

**School of Computing  
National University of Singapore  
CS4243 Computer Vision and Pattern Recognition  
Semester 1, AY 2015/16**

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**Lab 6: Background Extraction**

**Due Date: Labs in the week 5<sup>th</sup> Oct – 9<sup>th</sup> Oct 2015**

**Objectives:**

- To experiment with the averaging technique that we learned in class and use it to do background extraction for videos taken using stationary cameras (please refer to lecture notes CS4243\_L04\_Color\_v4.pdf slide #30).
  - Note that by “background”, we mean the pixels that belong to the stationary part of the scene.
- To reinforce the concept of vanishing points.

**Preparation:**

- Download the zip file background.zip into your working directory. Unzip the file and you should find the following: background.pdf, traffic.mp4.
- Take a picture of 3 boxes randomly placed in a scene, as illustrated in lecture notes CS4243\_L06\_CameraProjModels\_v3.pdf, slide #52.

**Part 1. Initialisation**

- Create a python script file called bg.py. Follow the rest of this lab instruction sheet to develop the script for extracting the background.
- Set the working directory, e.g., d:/myname, and import relevant modules.

```
import os
os.chdir("d:/myname")
import cv2
import cv2.cv as cv
import numpy as np
```

**Part 2. Background Extraction in Video**

Write a program to do background extraction in video using the following hints:

- Step 1: read the .mp4 video using OpenCV Python API cv2.VideoCapture

- Step 2: print the frame width, frame height, frames per second and frame count of the input video using cap.get
- Step 3: convert frame width, frame height, frames per second and frame count into integers using int()
- Step 4: get the background object by averaging away the foreground (i.e. moving) objects using the following suggested codes:

```
_,img = cap.read()
avgImg = np.float32(img)
for fr in range(1,frameCount):
    _,img = cap.read()

----- add your codes here -----
```

```
normImg = cv2.convertScaleAbs(avgImg) # convert into uint8 image
cv2.imshow('img',img)
cv2.imshow('normImg', normImg)

cv2.waitKey(0)
cv2.destroyAllWindows()
cap.release()
```

Capture a snapshot of the background and save this background image.

### **Part 3. Vanishing points experiment.**

Take a photograph of 3 boxes randomly placed in a scene. Obtain a hardcopy of this image. Construct and plot at least 2 vanishing points on this image.

### **Submission Instruction**

Submit the following to the TA at the end of the lab session:

1. Show the video output (i.e. background) to the TA
2. Hardcopy printout of your python codes.
3. Hardcopy of your vanishing points determination.

Submit the softcopy of your Python code, the background image, and the softcopy of the picture with vanishing points to IVLE.

Please put all your files in a folder and submit the folder. Use the following convention to name your folder:

MatriculationNumber\_yourName\_Lab#. For example, if your matriculation number is A1234567B, and your name is Chow Yuen Fatt, for this lab, your file name should be A1234567B\_ChowYuenFatt\_Lab6.