ParkingEase

Shopping Mall Parking App

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# Product Introduction

**Overview:**

The innovative parking application ParkingEase enables shopping malls to streamline their parking services for visitors. Through its real-time features the app enables users to see available spots and get easy navigational assistance combined with secure digital payment methods that offer ease to users during their parking experience.

**Key Features:**

* Before reaching the mall, visitors can view in real-time which parking spots remain available through the app features. The app will guide users toward opened parking locations through automatic navigation instructions. Online parking ticket entry and exit occurs through QR codes together with license plate recognition systems.
* Users can utilize the reservation system through which they can pre-book their preferred parking locations for added convenience. The application allows visitors to make cashless payments using various alternative payment options for parking expenses.
* Security Alerts: Receive notifications about your parked vehicle.
* EV Charging Spot Finder: It helps users search for electric vehicle charge spots and makes reservation bookings.

The facility enables disabled visitors to locate dedicated parking locations effortlessly.

**Benefits:**

* Reservation system benefits users who want to skip searching for a parking spot within the parking area during peak hours.
* Convenience: Manage parking remotely with a user-friendly interface.
* Security: Ensure your vehicle’s safety with integrated security features.
* Efficiency: Optimize parking space utilization for mall operators.

**Traffic headaches completely disappear when using ParkingEase since it delivers ultimate parking convenience at the mall through an enjoyable experience.**

# Product Vision

**Research On Similar Apps**

1. **ParkMobile**

* **Good:**

Offers digital payments for parking.

Users can check parking spots in real time through its service.

The platform enables users to access both cities and parking garages without interruptions.

* **Bad:**

Limited reservation options in many locations.

New users encounter complexities when trying to use this system because of various zones together with different pricing options.

Users sometimes encounter payment-related technical issues within the application.

* **Features to Use in ParkingEase:**

**Real-time availability tracking.**

**Digital payments.**

**Easy user interface with clear navigation.**

1. **SpotHero**

* **Good:**

Users can make advance booking for their parking spots through the application.

Discounts and promotions for pre-booking.

Clear pricing structure.

* **Bad:**

The service operates within particular locations throughout cities together with their selected garages.

Users sometimes encounter troubles while booking as parking slots get fully reserved.

The application does not provide up-to-date information about vacant parking spaces.

* **Features to Use in ParkingEase:**

Reservation system for guaranteed parking.

Discounts are available for those who book their parking early and the pricing system remains totally straightforward.

Integration with EV charging stations

|  |  |  |
| --- | --- | --- |
| Product Vision Statement | | |
| FOR | Visitors who use shopping malls for parking expect a non-stop parking experience. | Example: ParkingEase is for shopping mall visitors, such as daily shopper, family or business professional who require an easy, quick and convenient way to parking without suffers time looking for a space. |
| WHO | Customers experience difficulties finding parking spots while waiting in line for too long and dealing with poorly managed payment systems. | Example: Many shoppers spend a lot of time searching for parking, difficulties with complicated payment systems, and do not find accessible parking spaces. Parking process should be streamlined, and mall experience should be improved with a smart solution. |
| The ParkingEase is a smart parking app | | |
| THAT | It provides real time parking availability, guided navigation, cash free payment and such other conveniences that makes parking hassle free. | Example: It ensures a stress-free parking experience by giving real time availability updates diagonal parking and paying over the net, thus avoiding the hassles that normally come with parking and saving time. |
| UNLIKE | Traditional mall parking system that is manual and much frustrating leading to delays in entering and exiting the parking lot. | Example: In comparison, existing mall parking systems from this Vaunt spire are manual searching, physical tickets, and cash-based payment, resulting in inefficiency and delay form. |
| OUR PRODUCT | Picked up with real time tracking, easy navigation and a completely digital experience, to give the best, fast, convenient and stress-free parking solution. | Example: Based on real world tracking, reservation, and Navigate functionality, our product provides parking efficiency optimization, waiting time reduction, and user convenience improvement. |

# Features

**Feature List for ParkingEase:**

1. Real-time Parking Availability
   * 1. Users were able to learn which of the parking spots are available before making their way to the mall.
     2. Real time updates with the help of the sensors and cameras.
2. Smart Navigation
   * 1. It gives you turn by turn navigation to the nearest available parking spot.
     2. It routes users to accessible and EV charging spots if you need.
3. Digital Ticketing & Entry
   * 1. It supports QR code based or license plate recognition entry and exit.
     2. It eliminates the needs of paper tickets.
4. Parking Spot Reservation
   * 1. It allows users to make a reservation in advance for a convenience.
     2. It also offers a premium reserved spot for a fee.
5. Cashless Payment System
   * 1. It takes credit/debit card, digital wallet (Apple Pay, Google Pay) and in-app payments.
     2. Charges auto as per the stay duration of the user.
6. Accessibility Parking Assistance
   * 1. It also highlights designated accessible parking spots.
     2. Spots for people with disabilities can be reserved.
7. Security Alerts & Monitoring
   * 1. If your vehicle is tampered with, users will be notified as a result.
     2. It also integrates with mall security cameras for more protection.
8. Multi-Vehicle Management
   * 1. An account can register multiple vehicles.
     2. Reserve or pay for parking and switch vehicles.
9. Customer Support & Emergency Assistance
   * 1. Parking issue chat support in-app and also the emergency SOS to contact mall security.
10. Loyalty & Discount System
    * 1. There are points earned by users as per their frequent parking.
      2. Special discounts for long-term parkers or premium users.
11. Business Integration & Validations
    * 1. It can be used to validate parking for customers of mall stores.
      2. Parking discounts for purchases can be offered by businesses.
12. Find Your Car Feature
    * 1. Aids users in tracking down their parked car using GPS directions.
      2. It saves what parking location they were in automatically upon entry.
13. EV Charging Station Locator
    * 1. Provides displays and reserves EV charging stations in the mall parking lot.
      2. Provides charging and pricing status

