to recommendations for taking ParkCare to the next level. It is a social business, with the goal of improving the safety conditions related to parking in the United States.

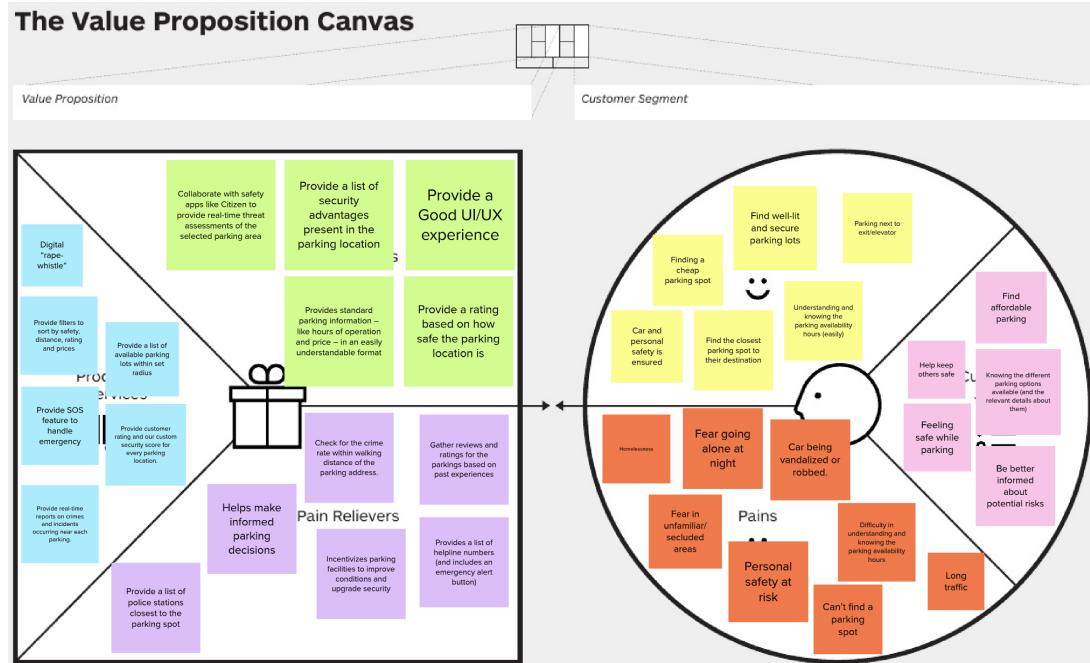
Problem Statement

Unknowingly or out of necessity, U.S. drivers expose themselves to significant safety risks from violent crime — which often occur in locations like parking garages and lots.

The FBI recently found that approximately one third of violent crime in the U.S. occurs in parking facilities. This concerning statistic doesn't even account for the crimes related to street parking or that occur when drivers are walking to or from their car. So, many drivers in the U.S. are concerned about their safety in parking locations. It is essential to be informed about the risks associated with parking and be prepared. With this objective in mind, we came up with a solution that meets our customer's parking and safety needs, in one single app.

Value Proposition

“ParkCare” is a safety-focused parking app, which – aside from offering standard functionalities – helps keep U.S. drivers secure and informed about the specific, safety conditions of parking locations, by providing a custom safety score, safety-focused user reviews, real-time crime alerts, and more.

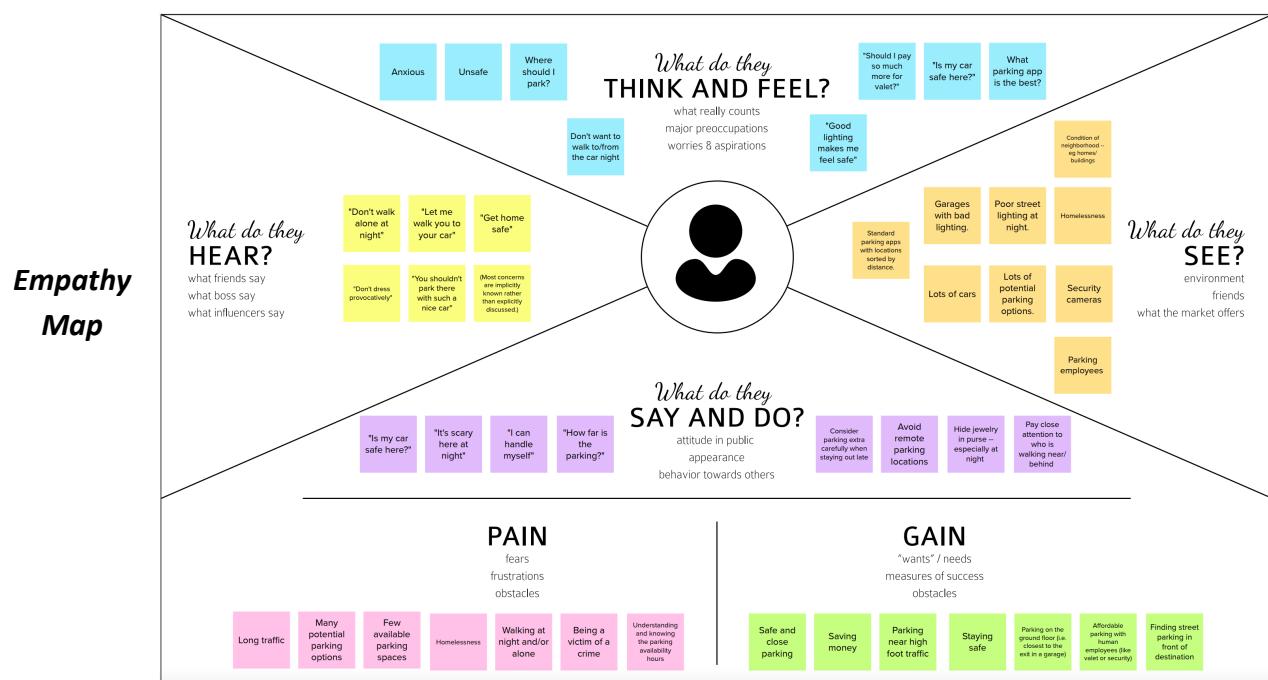


Research

As our first step towards approaching this problem, we concentrated on thoroughly understanding our target customer base and our competitor market. The following sections summarize customer discovery, validation, competitive market research, and analysis.

Customer Discovery

The chart shown below is an empathy map of our target customer – drivers in the US. We knew that women are more likely to be targets of violent crime; so demographically, women will likely make up a larger portion of our (active) user base. Despite considering this, we did not exclude male drivers since they can also be risk-averse and should stay vigilant despite the relatively lower threat to them. The Empathy map represents a group of users/ target customers and is used to gain deeper insights into them. Using this approach, we learned that our customers prioritize safety as the most important factor while parking. They especially feel anxious and unsafe while parking in secluded places or under poor street lighting at night. There is also an implicit association of homelessness with crime. They are often worried if their vehicle is safe at the parking location, while some even hide their valuables to be extra cautious. Our approach concentrated on helping our users find the best parking spot for them while foremost considering its safety and then other aspects like proximity to the destination location, and price, and availability. By understanding how our customers think and feel, we planned to arm them with information about their parking options so that they can make better/safer choices. An important realization we made through the Empathy Map is that “Most concerns are implicitly known rather than explicitly discussed”. So, we knew that the future interview steps would be very important to put words to our users’ thoughts.



We further narrowed down our customer target group and created a primary and secondary persona, for a detailed study. Directly below is our primary user persona: an extroverted female student, who is socially active but often worries about their vehicle and personal safety while parking alone. This often poses an unpleasant consideration while meeting her social (and other) obligations, which require driving.

Primary User Persona

Name & sketch

Give them a name and a portrait to empathize with your persona.



Erica the Extrovert

Behaviors & actions

What sort of tasks do they need to accomplish their desires?

Goes clubbing	Enjoying eating out	Cautious
Planning ahead	Trusts ratings/reviews	Likes to go shopping



Female, 16+	Risk averse	Commuting independently	Student/ Fulltime employee	Avoid parking in unfamiliar/secluded areas	Find well lit and safe parking lots	Parking lots with security (i.e. cameras) installed	Homelessness
Extrovert/Socially Active	Middle-Upper Class	Drivers Daily/Often	Single	Fear going alone at night	Finding (street) parking in front of destination	Parking near high foot traffic	Parking with human employees (like valet or security)
Understanding and knowing the parking availability hours							

Demographic & psychographic details

Write down information about the person your product or service is solving a problem for.

Needs & pain points

What worries them?
What gets in their way?
What do they need?

The secondary user persona is of a family man from a lower-middle-class background. This persona also must frequently use public parking. While they do care about safety (especially when their family is with them), their number one priority is cheap prices.

Secondary User Persona

Name & sketch

Give them a name and a portrait to empathize with your persona.



Frank the Family Man

Behaviors & actions

What sort of tasks do they need to accomplish their desires?

Goes to sports bars

Working late hours

Does Family Trips/Activities

Planning ahead

Prefers cheaper alternatives

Protects his family

Male, 35+

Not tech-savvy

Extrovert/Socially Active

Family Man

Chef

Lower-Middle Class

Drivers Daily/Often

Look for cheaper parking spots

Parking lots with some security installed (eg CCTV)

Find closest parking spot

Many potential parking options

Car and Personal Safety

Car being vandalized or robbed.

Finding (street) parking in front of destination

Few available parking spaces

Understanding and knowing the parking availability hours

Demographic & psychographic details

Write down information about the person your product or service is solving a problem for.

Needs & pain points

What worries them?
What gets in their way?
What do they need?

We defined our customer segment and identified its biggest problem. Following this, the initial value proposition was drafted using the provisional personas and problem statement. Using this draft, we can precisely define customer profiles and visualize the value we create to achieve the best Product-Market fit.

Customer Validation

To validate our customer discovery, we wrote several of key, probing questions and conducted interviews with 4 individuals matching our user persona profiles. To access the entire list of screener questions and interview questions refer to the following link:

https://docs.google.com/document/d/1JN2EuiyrQiWBDa7ruq42VDKbxBwnf2tVg_wBfTXZ65A/edit?usp=share_link

This interview helped us in collecting some meaningful insights as shown below. All the female customer discovery interviews validated our customer group. They prioritize safety while parking over anything else. They expressed concern and interest regarding this parking safety problem. The caveat here is that they either didn't know about the existence of parking apps or didn't use them.

However, no current parking app offers a solution to these safety concerns – like we hope to do. Whether it is their primary concern or not, all of the interviewees take safety into account when parking and keep an eye out for safety-related characteristics of the location – like security, lighting, and criminal elements.

