

# Queens's Parking Mobile

**Bowen Jiang**

for Submission

Kingston, CA

20bj4@queensu.ca

**Edward Ma**

for Submission

Kingston, CA

**Jiarui Li**

for Submission

Kingston, CA

**Yiweng Zheng**

for Submission

Kingston, CA

**Zhuo Ding**

for Submission

Kingston, CA

## INTRODUCTION

QueensParking is a sophisticated software application designed to facilitate the discovery and reservation of parking spaces within designated urban areas, such as cities or towns. Utilizing advanced GPS technology, this application is capable of pinpointing nearby parking facilities and providing users with essential information, including the location, availability, and cost of parking spaces. Moreover, QueensParking offers an array of supplementary features, such as reserving parking spaces, verifying availability, and updating one's parking space details. The primary objective of such applications is to render the parking process more convenient, efficient, and stress-free for users, while simultaneously alleviating traffic congestion and air pollution caused by unnecessary detours in search of parking.

## RELATED WORK

Source 1: Edmonton's mobile parking system

"Through regular surveying of our visitors and clients, we have consistently identified parking as an area where we can make the greatest impact on guest satisfaction," said Olaf Miede, General Manager, of Edmonton EXPO Centre. "As we elevate our health and safety protocols in response to COVID-19, contactless systems ensure a seamless parking experience and uphold our commitment to ensuring our venue is among the safest places to attend events." [1] To improve overall guest satisfaction. General Manager Olaf Miede noted that regular surveys show that parking is a key area that can be improved. Given the popularity of COVID-19, contactless systems, such as the ParkMobile app, have been implemented to ensure a seamless and secure parking experience. The use of these systems aligns with the venue's commitment to maintaining a high level of health and safety protocols.

Source 2: HonkMobile app

"The HonkMobile app is easy to use and allows customers to pay for parking from their smartphones before departure, during their trip or upon arrival at their destination, adding significant timesaving and convenience to the parking process. Users receive alerts 15 minutes prior to the expiration of their parking session, providing them with the opportunity to pay for additional meter time remotely."(Marketwired, 2015) [2]

The HonkMobile app is designed to make parking more convenient by allowing customers to pay for parking from

their smartphones. The app's particular focus on ease of use and flexibility that makes it relevant to the interaction design community and its potential to simplify and streamline the payment processes that makes it relevant to the HCI community. The app's novel features, such as the ability to receive alerts 15 minutes before expiration and to remotely extend the billing time, makes it different from other parking payment solutions. The rationale behind the app is to save customers time and effort while paying for their parking. All In all, the HonkMobile app is a relevant and valuable contribution to the interaction design and HCI community that addresses a common problem in an innovative way.

As with any technology, the application may have some challenges and limitations. HonkMobile also has them, such as technical difficulties. Users may experience technical difficulties when using the application, such as slow load times, errors or crashes. Compatibility. The application may not be compatible with all smartphone models or operating systems, which may limit its use by some users. Integration with parking infrastructure. The application may not be compatible with all parking systems and infrastructure, which may limit its functionality in certain locations.

Source 3: Toronto's Green P Mobile app

The update of GreenP application is to make the payment of urban parking fees more convenient, but these changes are more challenging for users. The new design replaces the direct parking time input window with a confusing chart, and the introduction of the "quick time" option increases this confusion. The interface becomes cluttered and more difficult to browse, and the user has not received any notice of these changes in advance. As a result, the next time they use the app to pay for parking, they are caught off guard and face an unfriendly experience. ("People in Toronto Are Hating the Latest Update to the Green P Parking App") [3]

Source 4: SpotHero

"The results suggest that parking reservation platforms are instruments for dynamic pricing and market segmentation that hold promise for increasing parking utilization. These platforms also have potential to support the movement to create 'Smart Cities'." [4]

SpotHero is a popular parking app that allows drivers to find, book, and pay for parking in real-time. SpotHero has

been integrated with smart city technology in some cities, allowing drivers to find parking spots that are available in real-time. This integration allows city officials to monitor parking demand and optimize the use of parking spaces.

### **PROBLEM STATEMENT OR DESIGN CONCEPT**

Kingston's parking system is well known for its inefficiency and inconvenience, particularly for students who park in busy areas frequently. We conducted research on university campuses in Kingston to gather insights from our target users, student drivers, about their parking experiences. Through on-site interviews and open-ended questions, we collected their perspectives on the current parking system, identifying difficulties and gathering suggestions for improvement.

