

# Project Proposal for CSCD 350 Spring 2024

*ParkSmart*

*Version: 1.0*

Team 2: Boolean Bros



Submitted By

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GitHub Repository: <https://github.com/Sanmeet-EWU/github-teams-project-bid-boolean-bros>

## **Motivation**

### **Problem Statement:**

In urban areas, finding parking spaces can be a real challenge for drivers. The traditional method of searching for parking typically relies on manual observation, which can result in wasted time and congested traffic, which leads to inefficient urban mobility.

Additionally, parking lot owners face challenges in managing their parking facilities effectively. Current methods of monitoring parking occupancy are often done by manually driving a vehicle around the parking lot and using parking enforcement equipment to scan license plates. This method can be labor-intensive and prone to inaccuracies.

### **Intended Users:**

The intended users are drivers who consistently need to and struggle to find parking spots in an urban environment. Some examples of these drivers include urban residents who own vehicles and regularly need to find parking spaces, commuters who rely on their vehicles for transportation to work and need a space to park, and tourists who are new to a city and need to find reliable parking.

Parking lot owners/companies could also be users of this application. Parking lot owners may want to check how many parking spots are available or taken, and use this information to compare how many parking spots are actually paid for. If our application says that there are more parked vehicles than paid customers, then parking enforcement can go out and check license plates for non-paying vehicles.

### **Reason for the Problem:**

The reason for this problem is the lack of real-time information on available parking spaces. The traditional method of manually searching for parking spots can be unreliable, time-consuming, and frustrating. Drivers often waste valuable time circling the city or parking lots searching for an open space, which can lead to increased traffic congestion, fuel consumption, and even air pollution.

## **Solution Benefits:**

By guiding drivers to available parking spots efficiently, ParkSmart will help reduce traffic congestion. With fewer cars circling searching for a parking spot, not only will the user be happy to find a spot easily and waste less gas, but every other driver will be happy that one less person is taking up road space.

Parking lot owners will also be able to save on labor costs by only deploying parking enforcement when they notice a discrepancy in how many customers paid and how many are parked. Additionally, this application will give parking lot owners insight on how busy a parking lot is. If the parking lot owners notice a parking lot isn't busy and/or losing profit, the owner may want to consider renting the lot to other companies or completely selling it.

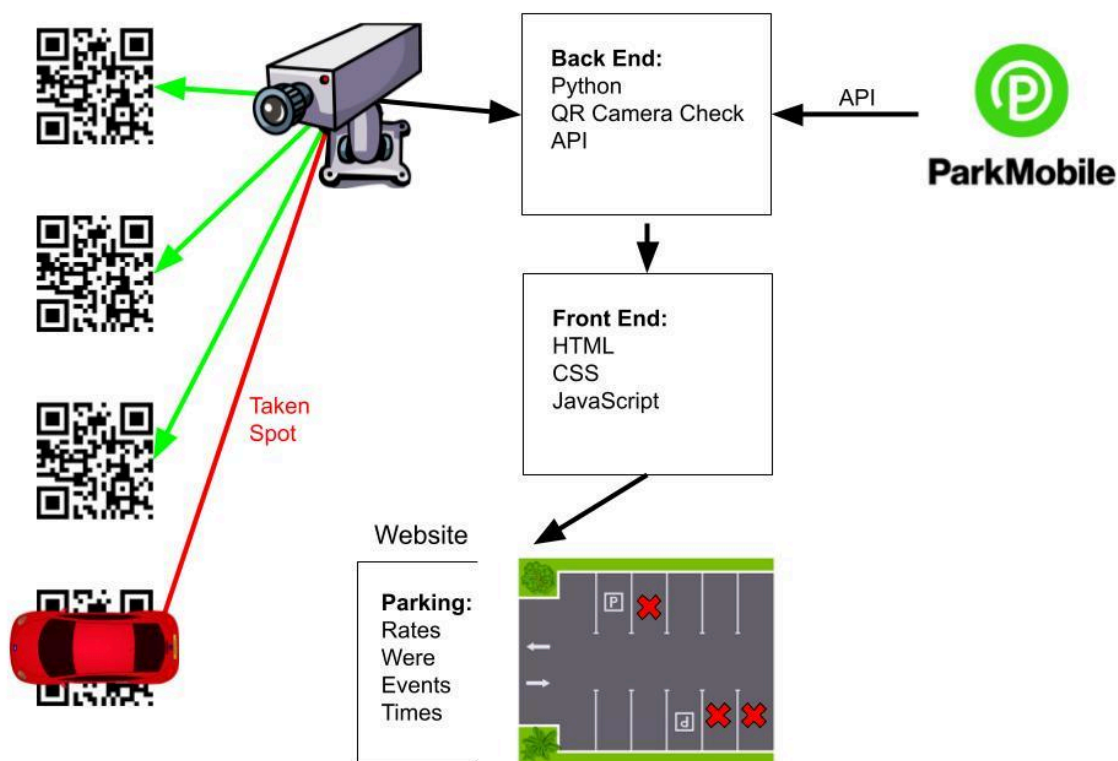
## **Approach**

Our approach involves developing a web application that utilizes real-time data to assist drivers in finding open parking spaces, compare the fees, as well as see how holidays, events, and after-hours affect the rates. Unlike traditional methods reliant on manual observation, our project will deploy cameras equipped with QR code[\[1\]](#) scanning capabilities in parking lots. QR codes will then be placed on parking spaces, and cameras will be continuously monitoring each QR code affixed to each parking spot. If the camera can no longer detect a QR code, then that must mean a car is parked in that spot. This method will provide accurate and up-to-date information on parking availability. Along with parking lots, this project can leverage existing data by integrating APIs[\[2\]](#) like ParkMobiles to provide accurate and up-to-date information on street parking from parking meters. By tying all the information from our QR scanning cameras and parking companies' APIs, we will be able to publish this information into one database and then offer it to users from a single web application to make parking sustainably easier for drivers. The application will also benefit parking lot owners by offering insights into parking occupancy, potentially optimizing parking lot usage, and reducing labor costs associated with manual monitoring. One key difference from previous approaches is the integration of real-time data collection and analysis, which enhances the accuracy and reliability of parking information. However, a potential limitation of our approach would be the initial setup cost associated with

installing cameras in parking lots, which could pose a barrier to adoption for some parking facility owners. Overall, by providing a user-friendly interface and reliable parking information, ParkSmart aims to improve urban mobility, ensure parking efficiency, and save money for both drivers and parking lot owners.

## Challenges and Risks

Given our strict time limit, the most serious challenge we can see in developing this project would be integrating other company APIs to include street parking availability. To minimize this risk we will use an iterative development approach, such as Agile[3], and develop our project in small batches, as well as setting milestones. Working in small batches will be able to give us a sense of how we should scale our project, and setting milestones will give us a way of monitoring progress. If we are cutting it close to our time limit, we will easily be able to scrap using other companies' APIs and prioritize monitoring parking lots with QR codes.



Hours spent: 7 hours

## **References**

- [1] QR code: A two-dimensional barcode that is machine-readable and contains encoded information.
- [2] API: Application Programming Interface. Sets of rules, protocols, and tools that allow different software applications to communicate with each other.
- [3] Agile: An iterative approach to project management that helps teams be responsive and deliver value to their customers faster.