

Detection and Identification of Parking Spots Using Image Processing Techniques

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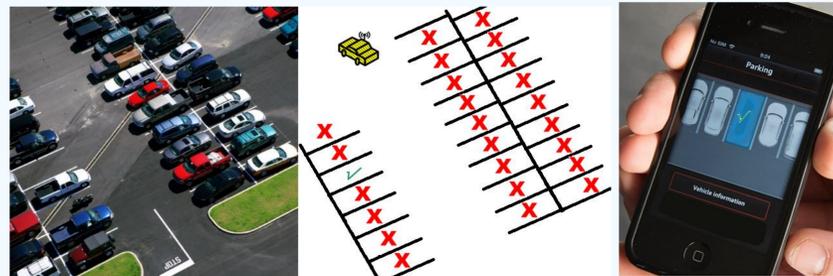


INTRODUCTION

- Locating a parking space at ERAU is a time-consuming feat for students, faculty, and staff members.
- There are 30+ parking lots of varying capacity and unique restrictions on the ERAU campus.
- Approximately 1500 students park daily on campus and the majority of the 1000 faculty and staff members have a vehicle.
- The average time taken to locate a parking space is 15 minutes between the hours of 8:30 AM to 11:00 AM.
- This parking time is expected to increase due to on-site construction and an increase in enrollment.
- This research project aims to design a system that identifies the status of the individual parking spaces on campus, and will push the data to a mobile device application.

CONCEPT

- This project will use MATLAB code and cameras to constantly monitor the parking lot to determine the status of parking spaces.
- The data is pushed to a server that will maintain the information sent to mobile users.
- The mobile application will have the ability to let users select a parking lot based on the color of their parking tag.



METHODS

- The approach for this project will use live feed from an IP camera which will be imported to the MATLAB environment.
- The real-time system will use image subtraction and feature detection to determine if there is a vehicle in a parking spot.
- This will be accomplished by subtracting a recent image from its predecessor, and comparing the mean value of the RGB pixels to the mean value calculated in the previous iteration.
- This system will constantly refresh over a short time interval to constantly keep the user informed on the status of parking lots on campus.
- The system will continue to be maintained to improve and update the application after it has been integrated.

OBJECTIVES

- Reduce wait time for an individual to park
- Decrease fuel consumption and emissions
- Make the campus safer and actively track all vehicles in the campus by improving security
- Establish a traffic management system
- Create mobile application that assists all ERAU commuters in the parking process



OBSTACLES

- Current Concerns:
 - Hurricane Matthew impeded camera performance that directly affected our ability to process images.
 - Finding a suitable camera replacement that allows for easy image manipulation and processing is necessary to continue the project.
- Future Obstacles:
 - The system must grant access to the application based on affiliation with Embry-Riddle Aeronautical University.
 - Security issues that would impede camera placement and legal use.

DISCUSSION

- The system should successfully identify the status of the parking lots on campus.
- Integration of this system will help regulate on-campus traffic, and reduce the stress associated with the parking situation for all students, faculty, and staff members.
- The current system detects the status of the parking spaces in the Citation East Extension parking lot located adjacent to the Lehman Building.
- The various stages of this project will be determined by expansion to each individual parking lot.
- Further development of the application will incorporate wireless communication to integrate remote hardware that could be powered by solar panels.