According to the results of our interviews, one of the problems faced by drivers is paying for parking at the pay stations. The current process involves walking to the pay station, operating the machine and waiting for the ticket to be printed, all of which must be done outside, regardless of the weather. This process is not only complex but also exposes drivers to adverse weather conditions.

Another issue is the difficulty of securing a parking spot close to their destination, especially for drivers who regularly park in busy areas such as city centers and university campuses. This daily challenges further exacerbated by the shortage of available parking spaces, causing drivers to spend too much time looking for a parking space and forcing them to travel further distances.

Given these problems, it is a priority to devise a solution to make the parking system more accessible to drivers. Our team plans to target Queen's University, St Lawrence College and Princess Street as trial areas to use our product. As mentioned above, our software is aimed at streamlining the entire parking process for student drivers, so that they can spend their valuable time focusing on their academics.

### **USER CHARACTERIZATIONS**

Our target user group comprises Queen's University students, specifically those who drive to school and experience difficulties in finding parking spots. This issue is exacerbated by the limited availability of student parking and the often fully subscribed prime parking list before the start of the school year. As a result, our primary focus is on students who have not obtained a parking permit.

**Demographics and Abilities:** The target user group primarily consists of individuals aged 18-28, belonging to Generation Z (born between 1995-2009). These "digital natives" have grown up with smartphones and the internet and are comfortable using various technological products. Our users have average to good hearing, vision, and memory, and are adept at managing touch tasks and using multiple functions. This group includes all genders and

represents a diverse range of university students, with the majority being undergraduates or those pursuing higher education. **Cultural and Socioeconomic Factors:** Our target users are predominantly English speakers, as English will be the official language of our app. Approximately 85% of Queen's University's students are domestic, while 15% are international students. The majority of our target users come from middle-class backgrounds or higher, making it more likely for them to own a car and drive to the university daily. Additionally, they can consistently afford to pay for parking. **Technology Preferences:** According to a 2023 marketing report, 75% of Generation Z consider mobile phones as their preferred device. These students often turn to their smartphones as their primary choice of media, which will facilitate the adoption and usage of our app for addressing their parking needs. **Social Responsibility:** Our target users exhibit a sense of social responsibility, as they adhere to parking rules and are willing to park in designated spots while paying for them. This behavior aligns with the driving regulations and laws of the broader society, making our product well-suited for addressing social needs. **User Group Determination:** To determine our target user group, we conducted interviews with Queen's University students who drive to school and face parking challenges. These interviews provided valuable insights into the demographics, abilities, cultural factors, and technology preferences of our target users, allowing us to create a more focused design for our product.

### **USER SCENARIOS**

**Scenario 1: Finding and Booking a Parking Space near Campus**  
**User:** Amy, a 22-year-old university student who drives to campus. Amy needs to drive to campus for an important exam but is worried about finding parking, as she has often struggled to find a spot in the past. She decides to use the "QueensParking" app to help her find and book a parking space. After opening the app, Amy inputs her destination, the university's main library, and sets her arrival time. The app displays a map with available parking spaces around the library. She reviews the options, taking note of the distance and price of each spot, and then selects a space that's close and affordable. The app guides her through the booking process, and Amy receives a confirmation for her reserved parking space.

**Scenario 2: Checking Remaining Time and Extending Parking Duration**  
**User:** Ben, a 20-year-old university student who is studying at the library. Ben is at the library working on a group project when he realizes that he might need more time than he initially thought. Concerned about his parking space running out, he opens the "QueensParking" app to check the remaining time on his parking reservation. He sees that he only has 30 minutes left, so he decides to extend his parking duration. Ben selects the option to extend his reservation and pays for an additional hour through the app. He then receives a

notification confirming the extension, allowing him to continue his group project without worrying about his parking spot.

**Scenario 3: Voice Input and Accessible Parking for an Elderly User**  
User: Carol, a 68-year-old retired professor who is attending a university event. Carol is not very comfortable typing on her smartphone and has some mobility issues. She hears about the "QueensParking" app and decides to give it a try, hoping it will help her find an accessible parking space near the university's auditorium. Carol opens the app and uses the voice input feature to tell the app her destination. The app recognizes her voice command and displays a map with available parking spaces. It also highlights the accessible parking spaces for her convenience. Carol chooses an accessible parking spot close to the auditorium and books it using the app. The app then provides her with turn-by-turn navigation to guide her to the reserved spot, making her visit to the university event a hassle-free experience.