Customer Validation Interviews: Findings

			
Divyam K. Male / 24 Student; loves going outdoors on weekends	Sheryl N. Female / 64 Retired Chef; loves going places with family	Armine G. Female / 47 Clinical Documentation Specialist; extrovert who enjoys outdoor activities as well as nightlife	Jennifer F. Female / 40 Works at USC and is a Graduate Student at USC; goes out occasionally to concerts/ shows/ movies/ etc
<i>Despite certain concerns regarding parking security, prioritizes finding a cheaper parking spot over safety.</i>	<i>From personal experience, is relatively knowledgeable about the risks associated with parking; thus, prefers safety (over anything) when parking.</i>	<i>Values safety when parking, which for her is largely based on neighborhood familiarity.</i>	<i>Values safety but is confident in taking care of herself in unfamiliar surroundings.</i>

Insights

- All participants insisted on proper lighting and security camera installation in an ideal parking structure.
- All participants have experienced an "unsafe" situation related to parking; they agree there is a problem at hand and see the benefits of an app addressing this.
- Surprisingly, most of the interviewees haven't previously used parking apps – many didn't even know parking apps exist. The matter of awareness – whether regarding the significance of parking safety or the existence of parking apps – is something that will need to be strongly considered and addressed.
 - However, it may be beyond our scope, as it is more of a marketing concern rather than a UI/UX. Nonetheless, it's important to note our customer group's level of familiarity with this problem and parking apps in general.

Competitive Research & Analysis

We conducted competitive research analysis to understand which existing apps in the market are our biggest competitors in terms of addressing the same problem or having a similar value proposition. We consolidated 12 apps and websites that help customers either find a parking location or security-based apps that provide location-based safety information. These were bifurcated into main competitors versus indirect competitors. For every company, we derived a SWOT analysis based on several factors, such as revenue streams, market evaluation, product usability etc. Below is a summary of the SWOT analysis of our top 5 competitors.

Competitor	SWOT Analysis
Citizen	<p>Strengths:</p> <ul style="list-style-type: none">- Brand recognition- Product Features: Only we provide location-based safety news (including livestreams) about real-time crime and other incidents — as well as 24/7 access to our remote safety experts. There is a strong demand for this, and user engagement is favorable.- Blue Ocean: No direct competitors (in terms of the service being provided)- High Quality UI/UX- User Network: large and active user base (which contributes UGC)- Strong funding <p>Weaknesses:</p> <ul style="list-style-type: none">- Employee Qualification: Job qualifications of the Citizen Protect “safety experts” are minimal — mainly customer service.- Profitability: The only current revenue stream is the new “Citizen Protect” service, which does not have many subscribers yet.<ul style="list-style-type: none">- Caveat: though this is meant to be from Citizen’s perspective, our actual knowledge about their internal finances is limited. So they might actually be profitable.- Dark Patterns: There are user complaints that the current UX has dark patterns with regard to the premium subscription. The quick set-up process for a user to register for the paid service can be seen as dishonest. <p>Opportunities:</p> <ul style="list-style-type: none">- New User Segment: currently using their established network and user base to expand into private security and disaster preparedness.- Expanding to more cities.- Establishing relationships with first responder and law enforcement agencies; for example — although there is currently no formal relationship with Citizen — N.Y. firefighters are required to have the app downloaded since 2019. <p>Threats:</p> <ul style="list-style-type: none">- Controversy: Although to a lesser extent than before our rebranding, “Citizen” still faces controversy with some people believing the app inspires/facilitates profiling and vigilante justice.
Premium Parking	<p>Strengths:</p> <ul style="list-style-type: none">- The design is very easy and intuitive for the user- It can be expanded to global scale easily- The concept of introducing a STAR space which is the ideal location in any parking structure is a major attraction point.- The app provides information on other locations and destination categories and not just

	<p>parking.</p> <ul style="list-style-type: none"> - An interesting feature is that the information provided to the user is quite extensive about the hours and pay rates individually for different hours. <p>Weakness:</p> <ul style="list-style-type: none"> - The data about different locations and destinations does not look completely up to date or real time. - It provides information on multiple locations with similar names while searching which takes efforts from user side to locate the exact place that the person is looking for. This searching is not as minimalistic as expected to be. <p>Opportunities:</p> <ul style="list-style-type: none"> - The amount of extensive information that the app can provide is a very strong point that the majority of apps don't provide to keep their app as easy to use as possible. However, this app has found a way to provide more information but keep the focus on the smallest segment at the same time by having a great UI. This can potentially help a wide variety of users expecting different types of information. - The STAR position information is one of the biggest key features that is very less likely to be found by any other app. The concept of using heuristics and other metrics to rate a physical location has been used flawlessly here and can be scaled to gain more profits. <p>Threats:</p> <ul style="list-style-type: none"> - Since the problem with the UI is that the searching and initial navigation by the user is a bit tricky part, the majority of other competitors not having this issue might have an upper hand in holding the user for a longer time. It is like the first impression and experience makes it extremely important even though the later content may or may not be up to the mark.
Noonlight	<p>Strengths:</p> <ul style="list-style-type: none"> - Product features: Our app provides numerous useful safety features which there is a demand for a silent panic button to contact emergency services (with relevant user info), camera monitoring, creating a safety network, and cloud-stored timeline/notes. User feedback has generally been very positive. - Simplicity: UI/UX is minimalistic with a pleasant aesthetic — while maintaining great efficiency. - Beneficial Relationships: Integration with other apps and services relevant to safety like Tinder, TASER Pulse+, Apple Watch, Uber, and Lyft. <p>Weaknesses:</p> <ul style="list-style-type: none"> - Underserved user segment: Android version doesn't have all the features the IOS app does. - Limited Scope: Our personal safety app's emergency response features do not work outside of the United States today. <p>Opportunities:</p> <ul style="list-style-type: none"> - Make sure Android version is no longer underdeveloped - Expanding globally - New user segment (by adding features): Right now, we provide a useful service as a personal energy response device, but which only helps our users only after the unsafe situation occurs. It would be valuable to provide a more preemptive feature to help prevent the unsafe situation. There is an API called Walk Score which gives a safety score for a chosen walking route — based on past crime and other considerations. Whether by integrating with this API or creating our own algorithm, we can help navigate our user down the safest path. Although this would be a big undertaking, it is also a big opportunity. This would also help us attract a new user segment. <p>Threats:</p> <ul style="list-style-type: none"> - Direct Competitor: bSafe is a direct competitor with a very similar value proposition and

	key features provided. Despite having less users than us, their app has seen a 320% monthly download growth.
Google Maps	<p>Strengths:</p> <ul style="list-style-type: none"> - Brand Recognition - Industry Leader - Technology: access to advanced, superior technology (e.g. provides 3D, satellite, and street view) - Default: It is pre-installed on most Androids - Google: Being integrated with our parent company ("Google") gives us access to an incredible amount of resources and data. - UI/UX: Well developed UI, which despite its many features and high level of detail, maintains a smooth user experience. <p>Weaknesses:</p> <ul style="list-style-type: none"> - Not well developed in certain areas/countries (e.g. missing or wrong information) - ETA times are inaccurate. - Traffic prediction and consideration is poor in the navigation algorithm. <p>Opportunities:</p> <ul style="list-style-type: none"> - Taking better advantage of user generated data (e.g. for traffic). - Note: Google also owns Waze which actually does make great use of UGC. So, technically Google Maps could have access to it. It must be deliberate, executive decision — such as to continue differentiating between the two brands (Google Maps and Waze). <p>Threats:</p> <ul style="list-style-type: none"> - Apple Maps is our biggest direct competitor with many of same advantages. Conversely to us, it is the default for all IOS systems. We need more to set us apart from them, than just slightly better UX. - Note: Not sure if we can consider Waze a competitor/threat; although it is technically a different brand and product, it is owned by the same parent company ("Google"). If we do, then Waze is indeed a threat as it thrives in Google Maps's weaknesses.
City Protect	<p>Strengths:</p> <ul style="list-style-type: none"> - Provides agency-based crime data on a map which is downloadable - Sign up option to receive incident updates in an area - List of police departments sorted by distance - Citizens can submit a tip for an incident to the specific agency - Multiple filters provided on the incidents to look for a specific one like "car theft" <p>Weakness:</p> <ul style="list-style-type: none"> - Buggy transition while checking out incidents on the map - UI is not uniform for different search locations - Agency information is not consistent; some agencies have very informative pages while others have nothing - The app is only web based and not as a mobile app <p>Opportunities:</p> <ul style="list-style-type: none"> - Popularize the app among citizen to update more real time incidents - Improve on UI transitions and keep agency information consistent and up to date - Release as a mobile app so that its more convenient to use <p>Threats:</p> <ul style="list-style-type: none"> - Apps like Citizen that provide a more real time update about incidents - Authority over agencies to reveal incidents in an area or keep it up to date

For a detailed view, visit:

<https://docs.google.com/spreadsheets/d/1rSmEOnFdMQkulGHvrdrOiCFZayOemES/edit#gid=1300602418>

Next, we analyzed these competitors from a customer's perspective by going through the app features thoroughly. The current market provides apps that cater to either the issues of parking or safety – not both. Apps like Parkopedia and Parking[dot]com provide real-time updates on parking availability. Alternatively, apps like Google Maps whose primary functionality is not parking but do provide those features are also one of the most widely used aspects of it. As far as safety is concerned, apps like Citizen and Noonlight provide a great means for a user to be safe and resourceful in times of danger.

For every competitor, we prepared a feature-wise pros and cons list to better understand how the key features in our app can be implemented. Below is a summary for the same.

Competitor	Value Proposition	Pros	Cons
Parkopedia, <u>Premium Parking</u> , Parking[dot]com, SpotHero	One stop solution for all your parking needs relating to availability and reservation of spots	- Real-time update on all available parking spaces - Extensive information on rates - STAR space reservation to get best spot in the locality	- No information on safety of the location - Limited to only a few specific structural parking and not all forms of parking
Citizen	Citizen is a personal safety network that provides access to real-time 911 alerts, instant help from crisis responders, and safety tracking for friends and families.	- High Quality UI/UX - Real-time incident updates via notification	- As compared to our value proposition, the safety aspects covered are too broad
<u>Noonlight</u> , bsafe	Lets the user create a safety network from their friends/family and also crucially acts as a personal emergency response device.	- High Quality and Simple UI/UX - Silent panic button, camera monitoring	- As compared to our value proposition, which is preemptive, the safety aspects focuses on helping an individual after an unsafe situation occurs. - Android vs iOS discrepancies
<u>Google Maps</u> , HERE WeGo	Provide one stop solution to all navigation related needs.	- Most effective UX/UI - One-stop solution for complete location information - Brand identity and	- Safety metrics aren't a part of the services - Does not provide information on availability of spaces

		industry leader - Access to advanced, superior tech (e.g. provides 3D and satellite view street view)	for parking
CityProtect	Find your agency. Explore the crime data on the map. Help solve crimes and build a safer, stronger community.	- Obtain a list of agencies and incidents in a location - Map-based incident display - Incidents can be filtered as per user needs	- UI transitions are not smooth - Only web-based not app-based

For a detailed view, visit:

https://docs.google.com/presentation/d/10ZP2pNx5TAn5CnNAe90p8DBI4wMolRwzn3UIZFhw_lw/edit#slide=id.p

Current Marketplace Analysis

Among apps like Citizen and Noonlight, which address users' safety concerns, there is very little competition since they are offering rather unique solutions to safety. Also, apps like CityProtect are too broad and refined to be practically helpful, while Noonlight/bsafe (unlike Parcare) are not preemptive. The competitive landscape for standard parking apps is very saturated; it is a red ocean.

