

EE / CprE / CybE / SE / SD 491– sdddec24-17

SmartPark: IoT-Driven Automatic Parking Solution

Week 3 Report

Feb 14 – Feb 20

Client / Advisor: Md Maruf Ahamed

Team Members:

William Clemmons - Project Lead and Software Design.

Kennedey Reiling - Client Interaction and Hardware Design.

Brian Witherspoon - Hardware and Software Design.

Ethan Haberer - Hardware Design and Quality Control.

Zachary Sears - Hardware Design and Quality Control.

Mubassir Serneabat Sudipto - Client Interaction, Quality Control, and Software Design.

Past Week Accomplishments

- Application Team:
 - Established two avenues for cross-platform app development:
 - React Native
 - Since the team already has some experience with React, learning and using React Native will take considerably less time.
 - Has worse performance when compared to Flutter.
 - Flutter
 - Maximizes performance at the cost of being more challenging to learn.
- Server Team:
 - Looked into different cloud hosting options to determine which should be used for the backend server:
 - Amazon Web Services (AWS)
 - Offers a comprehensive suite of IoT services, including AWS IoT Core for device connectivity and AWS RDS for MySQL database hosting. Known for its scalability and security.
 - Google Cloud Platform (GCP)
 - Provides Google Cloud IoT and Cloud SQL for MySQL, supporting real-time data processing and analytics. GCP is noted for its data analytics and machine learning capabilities.
 - Microsoft Azure
 - Features Azure IoT Hub for device management and Azure Database for MySQL, offering easy integration and extensive support for IoT applications.

- Self-Hosting
 - The cheapest option is available among all other options.
 - We would be responsible for both maintaining and securing the server.
 - Back end as a service (BaaS)
 - It is cheaper than cloud services upfront but can become pricing long-term.
 - Scales quickly, efficiently, and as needed.
 - Hardware Team:
 - Researched sensors to use for object detection and made a list weighing the pros and cons:
 - Lidar.
 - Ultrasonic.
 - Infrared.
 - After looking at the pros and cons between them, we recommend moving forward with ultrasonic sensors.
 - Also discussed was the placement of the sensor when looking at individual spots.

Pending Issues

Currently, there are no outstanding issues. Efforts are focused on refining the selection of products to be incorporated into our design framework.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
William Clemmons	Researched and consolidated our options for app development. We have also researched options for the server.	4	12
Kennedey Reiling	Researched possible sensors to determine the most reliable and cost-efficient type.	4	11
Brian Witherspoon	We met with the hardware team to research what sensor would best be used moving forward. I narrowed it down and will discuss it with the client.	4	11
Ethan Haberer	The app development team had a meeting to discuss development frameworks, and I did personal research on these frameworks.	4	11

Zachary Sears	Met with the hardware team to research sensors to narrow options and decide which to use for the project.	4	11
Mubassir Serneabat Sudiopto	Following a comprehensive investigation of various server and hosting alternatives for our project, a detailed documentation titled "Server and Hosting Research" has been compiled. This document elucidates the methodology and infrastructure proposed for implementation in the project.	4	12

Plans for Coming Week

- Present our research to our client and determine what to use in our prototype and final product:
 - Sensor recommendation.
 - Arduino WiFi board.
- Meet with the client to discuss application frameworks:
 - Flutter vs. React Native.
- Condense all research into a single document.