## DESIGN

By evaluating low-fidelity designs with a larger user base, we implement design modifications based on feedback and develop a high-fidelity prototype utilizing Figma. Initially, we designed an aesthetically pleasing landing page, providing a concise overview of QueensParking's features, including "login" and "sign up" buttons (Figure 1). Upon entering their username and password (Figure 2), users are directed to the "Home" page (Figure 3). Here, we discarded the previous low-fidelity model's design of combining the map and scheduled parking buttons within a single component, opting instead to visually display the map and the user's current location's parking spots. Users may tap the map to zoom (Figure 4). We also limited the number of buttons on the 'Home' page to two, increasing the size of the primary function button in comparison to the other button, and applied the color contrast principle to this button. The interactive map permits users to zoom in/out and navigate, also featuring a search bar. The search bar's primary function is to assist users in locating their desired destination and reserving parking spots remotely. Upon selecting a destination, users are redirected to the "Home" page, which now displays their destination's information rather than their current location. The green icon on this interface accentuates available parking spaces, offering users more intuitive information about parking options.

After selecting the "Parking Now" button, users are guided to an availability timetable page (Figure 5) that displays the nearest parking spot and available time slots near their destination or current location. Users can book parking spaces directly on this screen and switch to other nearby spots by dragging the parking spot image at the top of the page (Figure 6). On the payment processing page, users can adjust the parking duration within the available time range displayed in the timetable and then proceed to make payments. Following the payment process, users are

directed to the "My Parked" page (Figure 7), which illustrates a small map of their parked vehicle's location and the time remaining. Users can also quickly extend their parking duration by 30 minutes (if available) by tapping the button on this page. Subsequently, the "Home" page will resemble Figure 8, with the "Parking Now" button replaced by the "My Parked" button. This replacement helps users going to 'My Parked' quicker.

Lastly, the "My Account" page (Figure 9) offers functionalities that users may not frequently require, such as enabling/disabling time remaining notifications, modifying payment methods in the wallet, contacting technical support, and changing passwords. Within the settings, users can adjust the app's language or other basic configurations.

**Improve this:** Our design principle includes simplicity, parking applications should be simple to use and navigate, with an intuitive interface that users should not be confused and can easily find what they need. The layout of the application should be clear and concise, minimizing clutter and interference. The second principle is consistency, we have maintained orange and white as the main page and icon colors, the font of key features buttons, and the layout and structure of the application should be consistent. At the same time, we changed the color of some important text to be blue which is the contrast color of orange, so that those text will be more significant. The third is visual hierarchy, our application is designed to help users find parking spaces, so the map showing available parking spaces should be located in a central location, while other features and options should be placed in a secondary location. The last one is user-centered. This application is tailored for Queen's University students to meet the need for students who drive to school to spend less time searching for parking spaces and paying fees. The requirements for users are limited to the fact that they do not have reading and physical disabilities, as our program language is English and requires support from mobile devices. When designing high fidelity models, our design team found that a simple, user centric, visually pleasing, consistent application that can provide real-time feedback is not so easy to build. There are some challenges we met when design QueensParking. First, we spent a lot of effort and time exploring Figma. Through constant debugging, we had to create a detailed and interactive design that was very similar to the final product. The most significant change we made during our work is to reduce the number of buttons on the 'Home' page. This change makes users almost only need to focus on one button on each page and makes the whole process of interacting with our APP to be extremely clear and concise. Overall, at all stages of our work, we try to put ourselves in the user's shoes. These prototypes, whether low-fidelity or high-fidelity, can be validated and refined based on the feedback gathered, identifying missing gaps in the design that, when used in the iterative cycle of design and

development, will bring us closer to achieving the final perfect design.

Our design principles encompass simplicity, consistency, visual hierarchy, and a user-centered approach. Parking applications should be easy to use and navigate, featuring an intuitive interface that prevents user confusion and enables effortless access to desired features. The application's layout should be clean and concise, minimizing clutter and distractions.

Consistency is the second principle. We have maintained orange and white as the primary colors for the main page and icons, ensuring uniformity in key feature button fonts and the application's overall layout and structure. Simultaneously, we altered the color of crucial text to blue, which contrasts with orange, making the text more prominent.

The third principle is visual hierarchy. Our application is designed to assist users in finding parking spaces; thus, the map displaying available parking spots should occupy a central position, while other features and options should be placed in secondary locations.

