Pedestrian Detection System

Purpose

Learn how to use OpenCV to do some multimedia tasks on Raspberry Pi.

Steps

1. `wget http://director.downloads.raspberrypi.org/NOOBS/images/NOOBS-2018-04-24/NOOBS_v2_8_1.zip`
2. Format the SD card as FAT32
3. Extract `NOOBS_v2_8_1.zip` to the SD card
4. Plug the SD card back on Raspberry Pi and go through the installation proccess.
5. `sudo rpi-update`
6. `sudo apt-get update`
7. `sudo apt-get upgrade`
8. `reboot`
9. `sudo apt-get install build-essential git cmake pkg-config`
10. `sudo apt-get install aptitude`
11. `sudo apt-get install libjpeg-dev`
12. `sudo aptitude install libjpeg8-dev libtiff5-dev libjasper-dev libpng12-dev`
13. `sudo apt-get install libavcodec-dev libavformat-dev libswscale-dev libv4l-dev`
14. `sudo apt-get install libxvidcore-dev libx264-dev`
15. `sudo apt-get install libgtk2.0-dev`
16. `sudo apt-get install libatlas-base-dev gfortran`
17. `apt-cache search opencv`
18. `apt-get install libcv2.4 libcvaux2.4 libhighgui2.4`, if the cached version is not 2.4, install the cached version.
19. `apt-get install libcv-dev libcvaux-dev libhighgui-dev`
20. `sudo apt-get install libopencv-dev`
21. `curl http://www.linux-projects.org/listing/uv4l_repo/lrkey.asc | sudo apt-key add -`
22. `echo "deb http://www.linux-projects.org/listing/uv4l_repo/raspbian/ wheezy main" | sudo tee --append /etc/apt/sources.list`
23. `sudo apt-get update`
24. `sudo apt-get install uv4l uv4l-raspicam`
25. `sudo apt-get install uv4l-raspicam-extras`
26. `sudo service uv4l_raspicam restart`
27. `sudo rpi-update`
28. `v4l2-ctl || sudo apt-get install v4l-utils`
29. Connect the webcam and reboot.
30. `v4l2-ctl --list-devices`
31. `sudo apt-get install fswebcam`
32. Take a picture directly with `fswebcam image.jpg`
33. Create a script to take a picture,
    `mkdir $HOME/web && echo "\ #!/bin/bash DATE=\$(date +"%Y-%m-%d_%H%M") fswebcam --no-banner $HOME/web/\$DATE.jpg" | tee $HOME/web/webcam.sh && chmod +x $HOME/web/webcam.sh`
34. `$HOME/web/webcam.sh`

35. `wget https://ecourse.ccu.edu.tw/50531/textbook/LAB9/998_763_14_35.xml`
36. Execute the makefile with `make`
37. The following programs can do different things:
    - `resizeImage [target image]` : open and resize an image
    - `imageROI [target image]` : select region of interest of an image
    - `resizeVideo [target video]` : open and resize a video
    - `videoROI [target video]` : select region of interest of a video
    - `imageCLAHE [target image]` : apply CLAHE on an image
    - `videoDetection [target video]` : detect humans within a video
    - `camDetect [target video]` : detect humans from the webcam

Problems

1. After editing `/etc/apt/sources.list` , `sudo apt-get update` will get the following error:

```
Hit:1 http://raspbian.raspberrypi.org/raspbian stretch InRelease
Hit:2 http://archive.raspberrypi.org/debian stretch InRelease
Get:3 http://www.linux-projects.org/listing/uv4l_repo/raspbian wheezy InRelease
[1,155 B]
Ign:3 http://www.linux-projects.org/listing/uv4l_repo/raspbian wheezy InRelease
Fetched 1,155 B in 1s (611 B/s)
Reading package lists... Done
W: GPG error: http://www.linux-projects.org/listing/uv4l_repo/raspbian wheezy
InRelease: The following signatures were invalid:
88E8F32F724468BA39585D4099DA5D2AFCE635A4
W: The repository 'http://www.linux-projects.org/listing/uv4l_repo/raspbian wheezy
InRelease' is not signed.
N: Data from such a repository can\'t be authenticated and is therefore potentially
dangerous to use.
N: See apt-secure(8) manpage for repository creation and user configuration details.
```