

User Manual

Team Tech Ops

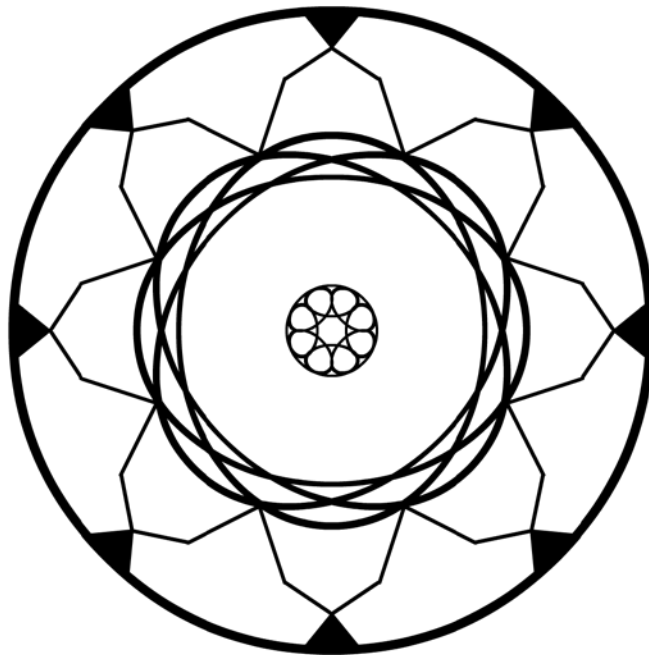


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1 Introduction

Purpose and Scope

The Parking Monitoring System will allow simple viewing and analysis of images fed into it from an elevated view of a parking lot. This system will be able to take images and compare them to a saved layout to determine which parking spots are currently occupied by a vehicle. These results will then be displayed for parking lot monitors and potential users of the parking lot, as well as archived for later use. This will reduce the time spent looking for parking, as well as provide usage statistics that can allow better planning of future distribution of parking passes or construction of additional parking lots.

This manual will explain the functionality and usage of the parking management system. It is meant as a guide to allow users to become more familiar with the system overall, and provide specific instruction pertaining to initial setup and day to day use.

Organization

This manual provides a summary of system capabilities, and a detailed description of system functionality. This includes a full description of features present within the system, as well as instructions on their use and basic troubleshooting information.

Also included are instructions for the initial installation of the packages and software required to run the program.

Points of Contact

For any questions or issues that are not described in this manual, please directly contact the TechOps group via the contact information described on their webpage. For bleeding-edge updates, refer to the TechOps GitHub page.

- <https://awagne30.github.io/TechOps/>
- <https://github.com/awagne30/TechOps>

Project References

Listed below are links to pertinent documentation for the Parking Monitoring System, as well as a page containing general references used in the design and implementation of this system.

Proposal -

<https://github.com/awagne30/TechOps/raw/master/documentation/Captstone%20Proposal.pdf>

SRS Document -

<https://github.com/awagne30/TechOps/raw/master/documentation/Requirements%20Document/SRS%20Document.pdf>

Design Document -

<https://github.com/awagne30/TechOps/raw/master/documentation/Design%20Document/Design%20Document.pdf>

General References - <https://awagne30.github.io/TechOps/resources.html>

2 System Capabilities

Purpose

The main purpose of the Parking Monitoring System is to keep track of the available and occupied spaces in a parking lot. The application system provides a way to monitor the available parking spaces by using an elevated camera. The system benefits many drivers who are searching for a parking space. The system is responsible for providing an output of how many parking spaces are available in a parking lot.

General Description

The system is primarily responsible for monitoring the parking lot by using the elevated camera. The camera will take pictures. These pictures are sent to system which will process these images and store them. The system will continuously keep taking images of the parking lot, track the available spaces and display the output of the parking space availability. This will help drivers to pick a parking lot with available spaces and park their car. This system certainly benefits the driver in saving their time and not wasting their time in searching for a parking space.

The system is a collection of various functions which implement the functionality of the system.

1. Admin setup: Administrators can set up the initial state of the system.
2. When space is occupied, the system will remove the space from the available list.

3 Operating Instructions

Initial Program Installation

1. The system must be running Ubuntu 14.0.4 for the parking monitoring system to work
2. Using the Installation instruction in the link below in Step 3, the CUDA drivers and Caffe libraries with dependencies will be installed.
3. Installation Link: <https://github.com/NVIDIA/DIGITS/blob/master/docs/UbuntuInstall.md>
4. Follow the steps in the link for installation. Do not go past the "Getting Started" Section in the link.
5. Open the Linux Terminal
6. Run the following commands in the terminal
 - a. `sudo apt-get build-dep python-imaging`
 - b. `sudo apt-get install libjpeg8 libjpeg62-dev libfontconfig1 libfontconfig1-dev`
 - c. `sudo pip install Pillow`
 - d. `sudo apt-get install python-imaging-tk`
 - e. `sudo apt-get install cuda`
7. Download all the files as a zip in the link provided:

8. <https://github.com/awagne30/TechOps>
9. Then extract the zip file to the user's preferred location.
10. Locate the file "PLSM.sh" and execute the script to run the program.

Setting up Parking Lot Spaces

1. Adding spots
 - a. Navigate to the main screen of the program
 - b. Click on the button labeled as "Open operator"
 - c. To add a spot, navigate to the desired parking space.
 - d. Then click and hold the left mouse button, and highlight the area of the parking space inside each parking box. (Important: When highlighting the area, make sure the highlighted regions are inside the box or inside the outline of the parking space)
 - e. Release the left mouse button to finish highlighting the spot. A rectangular box and a number label will appear on the image indicating the parking spot that will be monitored.
 - f. To add more spots, repeat steps c through e until all spots are added
2. Delete Spot
 - a. To delete a spot, click on a label number inside a list box that is located on the right-hand side of the window.
 - b. Once the label number is selected, click on the "delete selected" button to delete the highlighted spot.
3. Saving Parking Lot
 - a. After all spots are added and finalized, click on "Save Parking Lot" button which is located at the top of the window to save the image.
 - b. Once a dialog box appears, name the parking lot to save the content.
4. Open Existing parking lot
 - a. Click on "open parking lot" button to open existing parking lots.
 - b. Navigate to the desired parking lot file and open the file.
 - c. The parking lot image and existing parking spaces will be highlighted on the image.

Monitoring Parking Lot

1. To monitor the parking lot, a parking lot must be selected by using the "open parking lot button"
2. A red box will appear on the image to indicate occupied spaces.
3. A green box will appear on the image to indicate available spaces
4. At the bottom of the window, the number of available spaces and occupied spaces are labeled for that time interval.

Terminating the program

1. Save all necessary information before proceeding to step 2.
2. There are two ways to terminate the operation.

- a. Click on the “X” button on the top-right hand side of the window to terminate the program
- b. Locate the “Quit” button on the top of the window, and click on the button to also terminate the program.

Unscheduled Termination of program

In the event of an unscheduled termination of the program there is a risk of losing unsaved data. This primarily refers to unsaved parking lot layouts, but could also damage temporary files. These will be restored when the program is reopened.

Restarting the program

1. Navigate to the directory of the program.
2. Locate the file “PLSM.sh” and execute the script to run the program.