Lastly, the application is user-centered, specifically tailored for Queen's University students to address their need for efficient parking space searches and payment processes. Users' requirements are limited to English proficiency and mobile device support, as our application is in English and necessitates mobile device compatibility.

When designing high-fidelity models, our team discovered that creating a simple, user-centric, visually appealing, and consistent application capable of providing real-time feedback was challenging. During the design of QueensParking, we encountered various obstacles. First, we invested considerable effort and time in exploring Figma. Through continuous debugging, we aimed to produce a detailed and interactive design closely resembling the final product. The most significant alteration made during our work was reducing the number of buttons on the "Home" page. This change allows users to focus on a single button per page, streamlining their interaction with our app and enhancing clarity and conciseness.

Throughout all stages of our work, we endeavored to empathize with users. The iterative advancement of our products is fundamentally intertwined with the thorough examination of user feedback and preferences. Both low-fidelity and high-fidelity prototypes can be validated and refined based on collected feedback, identifying gaps in the design. Employing these insights in the iterative cycle of design and development brings us closer to realizing the ultimate, flawless design.

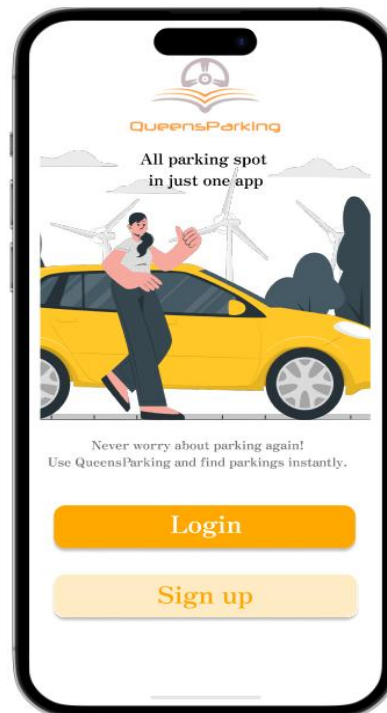


Figure 1.

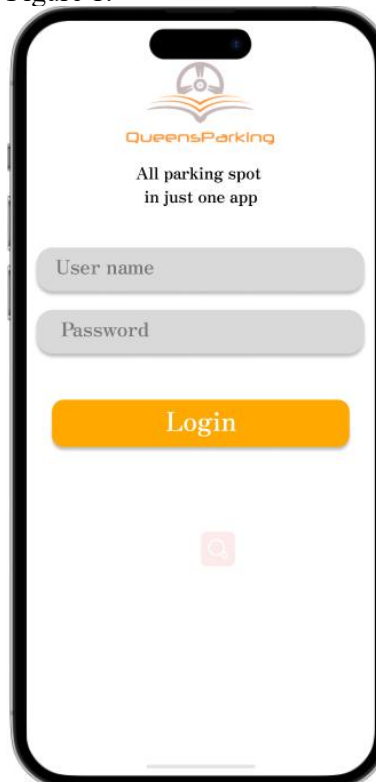


Figure 2.

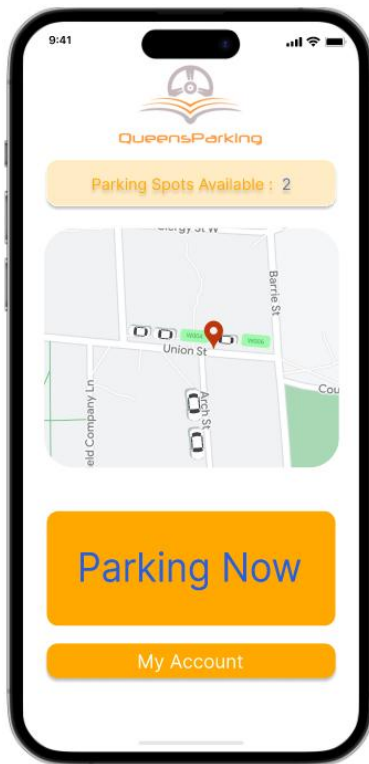


Figure 3.

