Background

- There lacks a real-time tracking system for public parking spots in general, but especially in dense urban areas.
- Commuters in the US can spend considerable time each day searching for parking.
- This project aims to create a real-time tracking infrastructure across cities globally, by saving individuals time and energy by using image recognition techniques.

Objectives & Specifications

- Using image recognition techniques in real-time to:
  - Detect if image contains a parking spot
  - Detect number of parking spots (if multiple)
- Output Parking Spot data to User Application
  - System must be able to display back a map of the available spots to a user.
  - A parking lot owner must be able to configure a registry of cameras and positions to be monitored by the system.

System Design

Hardware

- Implementation of Server Interface:
  - Utilize mounted cameras and Wi-Fi capability
  - Transmit images taken from camera to server via Arduino
- Server-Side Application:
  - Parking spots registered in server connected to database
  - Requests cycled; image recognition algorithm processes image and determines open/empty parking spots and number.
  - Server updates table entries and allows client-side application to retrieve parking spot data.
- Client-Side Application: Allows users to view availability of parking spots.

Software Control

Performance Metrics

- Accuracy:
  - System outputs number of parking spots approximately 90% accurately and updates to app with minimal delay which can range from few seconds to about 5 minutes.
  - Number of available and taken spots correctly identified by algorithm (design requirement: minimum of 5 spots)

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