Furthermore, a significant portion of potential users opt for using general-purpose navigation apps like Google Maps, instead. Regardless of this, we believe the competitive landscape for "Parcare" – to service safety-conscious U.S. drivers – is (mostly) a blue ocean. The problem with the parking app is that they provide almost no differentiation. Although we are technically a parking app, at our core, our mission – our value proposition – is one of providing safety.

Overall, our main competitive threats are Google Maps and Citizen (if we did not plan to collaborate with Citizen); Google Maps currently best meets our potential customers' parking needs, while Citizen meets their safety needs. However, neither – even remotely – address both. While they are both incredible apps, in terms of our value proposition, they are both very lacking. That is their major drawback.

Feature Definition & Prioritization

For our app to have a competitive advantage we worked on identifying the key features that will best address the parking safety problem. These key features were defined to set our product apart from all others. The below three features were identified as the most suitable intersection of desirability, viability, and feasibility:

Safety metric:

- We will create a custom algorithm that considers parking type, presence of security (or other human employees), lighting, location remoteness, and weighted history of crime within a 0.5 mile radius of the parking location. This score will be dynamic and also adjusted to take into account crimes that are currently (or recently) occurring.
- The overall safety score will be one of the first things the user sees when searching for parking; possibly next to price. They can also filter based on this. After they select a certain parking location for further view, there will be an option to click an information (*i*) icon to see a more detailed breakdown of the metric.
- Parking Safety is our main mission. The MVP is based on this key feature to help drivers be more informed and secure as it relates to parking.
- Some of this is already mentioned in c. The overall score will appear as soon as possible during general viewing of potential parking spots. Further details can be viewed after a specific location is selected.

Real-time crime alerts (within a specified mile radius of the parking location):

- We will provide real time crime alerts within the vicinity of the user's parking location by collaborating with Citizen app. The alerts may be weighted based on relevance (e.g. being actually in the garage or being a violent crime).
- It will help users to be cautious about potential dangers in their current location, as it will notify them whenever necessary.
- It will be crucial for users because it will help them be more alert and avoid any risky circumstances.
- It will be a constant aspect which the app will notify to the user whenever necessary.

Safety focused user reviews/ratings:

- We will have an option for users to input their review/feedback in a textual format as well as a 5 point rating system
- It will be used as a rating for a parking structure
- The user reviews are important as they provide a qualitative perspective of the safety aspects. This could provide a broader safety consideration apart from the one provided by our app's algorithm.
- It appears while the user is trying to search for a parking location (while making a parking decision)

Designing Key Experiences

To further gain an understanding of the key features and our target customer motivations/intentions we created scenario maps and built storyboards over it. The Scenario 1 and Story board 1 were created keeping in mind our Primary User Persona, who prioritize safety over any other aspects while parking. We mapped two of our key features - Safety Metric and Safety focused User Reviews/Ratings within the Story line.

The Scenario 2 and Story board 2 were created keeping in mind our Secondary User Persona, who prioritize safety in specific situations and conditions. This storyline showcases our “Real Time Crime Alerts” key feature.

This is the final step in our research stage and below are the screenshots of Scenario Maps and Storyboarding that we came up with.

Scenario Map 1 from Primary User Persona Perspective

Scenario Map 1

Understand your product's user experience and identify pain points

1

Erica is invited to a dinner party in an unfamiliar neighborhood and she notices that the area is quite secluded. She is reluctant to go alone but her friends insist on using "ParCare" to feel safe and alert.



Storyboard 1 from Primary User Persona Perspective

1

Define your key features and visualize the scenario

Key Feature #1: Safety Rating

We will create a custom algorithm that considers parking type, presence of security (or other human employees), lighting, location remoteness, and weighted history of crime within a 0.5 mile radius of the parking location. This score will be dynamic and also adjust to take into account crimes that are currently (or recently) occurring.

Key Feature #2: Safety focused user reviews/rating

We will have an option for users to input their review/feedback in a textual format as well as a 5 point rating system

Erica is invited to a dinner party in an unfamiliar neighborhood and she notices that the area is quite secluded.

She is reluctant to go alone but her friends insist on using "ParCare" to feel safe and alert.

2

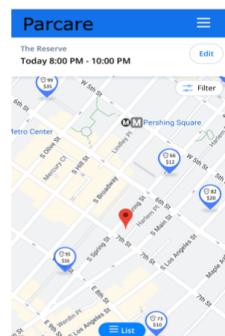
Visualize each step



Erica is feeling anxious about the parking situation near the restaurant. She receives recommendation from her friends to use ParCare.



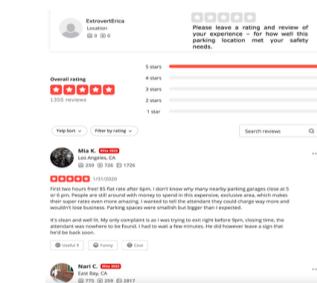
Erica installs the app and signs up without any hassle. She has a positive feeling about this!



After entering the destination and start/end time, she is able to view the parking spots on a map! She is hopeful to find a safe option that best suits her needs.



She is intrigued by the "safety score" parameter and reads more about it. She sorts/filters the parking options based on this score.



She looks at more information about the parking location and feels confident after reading some of the user reviews/images.



She finalizes her parking choice, and uses the app's navigation to drive there. She feels safe and happy with her parking experience (and plans to recommend Parcare to her friends & family).

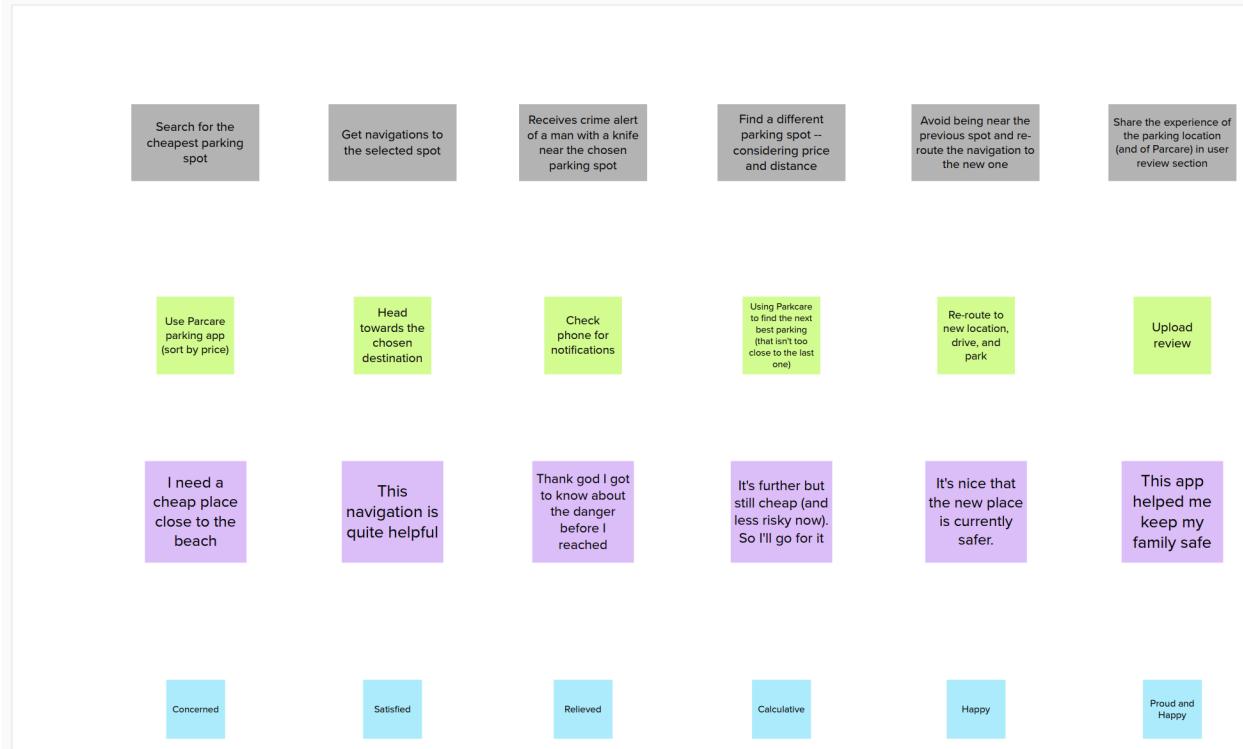
Scenario Map 2 from Secondary User Persona Perspective

Scenario Map 2

Understand your product's user experience and identify pain points

1

Frank is planning an outing with his family to visit the beach.



Storyboard 2 from Secondary User Persona Perspective

1

Define your key features and visualize the scenario

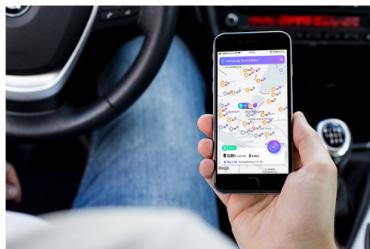
Key Feature: Real-time crime alerts (within a specified mile radius of the parking location)

We will provide real time crime alerts within the vicinity of the user's parking location by collaborating with Citizen app. The alerts may be weighted based on relevance (e.g. being actually in the garage or being a violent crime).

Scenario:-
Frank is planning an outing with his family to visit the beach.

2

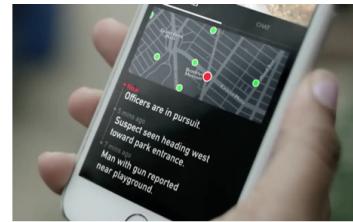
Visualize each step



Frank is concerned about finding a budget friendly parking space near the beach. So, using the sort-by-price option, he searches on Parcare for cost effective parking spots around his destination.



He found a good place with cheap rates and is satisfied to see that the app provides with the navigation to the chosen location



When he was within half a miles range from the parking location, he suddenly got an alert that a man with a knife was spotted 200 feet away from his parking location. He immediately stopped and was relieved to know about it ASAP. He was happy that his family was not in a dangerous zone.



He goes back to app and looks for other suitable options. He finds a place at similar price in another neighborhood which needs him and his family to walk for additional 15 minutes which he is calculating if it would be worth.



Calculating all that, he decides that the overall price is same and distance can be compromised for safety; he re-routes the drive. He is happy that he got an alternative without compromising his needs and taking safety precautions for his family too.



He shares his experience so that people can understand what can be done in similar situation and provides satisfactory reviews about the app and its features.

Design Iterations

Prototype Development

After determining the key functionalities of the product and a few more additional features, the next steps were to design a prototype of how the application would look and operate. We used Figma tool to design a concept UI as it provides a variety of designs. The task was to create a workflow which can replicate a way for users to experience the front-end of the app and the flow of screens. The best part for our process was that we had very solid key features decided which worked in good coordination by itself. This helped us to just stick to the flow in which the features come along and design screens accordingly.