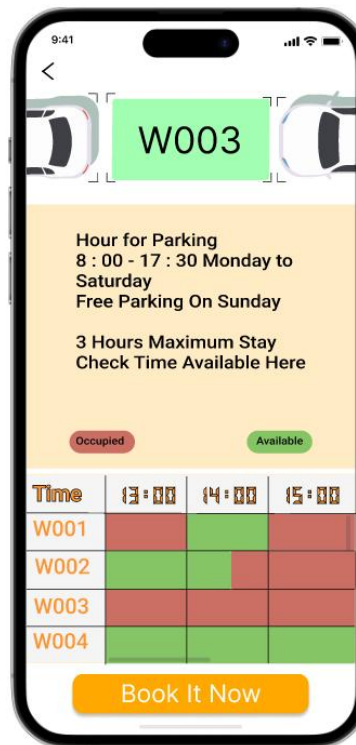


Figure 5.

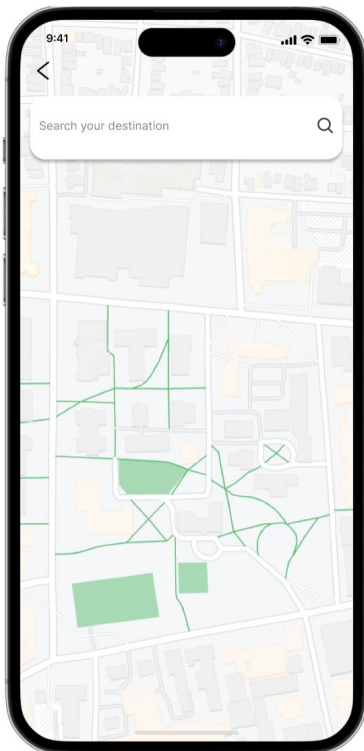


Figure 4.

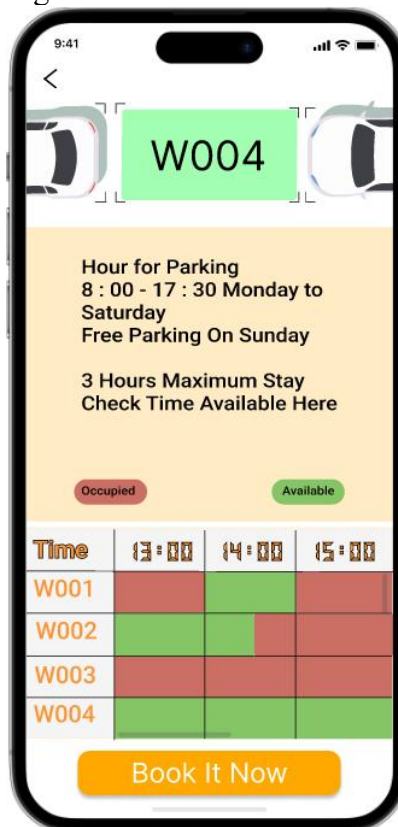


Figure 6

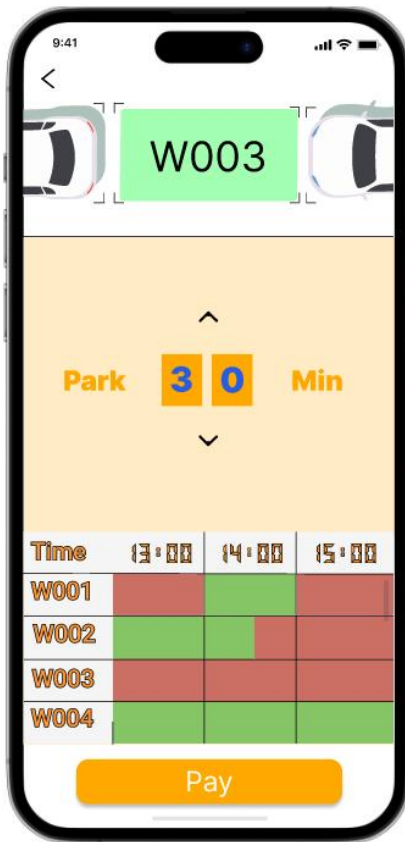


Figure 7.

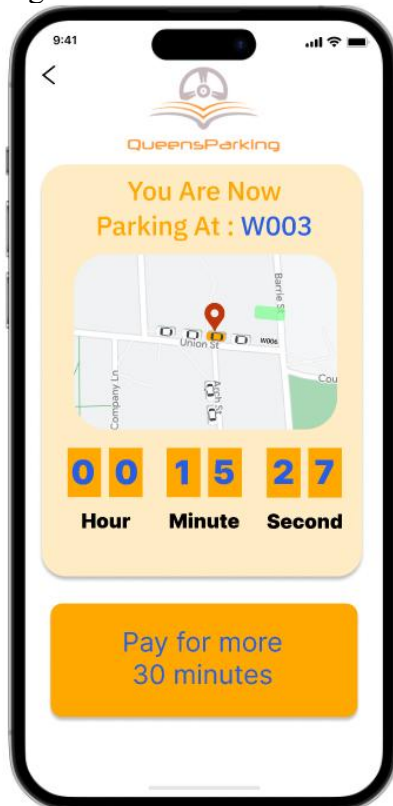


Figure 8.

