Final Project Proposal

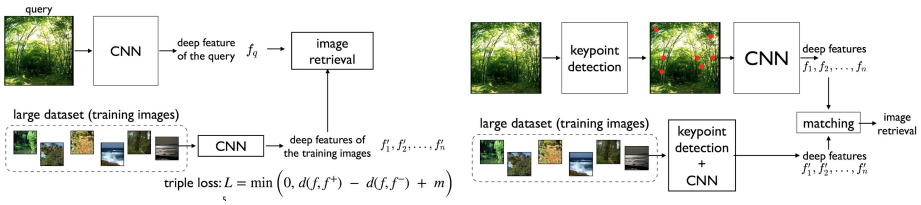
Yu-Hsinag Liu
CS 537 Spring, 2020

(1) Problem statement

Scene binary classification.
Given an image of scene (256 x 256), determine whether it is coast or forest.

(2) Approach

Tipple Loss: One-One Matching:



1. Keypoint detection

Library : cv2

Detect the 15 SIFT keypoints in the image, extract the (32 x 32) patches from each keypoint.

2. Compute a 128-dimensional deep feature by CNN & Triple Loss

Library : pytorch, torch.nn
Learning rate: 1 ; Epoch: 20 ; CNN Layer: 3 ; Optimizer : sgd
Determine the image by reducing triple loss.

3. Compute a 128-dimensional deep feature by Keypoint + CNN & One-One Matching

Library: scipy.optimize.linear_sum_assignment
Determine the image by their similarity.

(3) Dataset

25 coast test images 50 coast train images
25 forest test images 50 forest train images
Testing Method:

In ground_truth.txt:
Index: 0 ~ 24 = 0, represent coast; Index: 25 ~ 49 = 1, represent forest.

  *(coast(0), forest(0))*

Challenge: The small data set might lead to overfitting. Also, some testing images are similar to others, forest with a lake, for example.

(4) Preliminary Quantitative Results

Matching Approach:

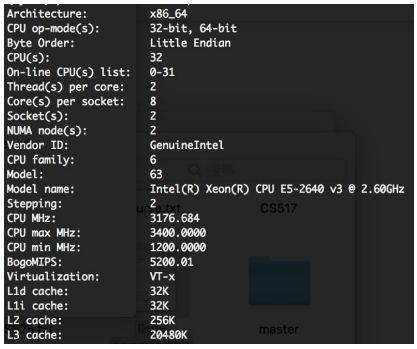
# of image	50
Precise	62%

Training runtime: less than 10sec (per image) ;Testing runtime: less than 10sec (per image)

Triple Loss Approach: Still testing

(The project will also try smaller dataset, and different amount of keypoints)

Sever: pelican.eecs.oregonstate.edu



(5) Baseline Approach

The evaluation of the result should be higher than 50%. Since this is binary classification, the baseline approach by random guessing is 50%.

(6) Teammate

No Teammate, individual work.