

Smart Park



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Problem

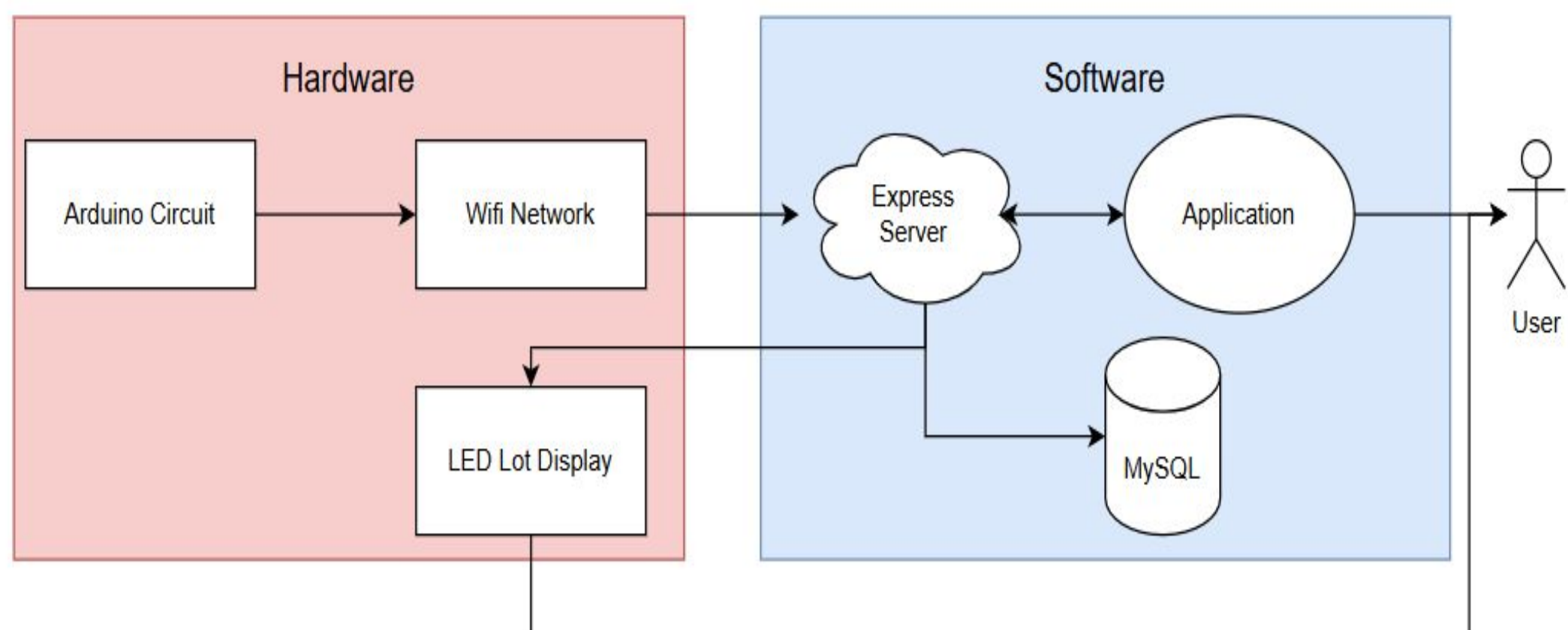
Currently, parking at Iowa State is inconvenient. Finding parking is always difficult because of unknown availability and restricted areas. A systematic process to ensure that a user can park efficiently is necessary.

Solution

Our goal is to streamline the parking experience by:

- Enabling drivers to see live updates on which parking lots are open
- Allowing drivers to reserve parking spaces in advance