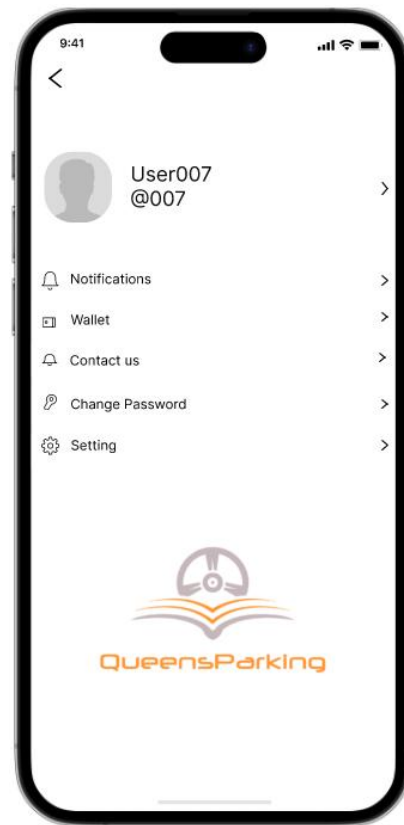


Figure 9.

#### HI-FI DEVELOPMENT

As I mentioned in the design section, our team will prioritize responsiveness, simplicity, and ease of learning. But at the same time, we also put a lot of effort into other GUI design principles.

In early sketching, our design process started with hand-drawn sketches to brainstorm and visualize the arrangement of functional modules in the mobile interface. These early sketches allowed us to focus on the layout and structure, exploring different possibilities and ensuring the application would be user-friendly and meet the necessary requirements.

We took a lot of reference from the UI (User Interface) design ideas of mainstream young people using software, and we reduced the number of components on the home page and arranged them in an orderly fashion, which increased the simplicity and orderliness. We considered adding a lot of features to help people with disabilities and minority groups, which is our consideration for adaptability. The key features are voice-to-text and multilingual settings. The logo has a grey and orange color scheme. It is very industrial and modern, but also very recognizable, which reflects visibility.

After finalizing the general design and style, we created a low-fidelity prototype using Pixso, an easy-to-use UI design software. We prioritized responsiveness, simplicity, and ease of learning while incorporating GUI design principles. The design included features to enhance adaptability, such as voice-to-text and multilingual settings. The logo's grey and orange color scheme created a recognizable, industrial, and modern appearance.

The low-fidelity prototype included interactive elements like buttons, dropdown menus, and sliders, with animations to provide user feedback. However, we identified limitations in Pixso for detailed icon design, specific functional codes, and interaction design, leading us to use additional software like Photoshop, CSS code compilers, and color mixing tools.

During the high-fidelity prototype design, we switched from Pixso to Figma, a more collaborative and feature-rich UI design tool, which improved team collaboration and efficiency. Figma allowed us to enhance the interactivity of the UI interface, develop corresponding button paths, and refine the overall design.

We employed several design principles in our user interface:

- **Visibility:** The grey and orange color scheme for the logo made it easily recognizable and modern.
- **Simplicity and Orderliness:** We reduced the number of components on the home page and arranged them in an organized manner.
- **Adaptability:** We incorporated features for users with disabilities and minority groups, such as voice-to-text and multilingual settings.

Our design also incorporated affordances like interactive elements (buttons, dropdown menus, sliders) and animations to provide feedback and improve user experience.

User feedback played a critical role in shaping our design, helping us address issues and improve usability.

- Enhances design elements and action buttons for better recognition (e.g., underline or outline).
- Reduces clutter for improved user focus.
- Polishes aesthetics, including color and typography consistency.
- Ensures clear navigation between pages.
- Avoids misleading designs or elements and ensures proper alignment and placement of components.

Our team made several technical accomplishments with the finished interactive design:

- Utilizing multiple design tools (Pixso, Photoshop, CSS code compilers, color mixing tools, and

Figma) for a more refined and collaborative design process.

- Transitioning from Pixso to Figma for better team collaboration and enhanced design features.
- Implementing interactivity and feedback mechanisms through buttons, dropdown menus, sliders, and animations.
- Developing button paths and seamless navigation between interfaces.

