

Final Project Proposal

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(1) Problem statement

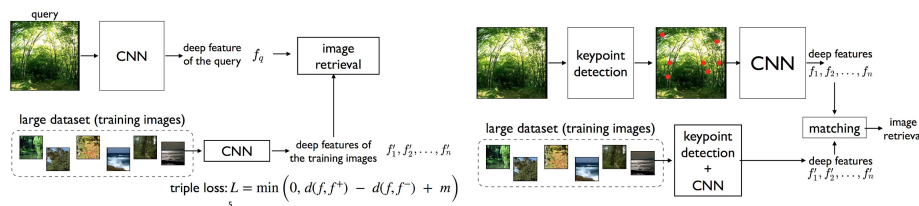
Scene binary classification.

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

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 63
Model name: Intel(R) Xeon(R) CPU E5-2640 v3 @ 2.60GHz
Stepping: 2
CPU MHz: 3176.684
CPU max MHz: 3400.0000
CPU min MHz: 1200.0000
BogoMIPS: 5200.01
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 20480K
          master
```

(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.