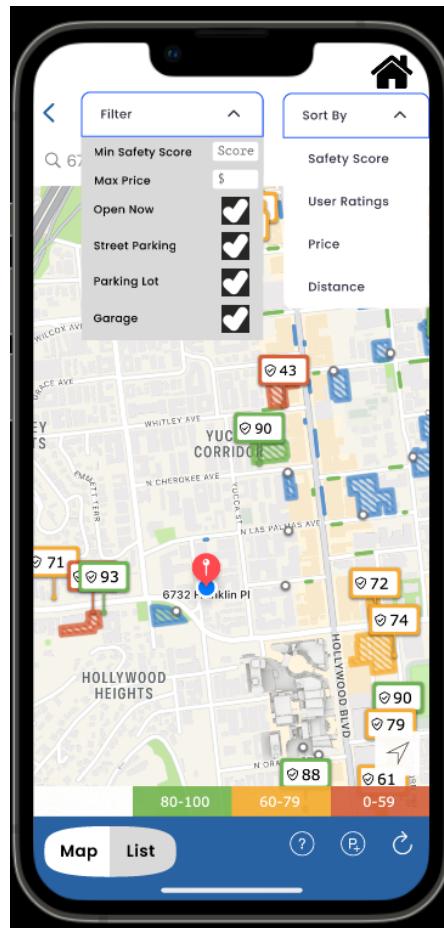
- **Home Screen**

The first screen was the home screen providing a little bit of information about the app and a way to start using the app intuitively. The user can directly understand by looking at the “enter city, place or postcode” search bar and the “Current Location” button to start.



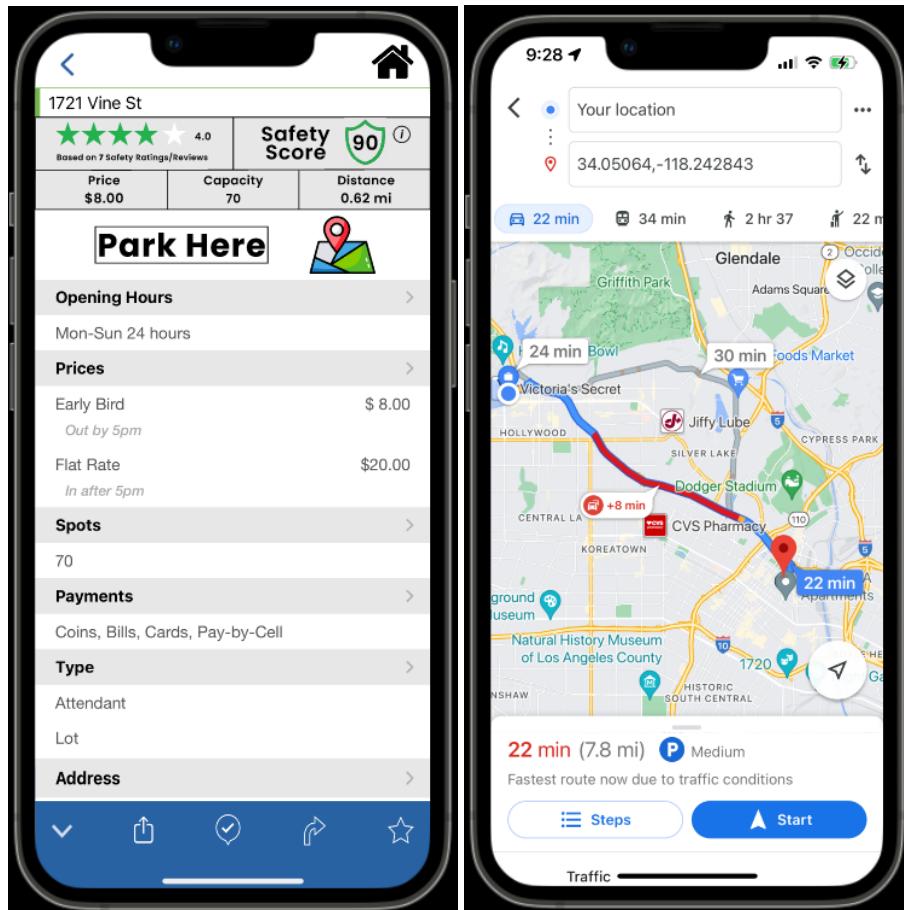
- **Location Listings Screen**

The next step would be a feature which shows all possible parking locations with their safety score on a map view. This will be the place with maximum user interaction and hence we included a lot of controls for users to have a more convenient journey. The main controllers were the filter/sort options on the map, which lets the user customize their parking results. They can filter out the locations based on the minimum safety score, maximum price, and the type of locations (street parking, parking structure and so on). The next controller was sorting the listings of locations based on safety score, price, distance, and user ratings. Per our value proposition, the default sorting would be based on the safety score; however, this hasn't been visually integrated with the Figma prototype. An additional convenience that was added was to view the listings of locations in a list view instead of a map view. Finally, the way to go to the next step was simply by clicking the location that the user chooses on either map or list view.



- **Parking Location Information Screen**

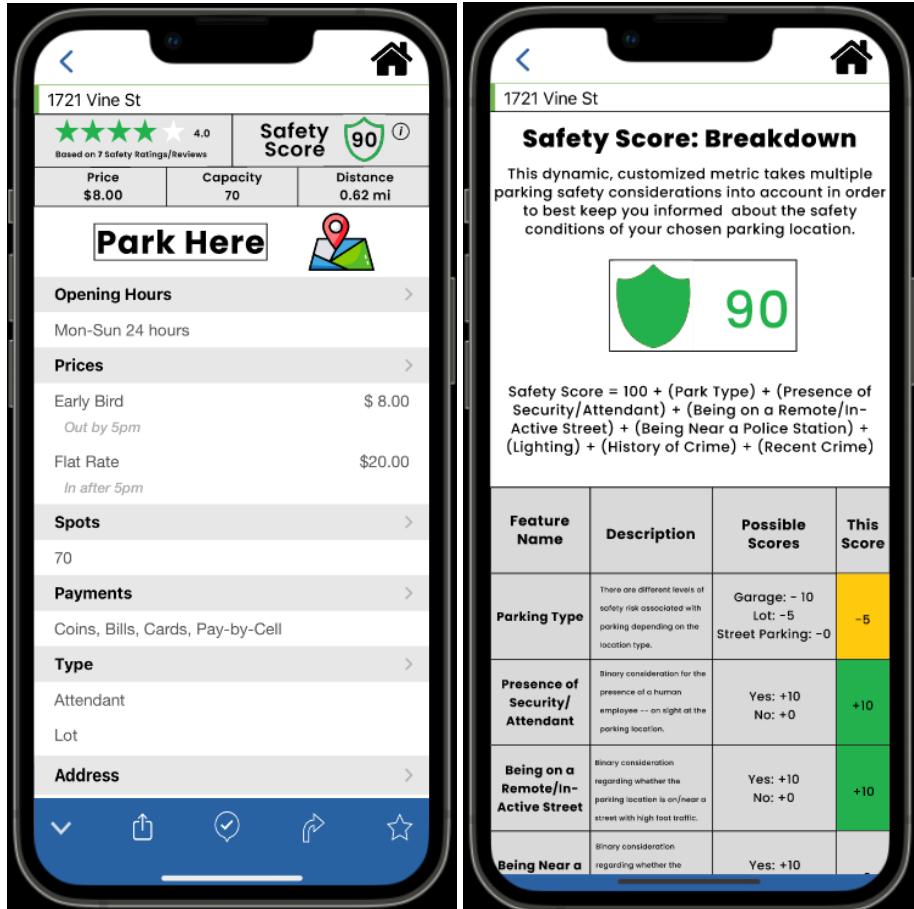
The next section was the menu card (i.e. general information page) for all of the key features of our product in a manner of speaking. This screen provided the primary information about the parking location (working hours, price, total capacity, address, contact, and so on); there is also a way to access the key features which provided detailed safety-focused information about the location. The first and most intuitive aspect was the “Park Here” button which redirects them to Google Maps navigation with the route from current location to the selected parking location.



- **Safety Score Information Screen**

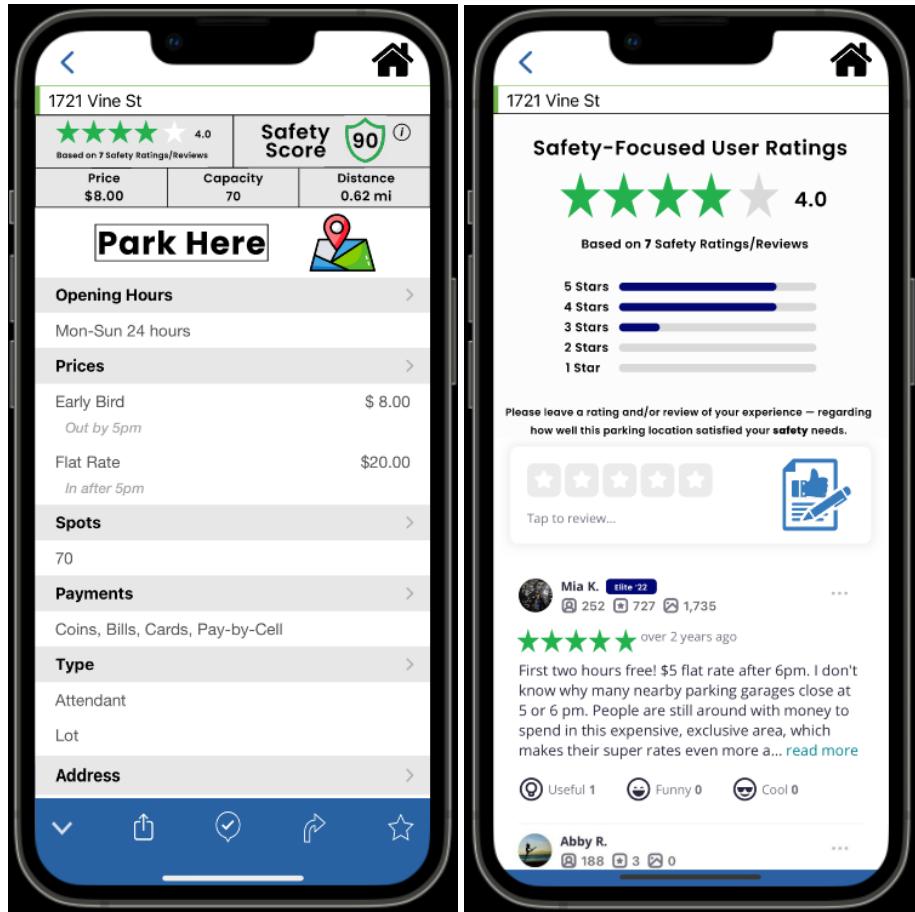
From the information page, the user can also access a lot more information about the safety score as well as manually check for the daily crime updates. An (i) icon is added on the information page’s safety score to inform the user that it is clickable. In the “Safety Score: Breakdown” page we provide detailed information on what criteria were taken into consideration when grading the safety of the specific location. These parameters are primarily heuristic but measurable in nature – e.g. parking type, presence of attendant,

lighting, history of crimes, and so on. This page also provides information if there was any nearby crime recently within a certain distance.



