CS 537: Assignment 2: Bonus

Behnam Saeedi
(Saeedib@oregonstate.edu)
Due March 13th 12:00pm

1 Introduction

For this assignment we are trying to use the fundamental matrix in order to enhance the accuracy of our one to one matching algorithm. This is done by adding a second optimization parameter to our problem based on the fundamental matrix. For the purpose of this bonus assignment we will need to assume that the image pairs are the query images and each one of the image classes associated with a query. Many parts of this bonus assignment is either very similar or identical to the assignment 2. The feature extraction algorithm used was sift and we were looking for corners within each image pair. The CNN model used is the same model that was provided to us as a part of assignment 1 solution. The code and specifications for these two parameters are thoroughly described in the write up of the assignment 2.

2 Procedure

The procedure for producing the image pairs as follows:

1) **Get the points:** We are using the sift detection in order to get the points.

2) **Describe the points:** We need to extract the patches from the images for the description process.

3) **Run the Patches through CNN:** We need to use the patches in order to get the description by the CNN. This will help us in finding the matching.

4) **Find the initial matching:** We need to find the first 1 to 1 matching in order to compute the W matrix. please note that this step and all previous steps were already done in assignment 2 and there was no need to do it again.

5) **Find C:** Using the original matching that we had, find the C matrix. C matrix the coordinates of every feature extracted and the matching of them.

6) **Compute W, and F:** Computing F is no different than how we did it in assignment 3. The only two differences are that now we are doing it for a lot more pairs and we are using RANSAC to compute the F matrix. This step was alos performed in Bonus assignment for assignment 3.

7) **Re-matching:** The final step is to re-compute the matching with our new optimization metric.

3 PLOTS AND COMPARISON

The following charts are for the purpose of comparing the old performance and the new performance. It appears that there was an overall improvement from assignment 2.

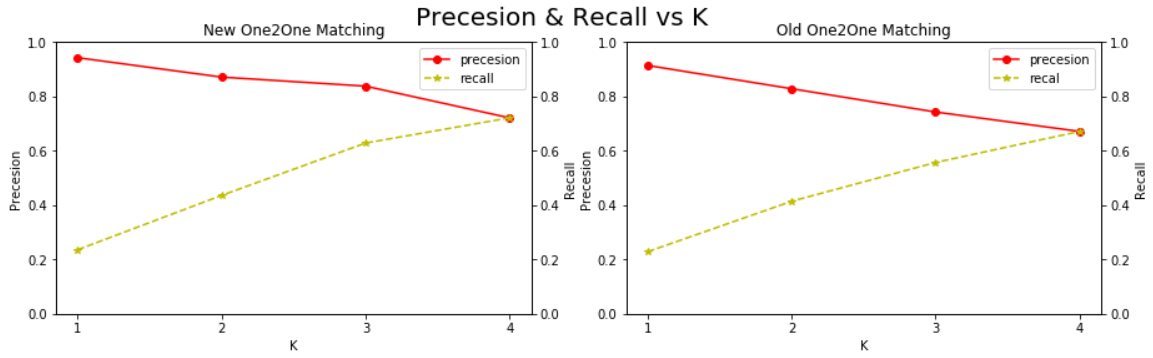

Figure 1. On the left we can see the original performance and on the right we can see the new performance

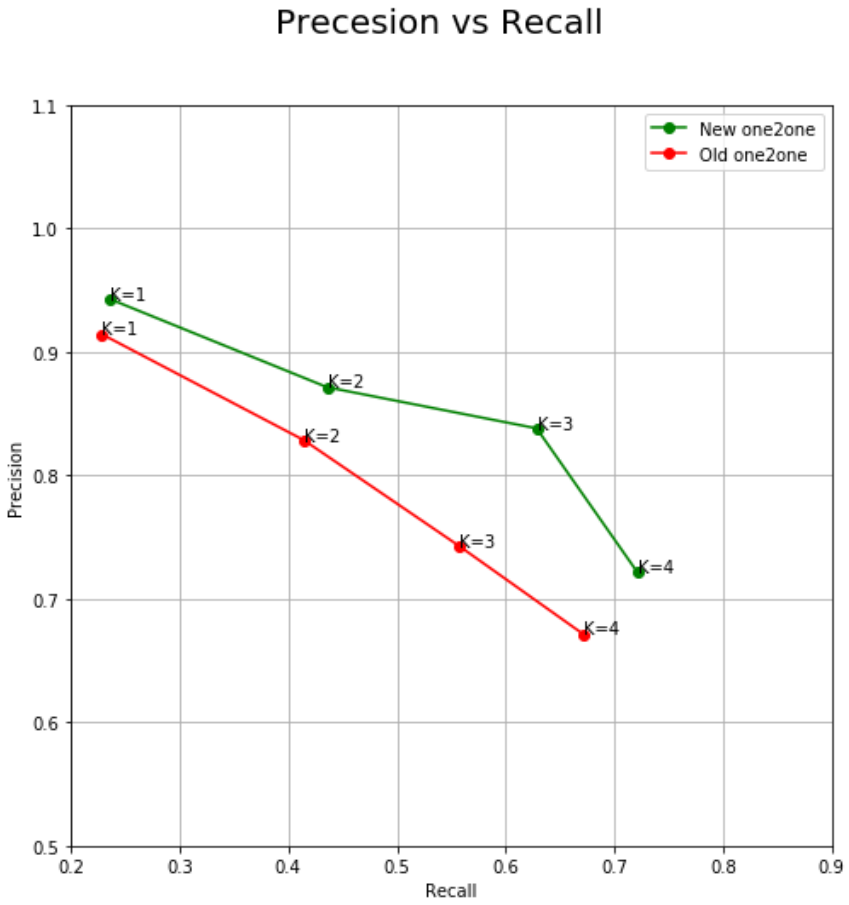

Figure 2. Green is the new similarity matrix and the red is the old one