MIT ADT University MIT School of Engineering DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING Mini Project III T.Y (IS 2)
Year: 2019-20 SEM 5

MINI PROJECT III SYNOPSIS

Project Member

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Project Title: Parking Space Detection
Sponsorship: NA External Guide: NA

Internal Guide: Prof. Sagar Jaikar

Synopsis:

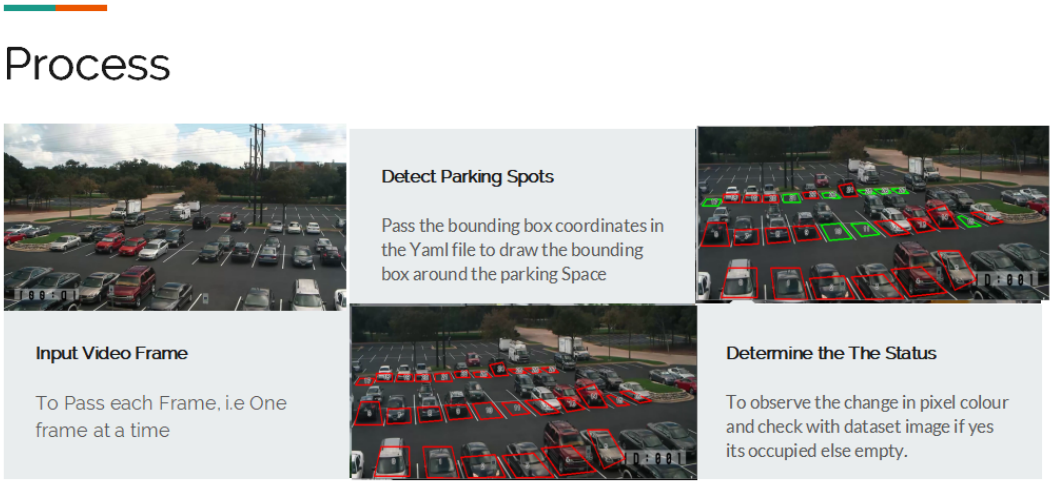
1. Problem Statement:

To create a Vision-Based Parking Space Detection System.

2. Introduction:

Finding a vacant parking lot in urban areas is time-consuming and, thus, not satisfying for potential visitors or customers. Efficient car-park routing systems could support drivers to get an optimal parking lot immediately. Therefore we are implementing a vision based “Parking Space Detection” system to detect empty spaces in a Parking lot.

▪ Proposed System:



- We'll pass each frame of video through the pipeline, one frame at a time.
- The first step in the pipeline is to detect all possible parking spaces in a frame of video. Obviously we need to know which parts of the image are parking spaces before we can detect which parking spaces are unoccupied.
- The second step is to detect all the cars in each frame of video. This will let us track the movement of each car from frame to frame.
- The third step is to determine which of the parking spaces are currently occupied by cars and which aren't. This requires combining the results of the first and second steps

3. Hardware And Software Interfaces
    1. Hardware:

- The software runs on a standard desktop PC. In order to cover a possibly large amount of parking spaces, a wide-angle lens camera of-the-shelf is used for recording.(for demo we'll be showing direct cctv footage)
- The observation camera, it is positioned in the back of the parking lot with a slight top view.

    2. Software:
        - We have used Python 3, Python is an interpreted, high-level , general-purpose programming language used for image processing.

        - Numpy is used for image manipulation and image processing.

        - OpenCV is a library of programming functions mainly aimed at real-time computer vision

4. Conclusion :-

Even though our system is tested for outside parking lots, it can also be used in parking garages. In this case the Lightning conditions need to be adjusted and we are good to go.

Improvements can be achieved by minimizing the influences of adjacent cars overlaying the labeled area due to camera perspective.

5. References:-

Research Article:
https://towardsdatascience.com/find-where-to-park-in-real-time-using-opencv- and-tensorflow-4307a4c3da03

Image Thresholding:
https://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_imgproc/py_thresholding/py_thresholding.html#thresholding

Changing Colour Spaces:
https://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_imgproc/py_colorspaces/py_colorspaces.html#converting-colorspaces