Based on the following features, the features were identified.

1. Key product vision: the main things that ParkingEase will do (such as making parking seamless).

2. Competitive research: investigate similar apps to ParkMobile (SpotHero) to find strength and weakness.

3. User demand: find an available place to sit down, staying in line and an inconvenient payment system.

4. Technology helps: using real time tracking, AI avoidance, and ‘digital’ payments to make application with tech trends that help improve speed and cost effectively.

# Personas

## Persona 1

Dr. Emily Johnson is a Computer Science lecturer at SETU. She is 42 years old and is very proficient with technology. She grew up in a small village in the countryside where there were only a few shops and parking was never an issue. Emily has a PhD in Artificial Intelligence and has been lecturing in SETU for more than 10 years. While she is very comfortable with technology she still appreciates an app that is going to be easy to use.

Every day Emily drives to college where she faces the challenge of finding parking spots particularly during busy peak hours from 9-12 when the car park is most busy. She is unhappy with how long it takes her to look for parking in the morning because it reduces her available preparation time for both lectures and meetings and ads unnecessary stress to her mornings. The parking app's features of Real-time Parking Availability and Smart Navigation would be very useful to her because they would help her find the closest spot without having to spend 10-15 minutes patrolling the car park searching. She finds the EV charging spot filter useful because she has a hybrid car that she sometimes has to charge on campus.

Emily has very good technical abilities which lead her to demand an app with intuitive design and quick performance and dependable functionality, but she wants it to still be easy to use. She makes use of many of the features of the app such as the booking option as well as the EV filter.

## Persona 2

Alex Martinez studies Computer Science as a third-year student at Setu and he is 21 years old. Since his early childhood Alex has spent time with technology in his tech-obsessed family home. Alex demonstrates a strong enthusiasm for new applications and technological tools by testing them before their peers do.

Alex drives to campus often but faces difficulties locating parking spaces particularly when traffic is heavy. The EV charging spots interest him because he plans to purchase an electric vehicle in the near future. Alex finds the Real-time Parking Availability feature of the parking app particularly exciting because it saves him from the hassle of parking spot searches. Smart Navigation helps users locate their closest parking spot through its guidance system, particularly during urgent situations when they need to get to class on time.

The find your car feature is very helpful for Alex as although he is very smart, he is very forgetful and often forgets where he parks, adding 5-10 minutes of searching for his car at the end of most college days. He is also interested in the security alert feature because his car is quite expensive as he inherited it from his grandfather, and he appreciates the safety it allows him to feel in parking his car on campus.

### Persona 3

James O'Connor is a 24-year-old student in SETU’s Psychology programme. James is physically disabled which requires him to use a wheelchair for movement. His family supported his academic goals through every obstacle he faced. James obtained his bachelor's degree in Psychology before starting his master's thesis work in Setu.

James uses a modified vehicle to travel to campus and depends on accessible parking locations that are situated close to his department building. He gets stressed when he cannot locate accessible parking because it creates obstacles for attending classes and meeting with his friends. The parking app would be extremely useful to him because it helps him view Real-time Parking Availability and find accessible parking spots with ease. Smart Navigation proves beneficial to him because it automatically directs him to the closest open accessible parking spot without forcing him to search which would stress him out more.

James wants an app interface that includes straightforward design with large buttons and step-by-step instructions along with voice assistance for navigation. The app would benefit students with similar needs through accessibility filters and notifications about open accessible spots to enhance its user-friendliness and allow them to find their accessible spots easier.

# Scenarios

## Scenario 1

Dr. Emily Johnson a lecturer at SETU who drives a hybrid car needs to prepare for teaching lectures and attending meetings but finding parking at peak times adds extra stress. She hears about ParkingEase from a colleague.

Emily downloads the ParkingEase app at home and sets up her account with her car details and adding the EV charging spot filter. Using the simple interface, she checks the availability of parking spots near her office and sees the highlighted charging spots.

The following morning, as she approaches campus, she uses the app to find an open space. That afternoon she realizes her schedule for the next day is jam packed and she ant afford any parking stress, so she reserves a spot near her office. The process of booking is hassle free.