## USER EVALUATION

Method:

To conduct the user test, we recruited 10 participants who were representative of the target audience of our prototype. Our interviewees, who were mostly students at Queen's University, were between the ages of 18 and 28, as previously described. We showed our respondents our high-fidelity prototype and provided them with clear instructions on how to use it, telling them which buttons to click and the specific pages that correspond to each button.

Upon opening the software, the user is immediately taken to a login screen where they can choose to log in or sign up a new account. Upon successful login, the main menu will be displayed showing the currently available parking Spaces along with their map locations. Users can press a "Parking Now" button to direct them to the book page. Here, they can reserve the desired parking space and view the estimated parking time, and also browse the schedule of nearby parking Spaces by swiping the page. Click "Book it now" after you have selected the parking space to jump to the payment screen. Choose the time you want to stay and complete the online payment. Combined with valuable feedback from low-FI prototype testing, we added new features to enhance the user experience. For example, if users are concerned that their parking time may soon expire, they can easily open the application and click "My Parked" to check the remaining time. If they wish to extend their parking time, the "Pay for More 30 min" button is always available.

In order to gather user feedback on the app, we conducted online interviews and utilized questionnaires. Each interview lasted approximately 10 minutes, providing ample time for users to share their insights and rate their experiences. Throughout the interview, we collected valuable data as users responded to our carefully crafted questions. The following are the questions we posed during these interviews:

1. How would you describe your impression of the app's main page?

(1) Very positive

(2) Positive

(3) Neutral

(4) Negative

(5) Very negative

2. Do you find the background color gentle enough for your eyes?

Yes

No

3. How easy is it to read the text on each page?

(1)Very easy

(2)Easy

(3)Moderate

(4)Difficult

(5)Very difficult

4. In your opinion, is our app user-friendly? Please explain why or why not.

5. To what extent have the various parking functions in the app been helpful in your life?

(1)Extremely helpful

(2)Very helpful

(3)Moderately helpful

(4)Slightly helpful

(5)Not at all helpful

6.Are the necessary functions easily accessible without external guidance or assistance?

(1)Yes, always

(2)Yes, most of the time

(3)Sometimes

(4)No, most of the time

(5)No, never

Finding:

Question1:How did your prototype incorporate user experience goals? Give evidence.

Our prototype prioritized user experience goals through the following measures:

1. Intuitive Navigation: The app layout allows users to easily access essential features without external guidance.

2. Aesthetically Pleasing Design: The app's visual design, including its color scheme and typography, creates a comfortable user experience. We ensured the background color is gentle on the eyes and the text is easily readable.

3. User Testing and Feedback: We conducted online interviews and distributed questionnaires to gather user feedback, enabling us to make necessary improvements to the prototype.

4. Responsive Design: Our prototype functions seamlessly on various devices and screen sizes, ensuring unhindered access to the app's features.

5. Feature Prioritization: We focused on implementing features that directly addressed users' parking-related needs and pain points, resulting in an app that provides practical solutions and improves users' lives.

6. Continuous Improvement: By actively seeking user feedback and analyzing usage data, we have identified areas for further development, such as the addition of the "Renewal" function for extending parking duration.

Our prototype effectively incorporated user experience goals by emphasizing usability, aesthetics, and functionality, and by continually seeking user feedback for improvements. This approach ensures a valuable and enjoyable experience for users.

Question2:What is the range of possible actions a user can take to interact with your system? Is this range very restricted? What are its limitations?

The range of possible actions a user can take to interact with our system includes:

1.Registering an account or logging in as a guest.

2.Browsing available parking spaces and viewing their locations on a map.

3.Reserving a parking spot and estimating the parking duration.

4.Making online payments for the reserved parking space.

5.Checking the remaining parking time.

6.Renewing the parking duration through the app.

The range of user actions is focused on meeting the primary needs related to parking and providing a streamlined user experience. While not overly restricted, the system does have some limitations: Limited to Parking-related Functions, Dependency on Accurate Data, Internet Connectivity, Adaptability to Different Parking Systems. Despite these limitations, the app is designed to provide a user-friendly and focused experience for those seeking parking solutions.

As we continue to gather user feedback and analyze usage data, we aim to enhance the app and address any limitations to better cater to users' needs.

Question3:What happens if a user does something very unexpected?