- **User Ratings Screen**

The last key feature on this page is the user ratings. This button takes to the ratings page where users have shared their personal experiences of the selected location and their ratings based on their understanding. We decided to include this feature in order to help new users get a confirmation of some sort which can support the safety score feature by providing real life examples. Some people prefer qualitative data over quantitative data. Also, while we try to keep the safety score generalizable and objective, this also means there may be certain (smaller) elements of safety that we aren't able to account for. A safety-focused review can help users in such scenarios. This page also provides a means for users to provide their own reviews and share their story with everyone.



- **Real-time Crime Alerts Screen**

The last primary feature of our project was real-time crime alert notifications which the user will be receiving. The notifications will be location specific so the users will only receive the news around the selected parking location only. By clicking on the notification, the user will be directed to the safety score page with the information of the latest crime. If the user misses the pop-up, they can directly go to the algorithm page, since the incidents remain for 12 hours.



With the help of this UI, we conducted research again with the users to get their feedback based on some hands-on experience with the product. This research is explained in detail in the next section.

User Research Study

The user research was about interacting with the users along with something tangible. For that, the first step was to design a questionnaire that helps us understand the user's experience much more effectively. In a general view, the questions were general about whether or not they liked a particular feature. We designed different hypotheses for the same to help us determine the exact response from the user community. Below is the list of all the hypotheses and their relevant questions for which we wanted reviews from the user.

5. HYPOTHESES	6. VALIDATION QUESTIONS	7. MINIMUM SUCCESS CRITERIA
Hypothesis # 1 (testing value proposition): Customer segment would like to search a secure parking location and be informed about the safety conditions of the parking location based on safety-score, user reviews and real-time crime alerts.	Would you like to use an app -- like ParkCare -- to get safety information about a parking location?	87.5% (i.e. 7/8) positive feedback
Hypothesis # 2 (testing business model option 1): ParkCare monetizing by collecting user data won't significantly affect the users' willingness to use the app? (Note: ParkCare will function as a social social business.)	Would you still use ParkCare even if it collects your user data -- as is done by many apps and companies?	75% (i.e. 6/8) positive feedback
Hypothesis # 3 (testing business model option 2): Customer segment would get advertisements for paid promotions of recommended places in the vicinity. (Note: ParkCare will function as a social social business.)	Would you be fine with seeing advertisements/promotions for recommendations (in the parking's vicinity) -- on the specific parking information page.	50% (i.e. 4/8) positive feedback
Hypothesis # 4 (Safety metric): Customer segment is looking for the safest location for parking.	Do you consider your safety and/or your vehicle's safety while parking?	75% (i.e. 6/8) positive feedback
Hypothesis # 5 (Real-time crime alerts (within a specified mile radius of the parking location)): Customer segment would appreciate to have real-time updates on any of the crimes in the selected parking location to avoid personal risks.	Do you think there is a benefit in getting real-time crime alerts (for your selected parking location's vicinity)? Do you think that people would actually take the necessary course of action to avoid the risk?	62.5% (i.e. 5/8) positive feedback
Hypothesis # 6 (User reviews/ratings): Customer segment considers other users' experiences in user reviews while making a parking decision.	Do you think that the user will consider the safety-focused user reviews while making parking decisions?	62.5% (i.e. 5/8) positive feedback

After the hypotheses were designed, the next task was to prepare general questions for the interview and a flow of conversation to help guide the user through the usage of the UI. There were individual questions for each of the screens described in the prototype section. The questions were structured in such a way that could be asked without interfering with the users' natural flow through the prototype. The complete set of questions is mentioned below.

INTRO (1 MIN)

Hi <participant name>, I'm <your name>. I am conducting this research study because my team wants to learn from US drivers about how they stay informed and go about finding a safe parking location for themselves (and their vehicle). You can help us the most by giving us honest feedback to the questions. Please think out loud as you use the product. This is not our final app, so feel free to be critical. The recording of it is just for note-taking purposes and will never be distributed publicly. We are assessing the product, not you, so if you don't know the answer to a question, that's okay. Thank you so much for helping us with this study.

SET-UP (3-5 MINS)

How do you generally look for a parking space?

Do you consider the safety of yourself and your car while parking?

Have you considered using an app to find a safe parking spot?

PROTOTYPE DEMO (20 MINS)

Screen 1: Home Screen: User opens the app and is prompted to share their location or input an address.

From the home page, what do you think this app is about?

How do you think you will proceed to look for a parking space via this app?

Screen 2: Map/List with all parking options near the location with safety score visible. With two drop downs for sorting and filtering.

Looking at the screen what do you think these scores represent?

Do the filter and sort options meet all your potential requirements or would you expect anymore?

Screen 3: After selecting a specific location (from Screen 2), it will go to a separate page with standard parking information and at the top it will be the safety score and safety-focused user rating average.

Is the parking information provided here enough for you to decide if you wish to park here?

What information on this page are more useful to you?

Is the overall representation of information easy and understandable enough or would you recommend some changes?

Screen 3a: There will be a "Park Here" button, where the user will be taken to the navigation page.

Are you comfortable with using Google Maps?

Would you like us to have an alternative navigation-app option instead?

Screen 3b: The custom safety score (in Screen 3) will have an information (i) icon that is clickable. Once clicked, we go to a new screen that has the specific breakdown of our safety score. At the bottom, there is the latest (Citizen-powered) crime reports/incidents within a default radius (eg 1mile). The alert radius can be adjusted.

Does this information help you to understand if the parking location is safe?

Does the feature selection address all of your concerns while considering the location's safety? Would you like to add any more?

Which safety features on this page are important to you?

Screen 3c: If the user clicks the user rating average stars (in Screen 3), they will be taken to a separate page where they can leave their own rating/review (if signed up), and can read the existing safety reviews.

Does this information influence your parking decision?

Would you consider user reviews/ratings over safety score information while deciding?

Screen 4: Citizen notification pop-up that can appear anywhere (e.g. outside the app).

Is the "Security Alert" pop-up notification for your selected parking location meaningful to you?

What other pop-up information would you like to receive surrounding your selected parking location?

HYPOTHESES VALIDATION (3-5 MINS)

Would you like to use an app -- like ParkCare -- to get safety information about a parking location?

Would you still use ParkCare even if it collects your user data -- as is done by many apps and companies?

Would you be fine with seeing advertisements/promotions for recommendations (in the parking's vicinity) -- on the specific parking information page.

Do you consider your safety and/or your vehicle's safety while parking?

Do you think there is a benefit in getting real-time crime alerts (for your selected parking location's vicinity)?

Do you think that people would actually take the necessary course of action to avoid the risk?

Do you think that the user will consider the safety-focused user reviews while making parking decisions?

CLOSING (2 MINS)

Thank you so much for your time. You provided us with a lot of helpful insights and we truly value your time!

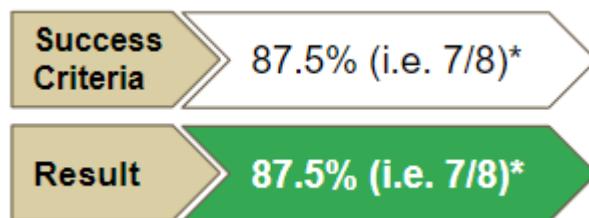
To read the User Research Interviews, please click on the following link:

https://docs.google.com/spreadsheets/d/1TfHgJqRoIXYsl93tK9dVK59qo8Tr4dHH/edit?usp=share_link&ouid=100802081724045731603&rtpof=true&sd=true

All the interviews were conducted on zoom while the user was sharing the screen real-time as they were exploring the prototype, to help us understand their exact first reaction for reliable validations. The end results of the interviews provided validations for all the hypotheses. The specific results are as follows.

- **Value propositions hypothesis**

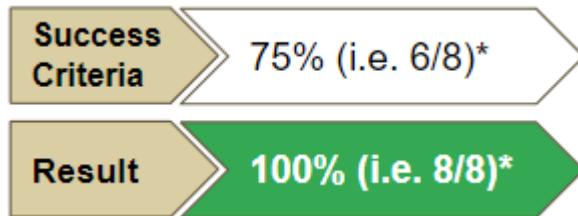
Customer segment would like to search a secure parking location and be informed about the safety conditions of the parking location based on safety-score, user reviews and real-time crime alerts.



We had a high criterion for the value proposition hypothesis as it was the primary aspect of whether or not the idea was worth working on from a user perspective. But the interviewees did provide the response we hoped for and validated our beliefs for the idea as well. Even the one person who rejected the hypothesis stated that they see the objective benefit in it, but they themselves are simply unlikely to use it.

- **Business model hypothesis 1**

ParkCare monetizing by collecting user data won't significantly affect the users' willingness to use the app? (Note: ParkCare will function as a social business.)

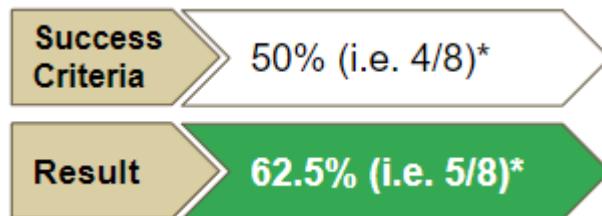


Data collection is one of the most common things in app business which almost every user is aware of and since we were not requesting any private or confidential data, the users had no issues with it. Additionally, we also got such reviews which expressed that since the app is free for use, it was alright with the users to push a little for the data aspects. Hence all the users gave a positive validation. Interviewee H.T. said, "My

physical well-being is more important than my digital privacy”, which I believe deftly summarizes the shared stance regarding this.

- **Business model hypothesis 2**

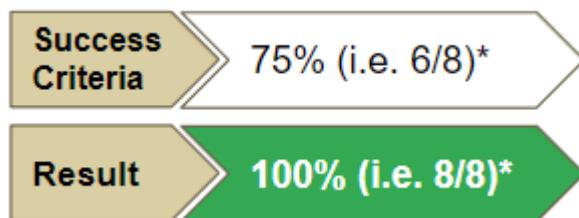
Customer segment would get advertisements for paid promotions of recommended places in the vicinity. (Note: ParkCare will function as a social business.)



We hoped to get a great response from this since the advertisements were not general pop-ups but customized to the location; in past feedback some peers even expressed the desire in having such ads (rather than just tolerating them). However, we anticipated that advertisements can be unpopular; the reason we chose a rather low threshold was because we thought that if at least half of our user-base validates this hypothesis, then we can simply make the presence of ads adjustable through the setting. By default, we would have ads, and the user can choose to turn it off if they really want to. We could do this since it is our secondary business model. Several of the prototype testers said that having ads of any sorts in any format would be an annoying thing for them based on their typical past experiences. We narrowly validated the hypothesis, which meant we would indeed be using the strategy of having ads adjustable.

- **Safety metric hypothesis**

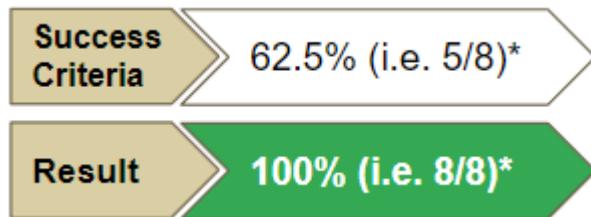
Customer segment is looking for the safest location for parking.



