School of Computing
National University of Singapore
CS4243 Computer Vision and Pattern Recognition
Semester 1, AY 2018/19

Lab 4: Background/Foreground Separation
Due Date: 23rd Sep 2018 (Sunday) 2359hrs

Objectives:

- To experiment with the averaging technique that we learned in class and use it to do background/foreground separation for videos taken using stationary cameras (please refer to lecture notes CS4243_L05_Color_v11.pdf slide #33).
    - Note that by "background", we mean the pixels that belong to the stationary part of the scene.
- To learn to devise a computer vision algorithm to count cars

Preparation:

- Download the zip file lab5.zip into your working directory. Unzip the file and you should find the following: `traffic.mp4.`

Background Extraction in Video

Write a Matlab program to do the following:

1) Background extraction in video
2) Extract the moving objects in the video
3) Devise and implement a simple algorithm to count cars and motor cycles in this video. Note the following:
    a. You need to write a program to automatically count the number of cars that touches the bottom of the image.
    b. Your challenge is to devise an extremely simple algorithm to do this counting. Remember: highest credit will go to students who come up with the simplest aalgorithms.

Hints:

- Step 1: read the .mp4 video using VideoReader. Do a help VideoReader in Matlab command prompt to learn how to use it.
- Step 2: use the methods in VideoReader object to display the following:
    - Total length of video file in seconds

- Height of the video frame in pixels
- Width of the video frame in pixels
- Bits per pixel of the video data
- Video format as it is represented in Matlab
- Frame rate of the video in frames per second

- Step 3: get the background by averaging away the foreground (i.e. moving) objects.

- Step 4: extract the moving objects from the video. Show the results for the first frame and the last frame of the video.

- Step 5: devise and implement the car counting algorithm

Submission Instruction

Submit the softcopy of your Matlab code, the resultant images of Step 3, Step 4 and Step 5 above to IVLE by the due date. Note that Step 5 results can be logged using a diary file.

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

StudentNumber_yourName_Lab#. For example, if your student number is A1234567B, and your name is Chow Yuen Fatt, for this lab, your file name should be A1234567B_ChowYuenFatt_Lab4.