Computer Science Department
California State University Channel Islands

COMP 478 - Final Exam - Part 2
Deadline: Wednesday, May 18, 11:59 pm
submission: a single .py file.
Late submissions will not be accepted or graded at all!
You are not allowed to share your solution with other teams!

Work in a group

1. (25 points) In this problem, we will write a python code using Keras to load one of the state-of-the-art CNN architectures proposed for ILSVRC-2012-CLS image classification task (ImageNet).

   (a) *Step 1*: Load your assigned pre-trained model in Keras:

      i. Juan and Dominique: MobileNet-v2
      ii. Alex and Jeffery: InceptionResNetV2
      iii. Evan and Daniel: ResNet50-V2
      iv. Rene and Christopher: Xception

      (Note: if you load the wrong network, you won't get any points!)

   (b) *Step 2*: 1) How many layers does it have? 2) print the summary of the network and specify the type of last five layers.

   (c) *Step 3*: Print the prediction of your loaded model for the given test set available under Week 13 module (img.zip folder includes 10 images)

   (d) *Step 4*: Calculate the top1-accuracy and top5-accuracy according to the given test set (img.zip folder). Use python to to do all the required calculations.

   (e) *Step 5*: Pick one of the final layers of your loaded model and extract non-linear features from it (for all the images). Print out the features and the shape of the extracted features. (Hint: for extracting features, you can use the last FC layer (not output layer!) or the last poolying layer. Use python to find the answer.

   (f) *Step 6*: Based on the calculated features in the previous part, which two images are more similar to each other? Use python to find the answer. (Hint: use the features to calculate the pairwise distances)

   (g) *Step 7*: Use the extracted features in previous part, cluster the images into two categories (Hint: pick one of the clustering algorithms and try it on your data). Justify the resulted clusters.