Final project proposal
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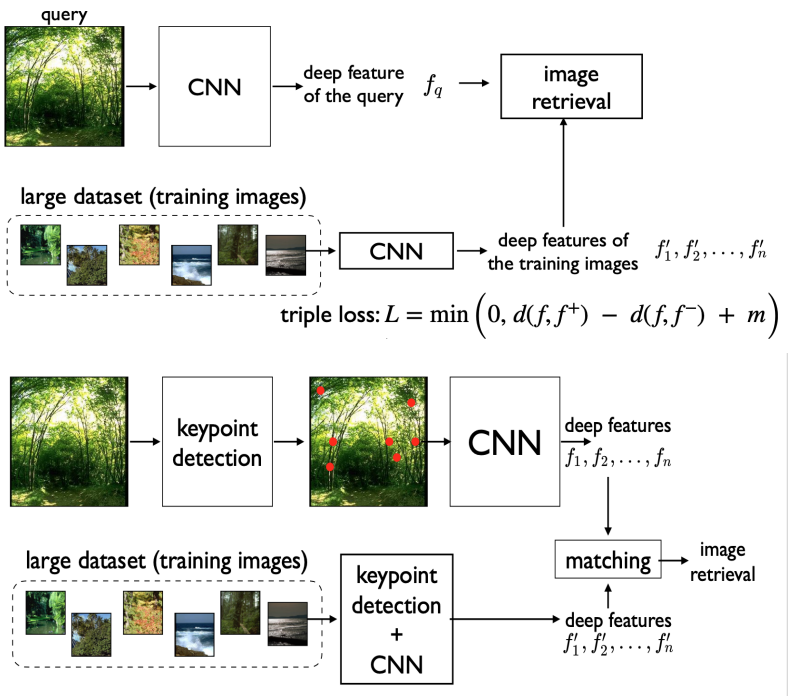
(1) Problem statement

I will do the scene binary classification problem. Specifically, if we are given an image of the scene (256 x 256), determine whether it is coast or forest by using what we learnt in this course.

(2) Approach



a. I'll use the cv2 library to implement this task. First, detect the 15 SIFT keypoints in the image, as we learnt in class. Then, extract the (32 x 32) patches from each keypoint.

   It is like what I did in HW2. 1) partition the image into patches; 2) apply CNN to each patch to compute deep features of the patches; 3) match the patches

b. 1) To each pair (query, image) apply a Siamese CNN to the entire images

   and estimate their similarity; 2) Train the Siamese CNN using the triplet loss;

This method is suitable because it could detect the images' similarity and solve this kind of problem nicely. The software I would use is the jupyter notebook, Conda, pytorch and opencv library which has been installed on the pelican server03.

(3) Datasets

https://drive.google.com/drive/folders/1fjCtMBwbhGsbQAq1QI71rmAe8TinTCTy?usp=sharing

Initially, I plan to take: 25 coast test images, 50 coast train images, 25 forest test images, and 50 forest train images.

May add some images later if needed: https://www.kaggle.com/search

The main challenge is that the small number of the dataset may lead to overfitting.

(4) Evaluation metrics

I'll use precision and recall as a function of the number of retrieved images query. The result should be more than 50%.

(5) Team work or individual

This final project is individual work and there isn't a teammate.

Reference

Prof. Sinisa Todorovic. CS537_FinalProjects.pdf