Design Approach



Testing

Hardware testing

- Sensor Tests
- Server Communication
- WiFi connection and management

Software testing

- Manual testing old functionality after adding new features

System testing

- Half trip testing
- End to End testing

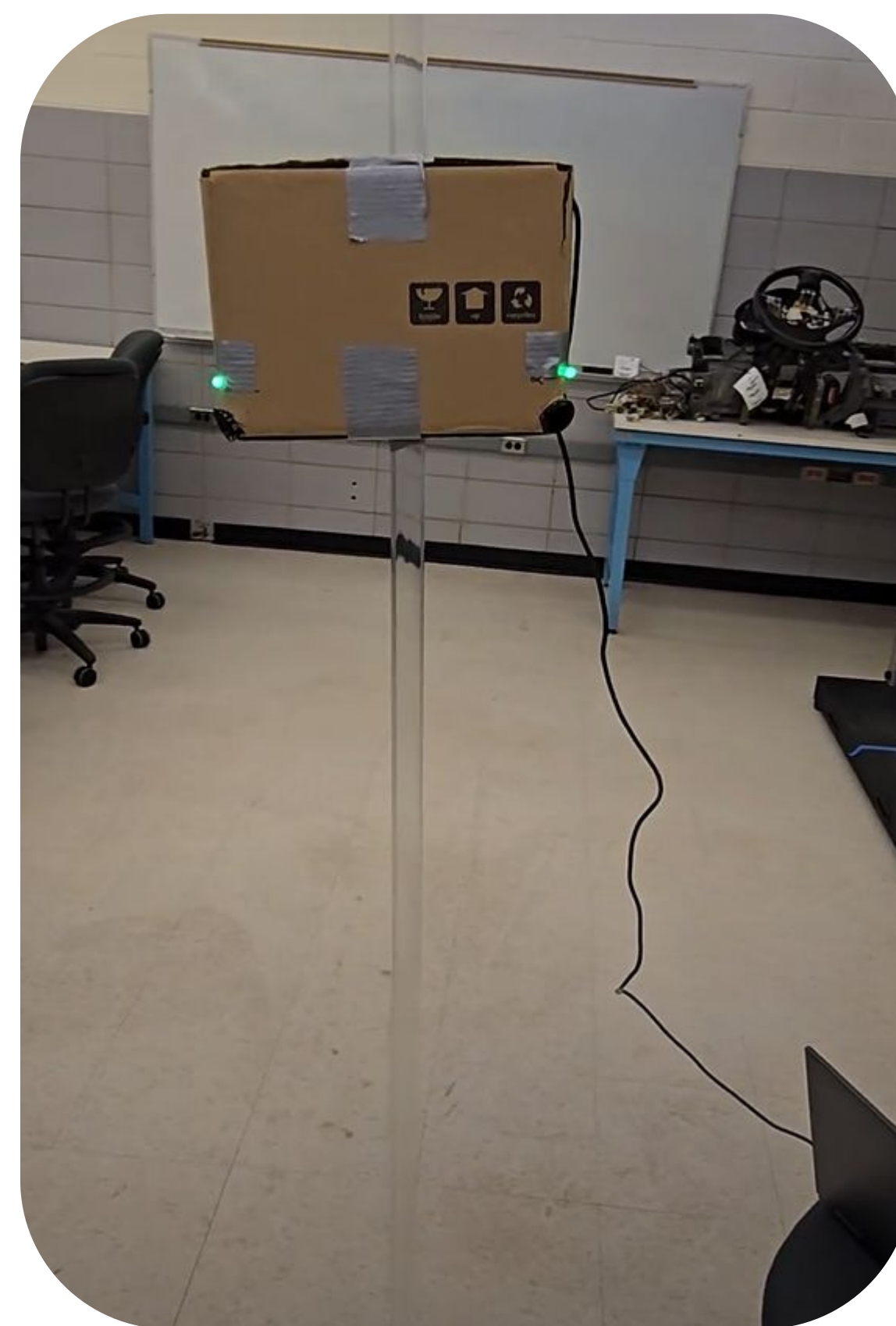
Functional Requirements

- Sensors provide live, and accurate information to a server.
- App must be user-friendly, allow reservations, and provide navigation to spots.
- Make payments within the app and/or an online version of the app

