Abstract

Spots is an application that will give users a bird’s-eye view of a parking lot (they select) that displays every spot and whether each spot is open or occupied, all in real time. Additionally, users will be able to see the total occupancy level of the lot and benefit from the other features Spots has to offer.

Approach

- Camera attached to computer to take pictures of parking spots at various angles
- Python* for vehicle detection
- Occupancy results stored in Firebase
- Android Studio to develop user application

*ImageAI, TensorFlow, NumPy, SciPy, OpenCV, Matplotlib, etc.

Results

Our primary goal from the beginning was to be able to determine if a vehicle is in a parking spot and to display that information through a user application. As seen above, we successfully accomplished this goal by accurately detecting the vehicles in the 3 given parking spots and properly displayed the spot status on the app screenshot. The foundation of the application is built upon this technology working as expected, and through numerous tests, various angles, and persistent troubleshooting, we have a basis for moving onto an entire parking lot.

Motivation

- Wasting time driving up and down each aisle in a crowded parking lot
- Being late to class/work
- Tickets from parking in unauthorized lots
- Potential seen in additional features
- Lack of a current application that provides a similar solution

Potential Features (in progress)

- Scalability to an entire parking lot (occupancy level)
- Predictive model
- Car finder (forgot where you parked)
- Spot reservations
- Connection w/ RU DOTS

References & Acknowledgement

- https://docs.python.org/3/
- https://firebase.google.com/docs/
- https://developer.android.com/docs
- https://towardsdatascience.com
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