COMPUTER VISION

WITH PYTHON OPENCV

BY FREE KNOWLEDGE MISSION

PREREQUISITES

- Python 3.4.1 needed
- Install packages with Pip numpy, matplotlib, cv2
  - Opencv is a wheel file from opencv.org
- Download the face and eye cascade files. Created by Intel
- Write program
- Detect your face, eyes, and watch in your webcam

HAAR CASCADE – PREBUILT CASCADE FOR FACE AND EYE DETECTION

- Haar cascade is a built in Python classifier to detect objects in a video or image.
- Demo of prebuilt cascade to detect features such as face or eye detection.
  - Download face and eye detection Haar classifier from GitHub.
  - Build Python code
  - Run

CUSTOM HAAR CASCADE

What if you want to detect your own object?

- Gather negative or background images. These are images that do not have the object you want to detect.
  - We'll get a least a thousand from ImageNet/Flicker
  - Roughly ~1k
- Create your positive images. This is the image you want to detect.
  - Impose your image into the negative image to create the positive images.
  - Double the amount of positives ~2k
- Create a vector file by combining all positive images.
- Train cascade by combining and negative images

STEPS

- Download packages/libraries to Linux server
  - Sudo apt-get update, sudo apt-get upgrade, sudo apt-get install git, git clone https://github.com/Itseez/opencv.git,
  - sudo apt-get install build-essential
  - sudo apt-get install cmake git libgtk2.0-dev pkg-config libavcodec-dev libavformat-dev libswscale-dev
  - sudo apt-get install python-dev python-numpy libtbb2 libtbb-dev libjpeg-dev libpng-dev libtiff-dev libjasper-dev libdc1394-22-dev
  - sudo apt-get install libopencv-dev

GATHERING IMAGES – DESCRIPTION FILE

- First step is find the negative images from imagenet
  - Bg.txt
  - run the program and save them to a directory /neg/1.jpg 2.jpg, etc…..
  - 100 x 100 pixels and change to grayscale
- Create the positive images
  - Info or pos.txt
  - Pos/1.jpg 1 0 0 50 50 extra parameters of location of file and location of object
  - 50 x 50 pixels – impose positive on negative

REMOVE OUTLIERS

- Get rid of broken links or bad image files
- New Python function
  - Find a broken image & compare it with good images.
  - Delete if not similar

COMMANDS TO TRAIN

- opencv_createsamples -img watch5050.jpg -bg bg.txt -info info/info.lst -pngoutput info -maxxangle 0.5 -maxyangle 0.5 -maxzangle 0.5 -num 1950
- opencv_createsamples -info info/info.lst -num 1950 -w 20 -h 20 -vec positives.vec
- nohup opencv_traincascade -data data -vec positives.vec -bg bg.txt -numPos 1800 -numNeg 900 -numStages 10 -w 20 -h 20 &
- Add to cron * * * * * echo 1 > /proc/sys/vm/drop_caches

ADD WATCH CASCADE TO CODE

- watch_cascade = cv2.CascadeClassifier('watchcascade10stage.xml')
- watches = watch_cascade.detectMultiScale(gray, 50, 50)
- font = cv2.FONT_HERSHEY_SIMPLEX

  cv2.putText(img, 'Watch', (x-2, y-h), font, 0.5, (0,255,255), 2 cv2.LINE_AA)

RESOURCES

- Sentdex Videos and Code