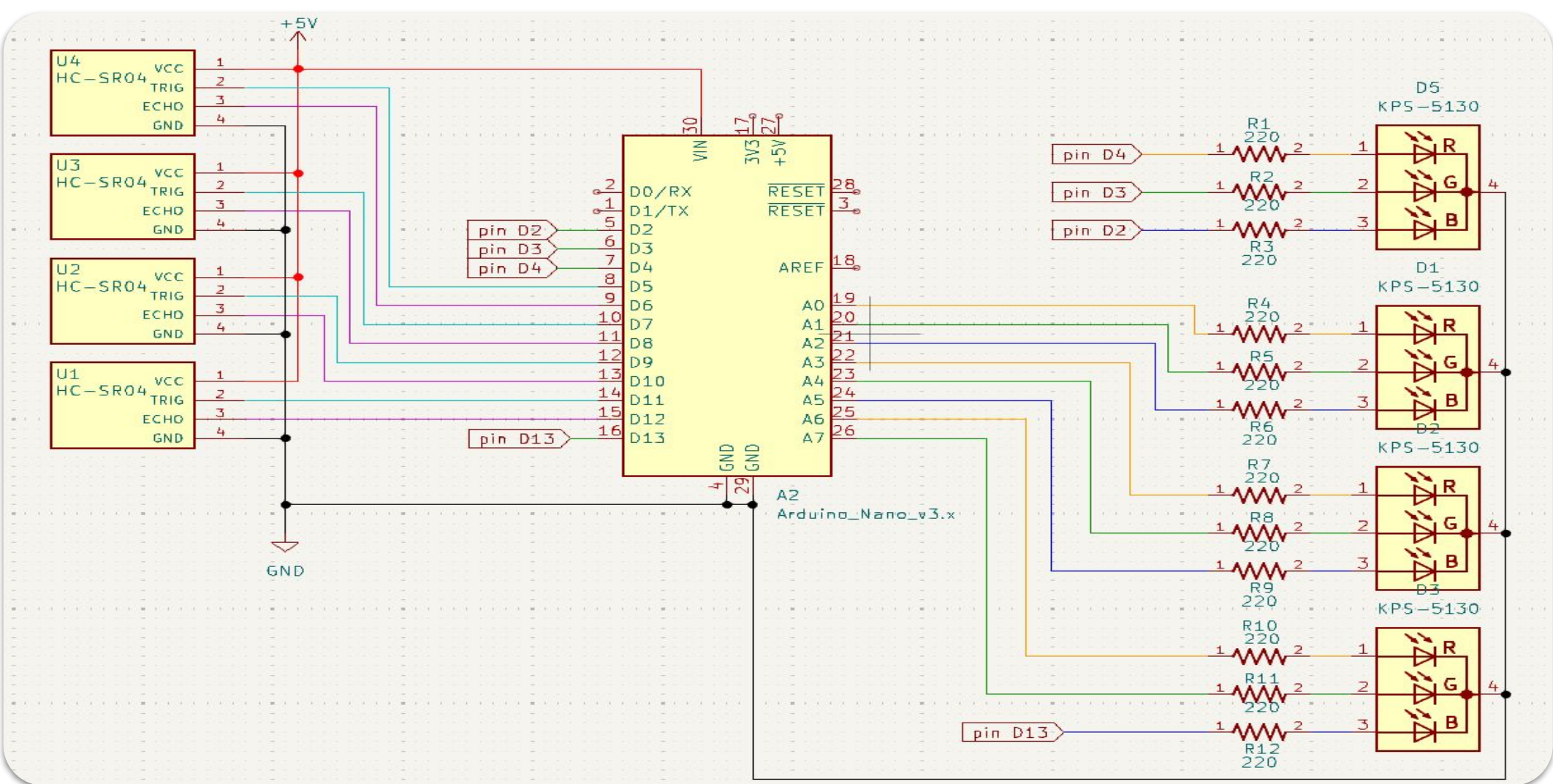
Non-Functional Requirements

- The system must maintain accurate, real-time updates on parking spot status.
- Safe and secure payment
- The application must be easy to navigate.

Prototype



Hardware Circuit Schematic



Technical Details

- Hardware
 - Arduino Board
 - Ultrasonic Sensors
 - RGB LEDs
- Software
 - Javascript
 - React Native
 - Node.js
 - MySQL

Edge Cases & Solutions

Scenario	Solution
User parks in invalid parking spot	We will contact the parking division
User parks in an invalid spot temporarily.	We will notify the parking division after a set amount of time.
User parks poorly (takes up multiple spots)	Have a user report it.
User parks in a correct spot but does not pay	Contact parking division.
Someone takes a user's reserved spot	If a spot is reserved, only the user who reserved it can pay for it.
Sensor is not working	Keep track of last time the board talked to the server

Application Layout

