Electrical and Computer Engineering Department
Parking Spot Detecting System Based On OpenCV

Group S18-52 Project Abstract

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Project Background:

In Rutgers university, increasing number of vehicles causes a lot of parking issues. From our students prospective. Students try hard to get a relatively closer parking spot for their convenience. However, this is almost impossible especially at noon. They need something to help them find a spare spot.

From the university's prospective, it also has trouble to manage the parking lot. RUPD gives large amount of tickets per day, but this does not really stop illegal parking. Due to the difficulty of managing parking lots, a parking lot monitoring system is needed.

Proposed Solution and Uniqueness:

Our project runs OpenCV on linux, which can be built into our embedded system. The System will detect the shape of the car and use the algorithm to judge if there is a car in the parking spot. Each embedded system can keep an eye on a row of parking spots.

Why is it so unique? Other parking managing systems are built into the parking garage. Most of them use pressure sensors or radar to detect if there is a car above the ground. This can only be done by putting the sensor hardware close to the spot, which is expensive and need pre-planning. Our embedded system is easy to install and relatively cheaper to get, because its size is small and you do not need to rebuild the parking lot or get additional hardware since optical camera are equipped in most lots.

Scope of work:

The goal of this project is to utilize OpenCV library and modifying it to make our own image recognition system. We will also put it on a embedded system to show the possibility of putting our system in an embedded system. After that we will make our own server of it and push the data to our mobile device.

Task: Get more familiar with openCV library and develop our own system, Install cameras and hardwares in the parking lot and start monitor servers.

POC will be required to give frequent reports about the working progress to the advisor. POC and group member will meet several times every week and work together.

General Work Plan:

- By the due date of interim report:
    - Build up the block design of our embedded system
    - Connect a webcam to the board and make it running
    - Run OpenCV on linux.
    - Have a basic idea how to implement our car detecting algorithm

- By the week of March 18th:
  - Put the basic image analysis algorithm on our embedded system
  - Test our algorithm on small toy cars and detect their motion

- By April 20th:
  - Detect real car motions
  - Set system up

- If we have extra time
  - Implement our mobile app
  - Send parking info to our mobile device