CSE/ECE 344/544 **Assignment-4**
Computer Vision (CV) **Total Marks: 250**

Question 1: **[20 marks]**

Name any 10 senior (>20 years experience) and 10 young researchers (around 10-20 years of experience) in the field of computer vision. In one line each, explain their contribution to the research community.

Question 2: **[25+25 marks]**

In this question, you are required to use CNN(Convolutional Neural Network) and solve a classification problem for the dataset CIFAR-10.

1. Use AlexNet model (you may use pretrained weights for your task) in order to extract features from the network. After feature extraction step, use any classifier and perform a 10 class classification.
2. Build a 3 hidden layered CNN to extract features and train a classifier on extracted features.
   [**Input**: 32*32*3]
   [**Architecture**: conv(16,3x3), Relu, conv(32,3x3), Relu, conv(64,3x3), Relu, 2 FC, Softmax(4)]
   You might have flatten the output after the 3rd relu, followed by 2 FC layers. Train the above mentioned network and perform a 4-class classification (automobile, cat, dog and truck).

Deliverables:

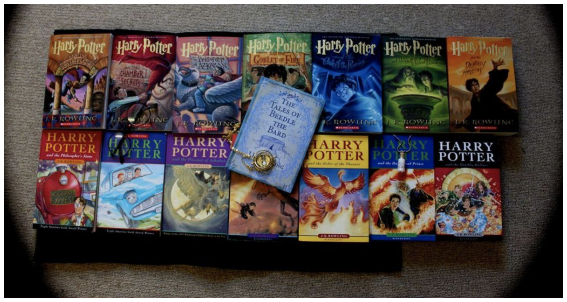
a) Please put all the images and necessary results in your report in tabular format.
b) A confusion matrix to illustrate correct and incorrect classifications for test set.
c) Report classification accuracy for your classifier.

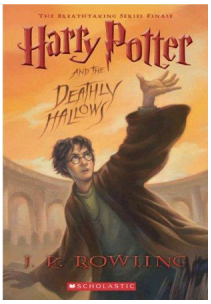
Question 3: **[60 marks]**

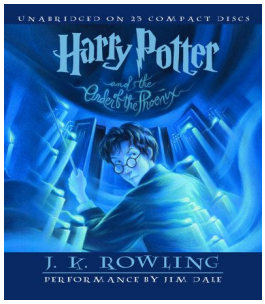
In this question, you are required to find the location of an object (test images) in the collage image using SIFT features. The images can be found here. The tasks in chronological order are as follows:

a) Find keypoints in the images and plot the keypoint matches. Show true and false matches with different colors.
b) Using Direct Linear Transformation algorithm to find the homography for both the test images. Report the homography matrices.
c) Find corners of the bounding box for test images in the collage image and plot them.

You are provided with following image (in respective orders): [collage, test1, test2]. You have to find the test images in the collage. These images can be found here.







Question 4: **[60 marks]**

Using the images of Taj Mahal provided, create one panorama image using image stitching. The images are as follows and can be found in this link:

Clearly write the algorithm you followed, the choice of parameters (if any!), and show the final combined image.

[VIVA+Report: 30+30]

Submission Policy and Requirements

1. Programming languages: python+opencv. For Q2, use pytorch.
2. You may use any libraries or external codes. However, don't forget to cite them.