This hypothesis represents our key feature around which the whole idea revolves and hence was the most important of them all. As per the expectations, we did get a 100% positive response from the users due to the uniqueness and importance of the idea after understanding the purpose behind it.

- **Real-time crime alerts hypothesis**

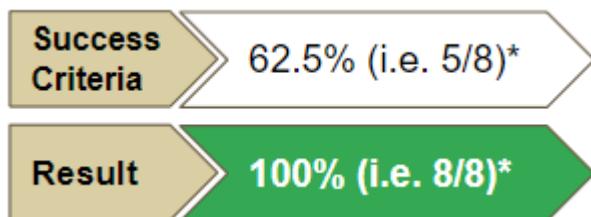
Customer segment would appreciate having real-time updates on any of the crimes in the selected parking location to avoid personal risks.



This was a core aspect for the app as well to help make the overall idea more dynamic in nature. We got complete support from all users for this one as well as they provided insights on how crucial this type of information might be for them. They did provide a few modifications which they might like to have but the primary core of the idea was very much supported.

- **User ratings hypothesis**

Customer segment considers other users' experiences in user reviews while making a parking decision.



The user ratings were also supported completely as it gave the users a means to rely on the people's actual experiences and not be completely dependent on our responses but get a little more validation. As we thought, the more qualitatively inclined people were actually even more likely to rely on user rating than the safety score. Even the more quantitative users say the benefit of having a second, subjective source of data; this is especially true if there are recent reviews.

Thus, we got a great response from the users and were able to validate all the hypotheses. The next phase of the project was to update the prototype design to make the small tweaks and improvements that were recommended by users to make the application more user friendly. After implementing the suggested changes – as well as some of our own which we previously didn't have time to include – we finalized the next second (and currently final) version of our prototype. The link to the prototype is in the next section.

Interactive Prototype

Based on feedback we received from the practice class interview and eight official interviews, we made improvements to our prototype's UI to make our users' experience more positive and intuitive; some of the changes we made were simply due to having more time at our disposal

than before the version one deadline.

Click on the link below to view an interactive prototype of our application.

Note: We left some comments that may help give you some insights, notify you about certain glitches, as well as show you the optimal Figma page flow that would best showcase our prototype.

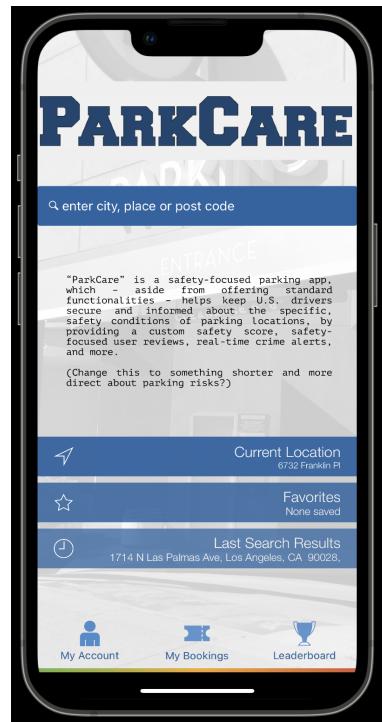
[https://www.figma.com/proto/3LNGjvVJYVCJddyvxjodu7/ParkCare-\(V2\)?node-id=15%3A185&scaling=scale-down&page-id=0%3A1&starting-point-node-id=15%3A185](https://www.figma.com/proto/3LNGjvVJYVCJddyvxjodu7/ParkCare-(V2)?node-id=15%3A185&scaling=scale-down&page-id=0%3A1&starting-point-node-id=15%3A185)

The changes made to the prototype from the initial version to the final version are also specifically mentioned below.

Note: The arrow compared the changes is pointing to the newer version of the prototype.

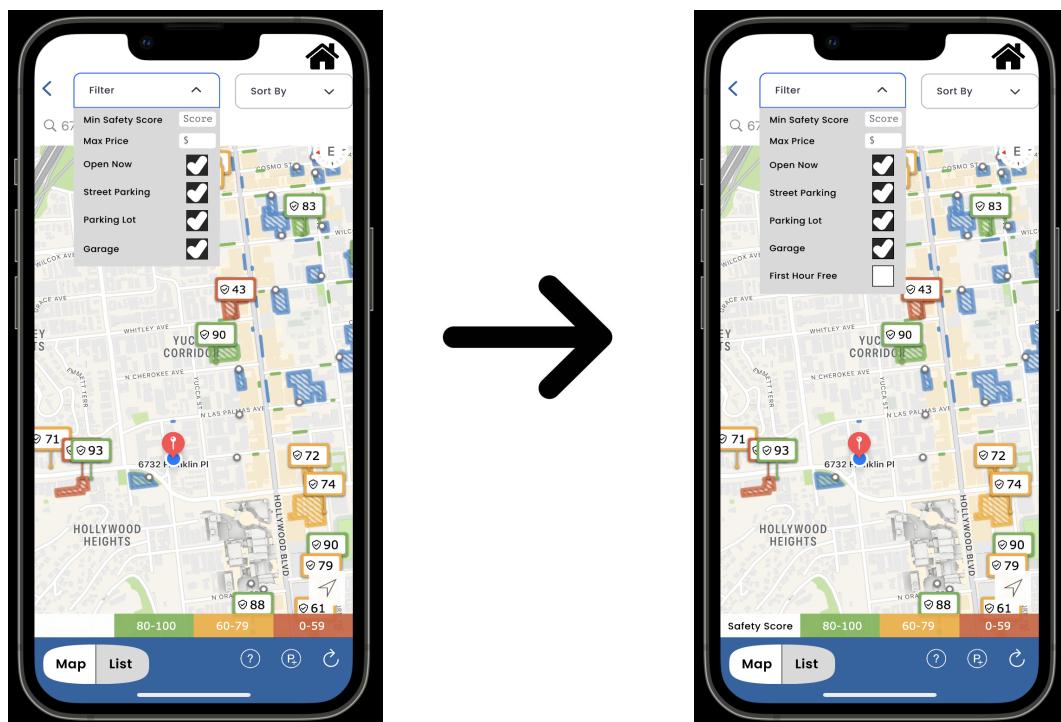
- **Home Screen**

- Added a subtitle to make it immediately obvious that this is a safety-focused parking app.
- Made the search bar interactive. This was done for the purpose of our story-style final presentation video.
- Changed the text to something shorter that will quickly catch the user's attention while showing the need for this app.
- The two icons at the bottom (in the middle and the right) didn't serve any purpose. We had forgotten to remove them. So, we changed it to something more fitting.
 - The bottom right "Current Parking" icon is interactive. If you have a parking location you parked at and/or saved for safety updates, clicking this icon will automatically take you to its information page. We were told in our class prototype interview that this would be a helpful UI feature.



- **Location Listings Screen**

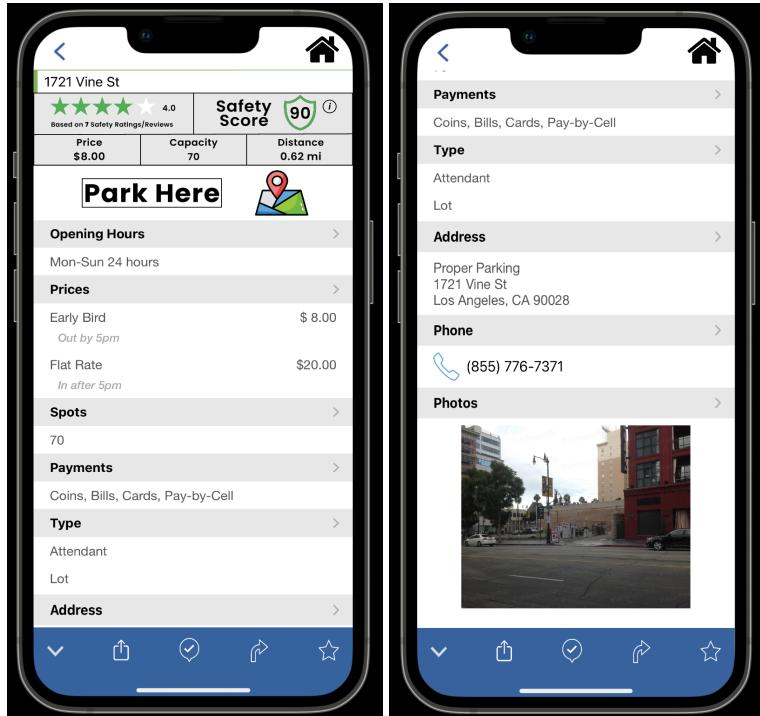
- To some interviewees it was not immediately obvious what the scores represented. We realized our perspective (as the creators) was a little skewed and that the shield symbol was not enough of an indication of this. So, we clearly stated at the bottom-left that the numbers associated with each parking are the safety scores.
- Also, multiple interviewees expressed interest in being able to filter by a “First Hour Free” criterion which we added.

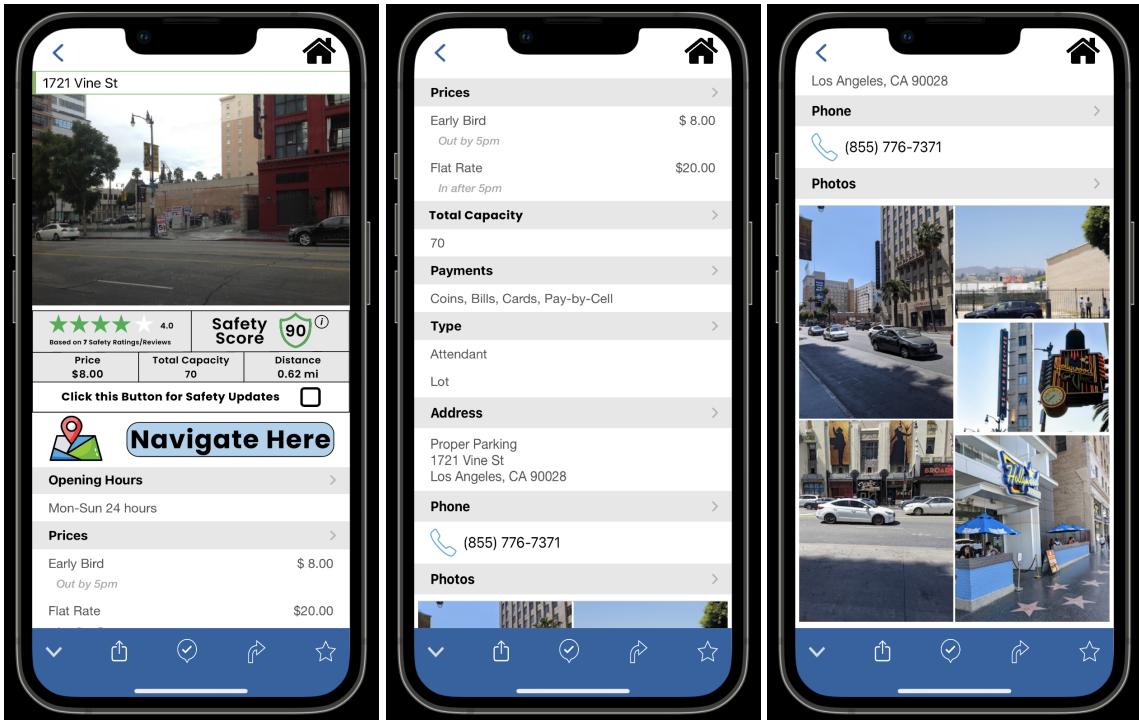


- **Parking Location Information Screen**

- One major thing we hadn't considered that our interviewees brought up, is the convenience of clicking the buttons when using an actual phone. Even for men (who have larger hands), reaching the very top of the screen can be rather uncomfortable. So, we shifted all of the clickable (interactive) sections of this page closer to the middle so it's easier to reach. We accomplished this by including an image of the location at the very top, which even on its own can be helpful.
 - Throughout the interviews, several users mentioned that they liked seeing a picture of the parking lot. So, we added multiple image views in the photos section. (In the future, it would also be good to add some pictures showing the location at night.)