Emily grows overtime to rely on ParkingEase for daily search for EV charging spaces. The apps efficiency fits swimmingly with her hectic routine giving her more time to focus on research rather than parking stress.

## Scenario 2

Alex Martinez is a student in third year in SETU. He drives to campus often but when there’s heavy traffic parking frustrates him. As a tech enthusiast he was interested to test out ParkingEase app.

During Alex’s morning commute he opens ParkingEase and checks parking availability in real time. The app shows there’s a few spots near his desired building. As he drives the smart navigation features guide him toward the nearest open space saving him time before class checking taken spots.

After he parks, Alex scans his license plate so that the automatic ticketing system can keep track of which car he has parked in this space.

After all his lectures Alex finds his car with the find your car feature, and he uses the apps EV charging station locator to check how where and how to reserve a charging space, as he has been thinking about buying an electric car.

Alex shares how the app has made his daily routine easier with his tech savvy classmates. He explains how the smart navigation, real time availability and digital tickets use tech to make parking much more convenient.

## Scenario 3

James O’Connor is a Psychology student in SETU who drives to campus everyday in his modified vehicle. As he is a wheelchair user, he finds it quite stressful to find accessible parking spots near his lectures. He often has to circle the car park multiple times.

James downloads the ParkingEase app and creates a profile with the accessibility filter. The app shows him the availability of disabled parking spots, James reserves a space right next to his building for the next morning.

As he arrives on campus the Smart Navigation feature directs him to his space. The simple interface and voice assistant make it seamless to find. As he enters his parking space the app automatically handles the digital ticket systems. In the afternoon, James forgets where he has parked, but fortunately ParkingEase helps him save time by leading him straight back to his car.

After a few weeks use of ParkingEase James feels more less stress anxiety about parking. The app saves him time and gives him peace of mind to know he can always have an accessible space reserved.

# User Stories

1. Real-time Parking Availability

* My goals as a lecturer are, for example, that I can check real-time parking availability to quickly locate a space and not waste time until my lectures.
* As a student, I want to see when there is open parking spot available so that I am not looking around while I drive.

2. Smart Navigation to Parking Spot

* What I as a driver want is for turn-by-turn navigation to an available parking spot so that I don’t have to look for it manually.
* Being disabled, I want the users of the app to be able to lead me to the closest accessible parking space.

3. Digital Ticketing & Entry

* For instance, as a student, I wish to scan my license plate going in so that I get parking session recorded automatically.
* I as a driver want to use a digital ticket system so there is no need to worry about losing a physical ticket.

4. Reserving a Parking Spot

* Being a busy lecturer, I would like to book a free parking space in advance so that I don’t have to worry when morning comes.
* I am a wheelchair user and therefore I would like to book an accessible parking space in anticipation to make sure it is there when I need it.

5. Cashless Payments

* A driver needs to be able to pay for parking digitally in the way they choose instead of with cash or cards at the machine.
* In my role as a student, I desire an electric payment system implemented based on license plate so that I don’t have to physically pay after each session.

6. EV Charging Station Locator

* Being an EV owner, I want to know where the available charging spots now, in real time, so that I can think of a plan for my charging session.
* Being a hybrid car owner and having a lecture building close by, I want to filter for charging spots located close to my lecture building to charge while attending my class.

7. Find My Car Feature

* When I was a student, I don’t want to waste time to find my parked car after the lectures since I know the parking location.
* I am a forgetful driver, and therefore I want the app to direct me back to the parking spot of my car, so that I do not waste time wandering.

8. Accessibility Parking Assistance

* A person with a disability wants an Accessibility filter dedicated exclusively for their access to accessible parking spaces.
* Also as a wheelchair user, I wish to interface with the app using large buttons and voice assistance to facilitate navigating the app.

9. Security Alerts & Monitoring

* Being a car owner, I need to get alerted when my vehicle is tampered with so as to respond in time.
* I am a student with a car that is expensive, I want to be able to monitor security in the app so I am feeling safe when parking on campus.

10. Customer Support & Emergency Assistance

* I as a user require in app customer support to sort out any parking related issues at efficient speed.
* Being a driver, I need an emergency assistance button so that I am able to assist campus security in the case of a problem.

# Revised Features List

New Features Added:

1. Voice Assistant for accessibility – which grants users like James the opportunity to use the app more hands-free and without having to rely on small text or manual interactions.
2. Emergency Assistance Button – Easy to contact the campus security for help.
3. Larger UI Elements for Accessibility – Improves app usability for users with physical disabilities.

Refinements:

* Smart Navigation now offers an option to filter for an accessible parking spot.
* Find My Car feature now points to saved locations with a steerable return path.
* Reservation system opens and allows people priority booking on accessible spots.

# Prototype

## Tool used to create prototype( briefly say if you found it easy or not)

# UML Diagram

## Use Case Diagram & Activity Diagram

A diagram of a student

AI-generated content may be incorrect.A diagram of a parking spot

AI-generated content may be incorrect.

## Class Diagram

A diagram of a company

AI-generated content may be incorrect.