If a user does something very unexpected, the system may react in a few different ways, depending on the nature of the action: Error Handling, User Support, Fail-Safe Defaults. While we strive to account for various user actions and create a seamless experience, it's important to continuously gather feedback and monitor app performance to identify and address any unexpected behavior or potential issues. This ongoing process helps improve the app's overall stability and user experience.

Question4:What one thing about your prototype was the most interesting for the users? most challenging? and most inspiring as opposed to similar technology?

Most Interesting: The real-time parking space availability and mapping feature proved to be the most interesting for users. It allows them to easily locate and visualize available parking spots in their vicinity, significantly reducing the time and effort spent searching for parking.

Most Challenging: The most challenging aspect for users was likely the online payment process, as it can be a sensitive area involving personal and financial information. Ensuring a secure, reliable, and user-friendly payment experience is crucial, and users may need to familiarize themselves with this part of the app to feel comfortable completing transactions.

Most Inspiring: Compared to similar technology, our app's most inspiring feature is the ability to extend parking duration through the "Renewal" button. This addition addresses a common pain point for users who may need to extend their parking time without physically returning to their vehicle. The convenience and flexibility provided by this feature demonstrate our commitment to understanding



and addressing users' needs, setting our app apart from competitors.

#### Recommendations:

Based on the findings from our user evaluation, we made several changes to the user interface and have some design recommendations for others building on our work:

1. Simplify the Registration and Login Process: To enhance user accessibility, we streamlined the registration and login process, minimizing the steps required and making it easier for users to access the app's core features.
  2. Improve Payment Process: We refined the payment process to ensure a more secure and user-friendly experience. This involved incorporating clearer instructions, enhancing security features, and offering multiple payment options to accommodate various user preferences.
  3. Enhance Typography and Contrast: To improve readability, we adjusted font sizes and styles, and optimized the contrast between text and background colors. This ensures that users can easily read and understand information displayed within the app.
  4. Responsive Design: We recommend adopting a responsive design approach to ensure that the app functions seamlessly across various devices and screen sizes, providing a consistent and enjoyable experience for all users.
  5. User Feedback and Iterative Improvements: Continuously gathering user feedback and analyzing app usage data is crucial to identifying areas for improvement. We recommend implementing a feedback loop, allowing users to provide suggestions and report issues, which can be used to inform future updates and refinements.
- By incorporating these changes and recommendations, we aim to create a more user-friendly, accessible, and enjoyable app experience that addresses users' needs and preferences, ensuring the app's success and continued growth.

#### DISCUSSION & REFLECTION

Throughout the project, we gained valuable insights from user evaluations and learned several key lessons that informed our design decisions. Our user study findings and the review of relevant previous work helped us create an original solution that addressed common user pain points related to parking. Our prototype faced limitations such as dependence on accurate data, internet connectivity requirements, and potential incompatibility with various parking systems. These factors may restrict the app's usability and effectiveness in certain scenarios.

Future enhancements could include integrating navigation features, traffic updates, real-time collaboration with parking management systems, and exploring offline functionality to address internet connectivity issues. Additionally, expanding the app to accommodate different parking systems and incorporating user preferences for customized experiences can further improve the app.

Our design stands out due to its user-centric approach, focusing on solving real-world parking challenges, such as the "Renewal" feature for extending parking duration. This focus on addressing users' needs makes our design original compared to previous related work.

#### For the question:

Our design differs from previous related work in its user-centered approach, real-time parking availability, and the convenient online renewal function, which addresses users' common pain points.

Upon reflection, if given the opportunity to start again with unlimited resources, we would invest more in user testing, explore additional features to enhance the app's functionality, and consider integrating our solution with other transportation services for a more comprehensive experience.

Lessons learned that we would like to share include:

- (1) Prioritize user needs and feedback: Continuously gather user feedback and adjust the design accordingly, ensuring a user-friendly and valuable experience..
- (2) Focus on a seamless user experience: Streamline navigation, optimize typography and contrast, and provide helpful resources to address user challenges.
- (3) Remain adaptable and iterative: Embrace an iterative design process and be open to change, continuously refining and improving the solution based on new insights.
- (4) Consider scalability and compatibility: Design the app to function well across various devices, screen sizes, and parking systems for a broad and inclusive user base.

In conclusion, our project's progression from proposal to the current stage has been guided by user-centric design principles, iterative improvements, and a focus on addressing genuine user needs. The high-level takeaways from user testing and prototyping have informed our design decisions, resulting in a more effective and enjoyable app experience.