- We also added a button above the navigation section, which users can click and unclick for safety updates. When a user presses “Navigate Here”, this button is automatically clicked.
 - This is linked to the new, interactive “Current Parking” icon on the home screen.
- Some people didn’t notice that the “Park Here” was a navigation button. So we changed its wording to “Navigate Here” and made it look more button-like. Also, since most people are righties, we switch places between the navigation button and the icon beside it. So, it is easier to press with one hand.
- A few interviewees were confused by the Spots/Capacity data thinking that it meant available spaces. We standardized the term to “Total Capacity” to be clearer.





- **Safety Score Information Screen**

- We added information about how often our safety score features are updated, since we realized this is a relevant factor in our users' decision making. For example, when comparing the (recent) user reviews with the safety score.
- For "Change search radius" at the bottom, we changed the interactive part from an input field to a drop down. In practice, an input field where a user could write anything wouldn't be viable; an entry that is too large or nonsensical would cause it to crash.
- Multiple interviewees found the old feature names for "History of Crime" and "Recent Crime" misleading. Since we had named them, we weren't able to notice this. We renamed them to "Recent History of Crime" and "Crime Today" to make it clear what they represent.
 - In the description section for "Recent History of Crime", we also added the info for how many last years of crime it is based on.
- Also, a couple interviewees noted that the description columns' information was too small to comfortably read. So, we added a zoom feature for each of the features' description which intuitively activates and deactivates by clicking on it. (In the future it would probably be helpful to add some sort of indication that the descriptions are zoomable.)

1721 Vine St

Safety Score: Breakdown

This dynamic, customized metric takes multiple parking safety considerations into account in order to best keep you informed about the safety conditions of your chosen parking location.

90

Safety Score = 100 + (Park Type) + (Presence of Security/Attendant) + (Being on a Remote/In-Active Street) + (Being Near a Police Station) + (Lighting) + (History of Crime) + (Recent Crime)

Feature Name	Description	Possible Scores	This Score
Parking Type	There are different levels of safety risk associated with parking depending on the location type.	Garage: -10 Lot: -5 Street Parking: -0	-5
Presence of Security/ Attendant	Binary consideration for the presence of a human employee -- on sight at the parking location.	Yes: +10 No: +0	+10
Being on a Remote/In- Active Street	Binary consideration regarding whether the parking location is on/near a street with high foot traffic.	Yes: +10 No: +0	+10
Being Near a Police Station	Binary consideration regarding whether the parking location is within 5 miles of a police station.	Yes: +10 No: +0	+0
Lighting	Whether the parking location has poor lighting.	- [0-10]	-5
History of Crime	Weighted score considering the history of crime that occurred within 0.25 miles of the parking location.	- [0-40]	-20
Recent Crime	Recent occurrence of a relevant crime/incident (based on Citizen), within 1 mile of the parking location.	Crime Occurred: Within 1 hour: -25 Within 4 hours: -10 Within 12 hours: -5 No Incident: -0	-0

Recent Crimes/Incidents

Change search radius: 1.0 miles

There are no recent crimes within 1 mile of this parking location.



1721 Vine St

Safety Score: Breakdown

This dynamic, customized metric takes multiple parking safety considerations into account in order to best keep you informed about the safety conditions of your chosen parking location.

90

Safety Score = 100 + (Park Type) + (Presence of Security/Attendant) + (Not on a Remote/In-Active Street) + (Near a Police Station) + (Lighting) + (Recent History of Crime) + (Crime Today)

Note: "Crime Today" is updated in real-time, while all other features are updated quarterly.

Feature Name	Description	Possible Scores	This Score
Parking Type	There are different levels of safety risk associated with parking depending on the location type.	Garage: -10 Lot: -5 Street Parking: -0	-5
Presence of Security/ Attendant	Binary consideration for the presence of a human employee -- on sight at the parking location.	Yes: +10 No: +0	+10
Not on a Remote/In- Active Street	Binary consideration regarding whether the parking location is on/near a street with high foot traffic.	Yes: +10 No: +0	+10
Near a Police Station	Binary consideration regarding whether the parking location is within 5 miles of a police station.	Yes: +10 No: +0	+0
Lighting	Whether the parking location has poor lighting.	- [0-10]	-5
Recent History of Crime	Weighted score considering latest 2-year history of crime that occurred within 0.25 miles of the parking location.	- [0-40]	-20
Crime Today	Current occurrence of a relevant crime/incident (based on Citizen), within 1 mile of the parking location.	Crime Occurred: Within 1 hour: -25 Within 4 hours: -10 Within 12 hours: -5 No Incident: -0	-0

Current Crimes/Incidents

Change search radius: Mile Radius ^

0.25 Miles
0.5 Miles
1 Mile
1.5 Miles
2 Miles

There are no recent crimes within the set radius of this parking location.

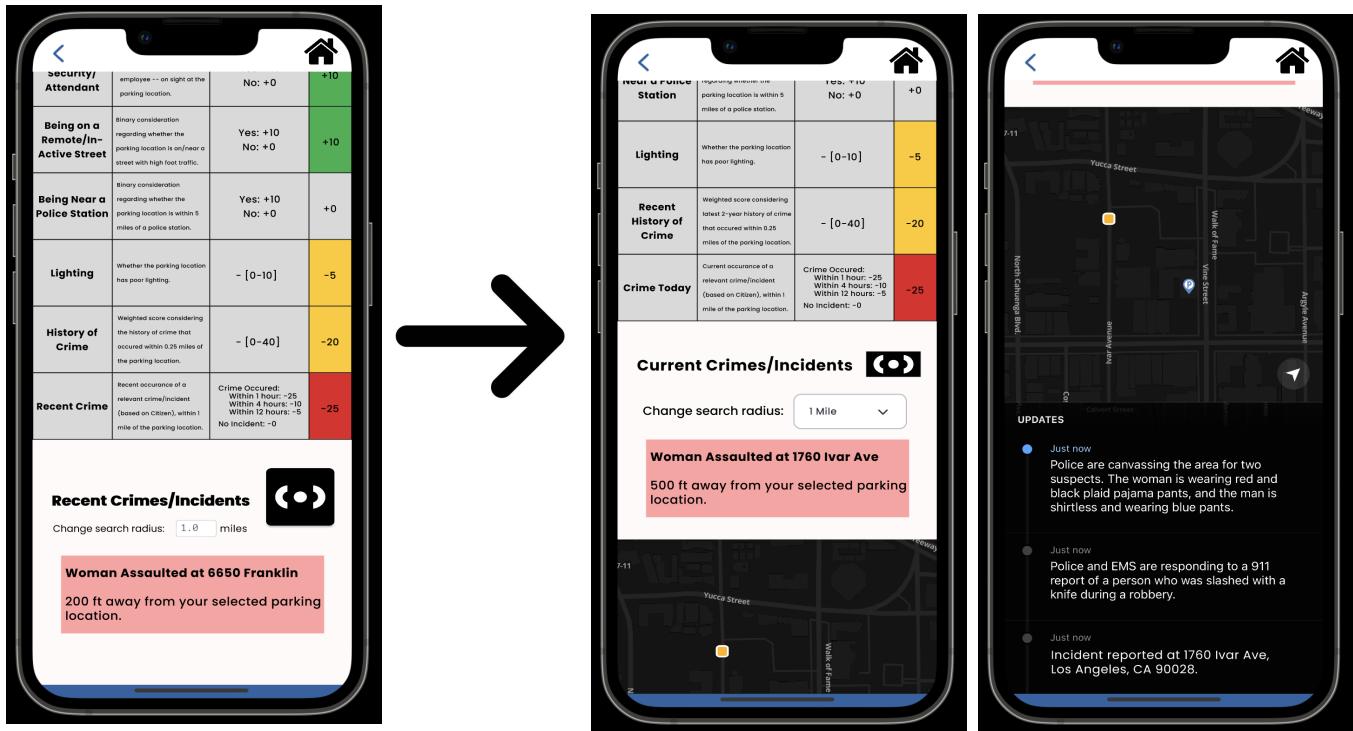
Current Crimes/Incidents

Change search radius: 1.0 miles

There are no recent crimes within 1 mile of this parking location.

- **Real-time Crime Alerts Screen**

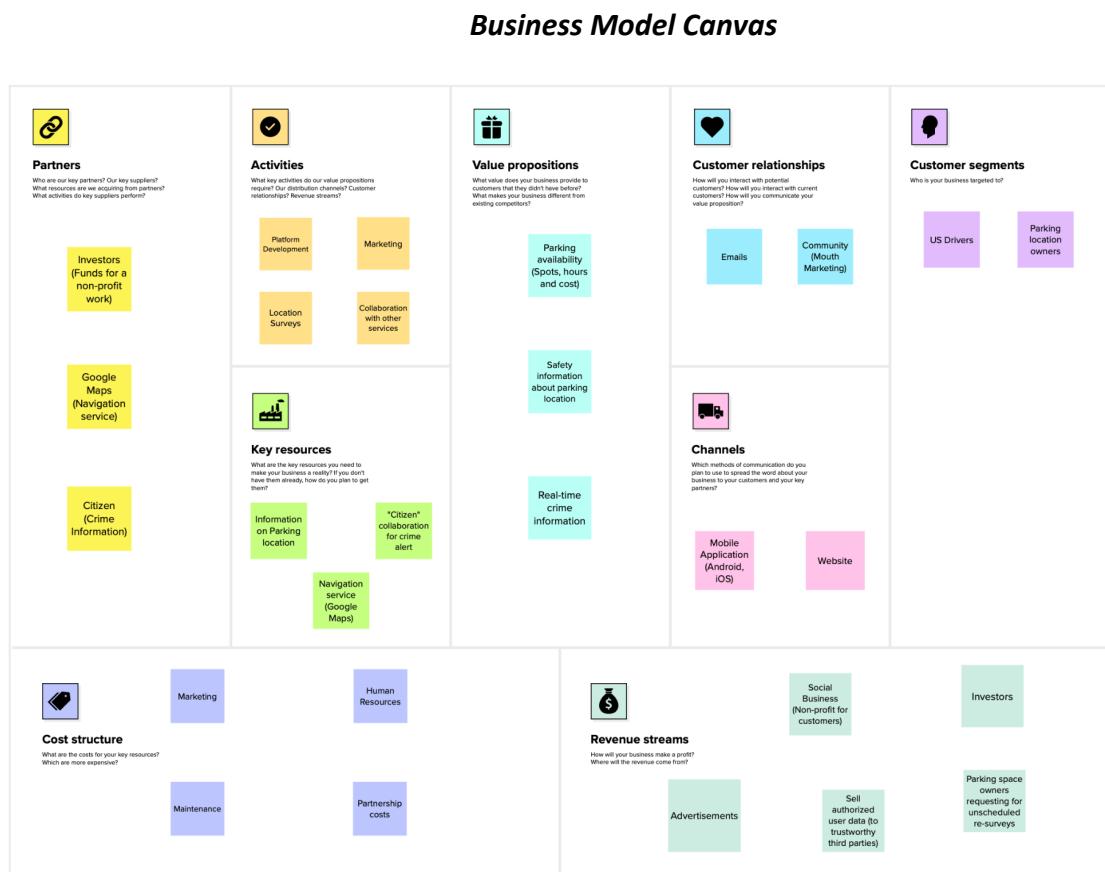
- The previous “Recent Crimes/Incidents” information – for when there is actually a crime – was a placeholder. We have updated it to what it is supposed to be like. We added a more detailed report of the crime incident, as well as a useful map showing where the user’s parking location is compared to the crime.



