Assignment-1

Q1 (Programming/Experimentation) (50 marks):

Step-1: Download any CNN model pre-trained on the ImageNet classification dataset.

Step-2: Download the PASCAL VOC 2012 dataset from the following link:
http://host.robots.ox.ac.uk/pascal/VOC/voc2012/index.html

Step-3: Pick any one category of your choice from the dataset. From the training set, randomly select 20-50 (at least 20 and at most 50) images from this category (call it category 'A'), and randomly select 50 images from all the remaining nineteen categories (call it category "not A"). This will be the training dataset.

Step-4: Represent these images using the (1000-dimensional) output of the prediction layer of the above CNN model, and train a binary SVM classifier using the training data collected in step-3.

Step-5: Use the entire validation set and split the images into two sets: the first set is of all the images from category 'A', and the second set is of all the remaining images (category "not A"). Represent these images in the same way as done in step-4.

Step-6: Evaluate the classification accuracy of the classifier learned in step-4 on the test set created in step-5. Also provide the confusion matrix.

Step-7: Submit all the codes along with a detailed write-up (PDF) containing all the analyses and relevant details. Also show some sample images from the training set you created in step-3, and put the complete list of the names of images in this set (one per line) in the appendix.

Q2 (Handwritten submission) (45 marks):

Assume we run Vanilla RNN for 3 time-steps (i.e., T=3) and use the sum-of-squares loss function for predictions at each time-step. Write the expression for the total loss (L) by accumulating losses at individual time-steps, and calculate the first derivative of L w.r.t. to the parameter matrix $\mathbf{W}_{hy}$.

Q3 (Handwritten submission) (5 marks):

List five things that you have learned in this assignment.

Note:

(1) The assignment needs to be done individually.
(2) Submit your solutions to all the questions in a single zipped file.
(3) One may use any programming language/platform.
(4) For handwritten submissions, write your answers on a sheet of paper and submit the scanned PDF.
(5) There will be a penalty in case of plagiarism.
(6) There will be a penalty of 10% per day for late submissions.
(7) There will not be any extension in the due date.