These were the changes that were made to obtain the final version of the prototype. We finally had an MVP-worthy representation of our idea with all the research in place to understand every single component that was included or excluded. The last phase was to get into the business mindset for establishing ParkCare. We planned how and what we might need to do in order for ParkCare to be a self-sustainable social business – aside from the two business models which we validated through our user research interviews. For this, we used Business Model Canvas and Lean Canvas to have a better understanding of the business propositions.

Business Model Canvas & Lean Canvas

A business model canvas is a visual representation of a business model, highlighting all key strategic factors. In other words, it is a general, holistic and complete overview of the company's workings. It is important since it forces us to think about the Cost Structure, Revenue Streams, and resources that would help to keep our business flourishing. The Business Model Canvas for "ParkCare" can be seen below.



The Lean Canvas Model is another similar template used for brainstorming different business model ideas. The main difference between them is that lean canvas zeroes in on solving a problem. Meanwhile, the business model canvas centers around selling a specific product. The Lean Model Canvas for "ParkCare" can be seen below.

Lean Model Canvas

PROBLEM	SOLUTION	UNIQUE VALUE PROPOSITION	UNFAIR ADVANTAGE	CUSTOMER SEGMENTS
<p>Majority of violent crimes occur in parking locations</p> <p>No way to know if a place is safe for a person and their vehicle</p> <p>Solution is to help drivers make safety focused decisions</p>	<p>Provide information on safety measures taken in a parking location</p> <p>Help drivers make data driven and informed decision regarding safety</p> <p>User choosing from one of the most safe parking options</p> <p>New metric to determine how many times a parking choice was changed based on a crime alert</p>	<p>Enable people to share their personal experiences</p> <p>Provide real-time information on crimes in vicinity</p> <p>Retention rate of a user continuing to use the app</p> <p>Long-term metric showing if parking locations' safety conditions (i.e. safety score) were improved.</p>	<p>Parking availability (Spots, hours and cost)</p> <p>Safety information about parking location</p> <p>Real-time crime information</p>	<p>First in the market (i.e. blue ocean)</p> <p>Importance of the type of information (safety)</p>
			<p>CHANNELS</p> <p>Mobile Application (Android, iOS)</p> <p>Website</p>	<p>US Drivers</p> <p>Parking location owners/managers</p>
COST STRUCTURE		REVENUE STREAMS		
<p>Marketing</p>	<p>Human Resources</p>	<p>Maintenance</p>	<p>Partnership costs</p>	<p>Social Business (Non-profit for customers)</p> <p>Investors</p> <p>Sell authorized user data</p> <p>Parking space owners requesting for unscheduled re-surveys</p> <p>Advertisements</p>

There weren't any surprises in this step since we individually covered most of the categories in the past phases of ParkCare's development. This was mainly useful in that it allowed us to approach and reinforce our past choices from a business perspective.

Reflections, Recommendations & Next Steps

Throughout this process, our team had a consistent vision for ParkCare – its driving principle being "safety". The aforementioned steps helped develop and fine-tune the execution of our app's UI/UX, while otherwise validating and reinforcing its key features. The interactive prototype implementation and general need for our three features (i.e., custom parking safety score, safety-focus reviews/ratings, and real-time crime alerts near chosen parking) were each confirmed through research and multiple rounds of user interviews. As mentioned in the competitive market research analysis, the demand for a safety-focus parking app is not being met in the current marketplace. Even our main competitors address only half of our potential customers' needs – parking or safety. The distressing crime statistic of $\frac{1}{3}$ of violent crime occurring at parking locations also speaks for itself. So, it's very simple, since there is demand but no supply, there is an opportunity for us. By focusing on the safety aspects of our parking app, we will carve out a niche that strongly differentiates us from both other parking apps and safety apps – thus leaving us in a blue ocean. Furthermore, we plan to collaborate with Citizen for

ParkCare's real-time crime alerts, which should also give us an advantage. While other safety-focused competitors (e.g. Noonlight) provides an amazing safety tool, it is an after-the-fact service – for when a person is already in a dangerous situation. Instead, our app's three key features preempt unsafe situations (related to parking), by helping drivers stay informed and alert during their parking process. For these reasons – as well as having validated our business model of data collection and targeted advertisements – we are confident that ParkCare will be a successful social business and help keep people safer.

For future steps, we believe we would benefit from conducting a new round of user-research interviews with a larger and more representative group of people. While our current ones were very informative, it is unlikely to have been a completely accurate reflection of our user base's true opinions. Also, the validation of our six hypotheses is largely dependent on the minimum success criteria that we set, which was somewhat arbitrary. The reasoning for the six chosen thresholds should be better based on industry research and data, rather than (mostly) our intuition. This second, expanded user-research would give us a more thorough understanding of our users' ParkCare experience and dispel any doubts about the validation of our hypotheses.

Besides what we have implemented, our team also has plans to further improve some UI/UX elements as well as explore new, interesting feature ideas for ParkCare's future. We determined these features to be outside the scope of our MVP, but that they are otherwise very well aligned with our value proposition. The mentioned UI/UX improvements are (mainly) ideas that were beyond our Figma capabilities (given the time constraint). One main example is to assign an index to each parking location; this index would be visible next to its corresponding parking on both the map and list pages; this is similar to what Yelp does. These indices would act as a reference point associated with each parking, which would make it easier for the user to find their target parking when switching back and forth between the map and list views. These indices would be dependent on the "sort" function; by default, we would sort by safety score, per our value proposition. In the current prototype, the utility of "sort" is only present in list-mode. However, including these dynamic, sort-based indices would make sorting relevant (i.e. visible) on map view as well – since the best parking option (based on the chosen sort) would appear with a 1 index next to it, on the map as well. This UI/UX change was suggested during our user research interviews. While we saw the merit in this, we were unfortunately unable to implement this improvement before the deadline – due to its relative complexity and the other changes we had to make. So, we hope to address this in our next steps. (*Note: This is hypothetical since the interactivity for "sort" hasn't actually been implemented on the Figma prototype yet, even for list-mode. However, the intended role of "sort" on list-mode is rather intuitive/obvious and was expectedly clear to our users during the interviews.*)

During our user-research interviews, we also received some interesting feedback regarding the potential use of ParkCare pop-ups. The first one was a simple request (by multiple interviewees) to have a pop-up that warns users that the parking time for the location where

they parked is ending soon. This is rather straightforward and can be easily added in the future, though it is not that relevant to our mission of safety. The second part was much more interesting in that regard – worthy of being a new key feature. The new pop-up feature is essentially a warning system for when a driver parks in a location with a low safety score. By default, it would be anything below 60 (i.e. red zone), but this would be adjustable by the user. Through our Discovery Interviews, we know that while some people plan ahead where they will park, most people do not (unless traveling far). In this case, our app would almost exclusively serve the former demographic. However, adding this new key feature would change this. For example, a person would drive around and park in the first available location. Once ParkCare notices the user has stopped in a red zone, they would receive a pop-up warning. Even if the user is unable or unwilling to change their parking location based on this information, just the knowledge that their current parking has a low safety score will help the user be more informed and vigilant, which is a huge safety benefit; they may also opt to get the real-time crime safety updates. Since our main source of revenue is based on user-data collection, this feature would provide a financial benefit to ParkCare as well. When a user is giving an app access to their data (e.g. location tracking), the user usually gets to choose between allowing “while using the app”, “always”, and “never”. With this feature, users are very likely to “always” allow rather than just “while using the app” because there is an actual, big benefit for them in having the app working in the background; this was stated as such by an interviewee. So, overall, this warning pop-up feature would bring new benefits for our existing users, potentially expand our user base, and give us more access to user data (which would benefit ParkCare financially).

In the user-research interviews for our prototype, a common request was to include availability information for each parking. While users that are aligned with our primary persona want the availability information, the absence of it would not prevent them from using ParkCare since safety is their priority. However, secondary persona users have other principal considerations like price or convenience. Availability information is the only “convenience” that we do not have, due to which we may lose these potential users. Since having real-time availability information and reservation capabilities is a significant project in its own right and it doesn’t directly align with our safety focus, we decided not to include it in our MVP. However, as to not lose a market share of users that have safety as their secondary consideration, it would benefit us to add this in the future.

On a related note, during our competitive research we had found that Premium Parking has an interesting feature called “STAR space”. While Premium Parking was not our biggest competitor, this feature was rather useful and unique, which set it apart. Premium Parking offers a parking reservation service, where the STAR spaces are specific spots that you can reserve (e.g. within a chosen garage), which are designated by Premium Parking to offer the ultimate convenience for drivers. We immediately saw the potential of using a safety-focused variation of this for ParkCare; it could be called SAFE space. Instead of focusing on convenience, we would

identify the spaces that are objectively the safest within the parking location. The implementation of this feature was indirectly supported by data collected from female drivers during the Discovery Interviews; they stated that the specific parking space within the chosen location is just as important as choosing the general parking – sometimes more so. Based on feedback from those interviews, some criteria that our SAFE spaces would consider are that the space is: near the exit (for cars), near the exit/entrance for people, near a security/attendant booth (if applicable), directly within security camera view, and directly under good lighting. So, introduced along with availability and the general reservation service, SAFE space could be a helpful key feature for ParkCare's future, which further helps keep U.S. drivers safe during their parking process. Even for our MVP, ParkCare benefits from some interaction with parking owners/managers; though this is mostly limited for potential parking-data collection purposes and for incentivizing them to improve their safety score. However, for this feature set (i.e. availability, parking reservation, and SAFE space) to be implemented, ParkCare would need to start actively operating in a two-sided network – with parking seekers as well as parking providers). This is not a small undertaking, but we believe it has clear utility and synergy with our current MVP features and value proposition; it is thus worth exploring for the future.