Project 2. Feature Detection Report

- Run the benchmark in featuresUI.py on the **Yosemite** dataset for the four possible configurations involving Simple or MOPS descriptors with SSD or Ratio distance. Include the resulting ROC curves, report AUC and comment which method is the best.

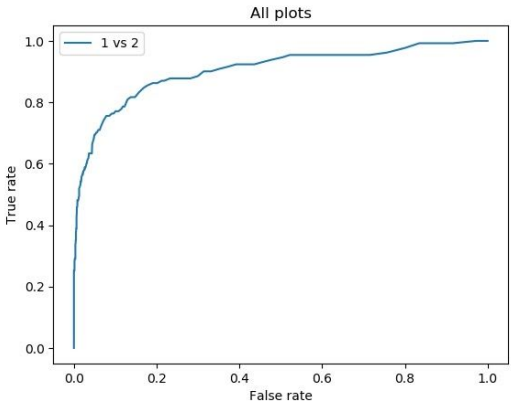

Figure 1. MOPS and Ratio
Average AUC: 0.9038905638591315

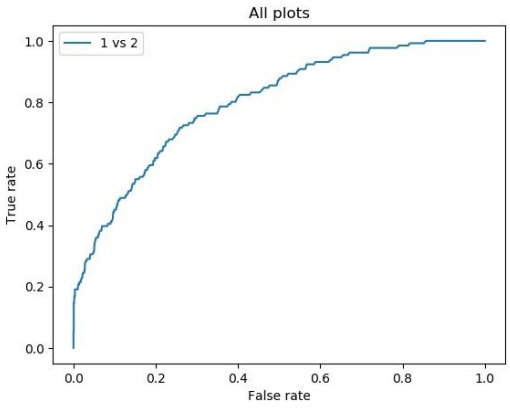

Figure 2. MOPS and SSD
Average AUC: 0.7987122329847969

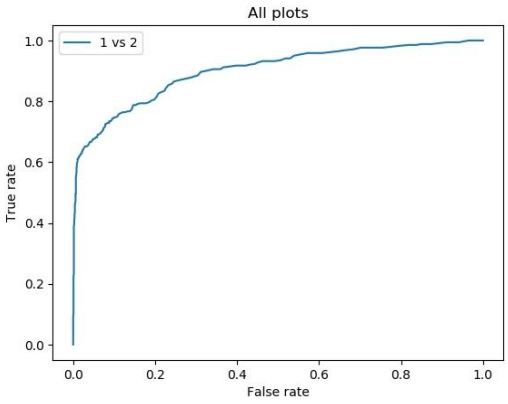

Figure 3. Simple and Ratio
Average AUC: 0.9005186421006821

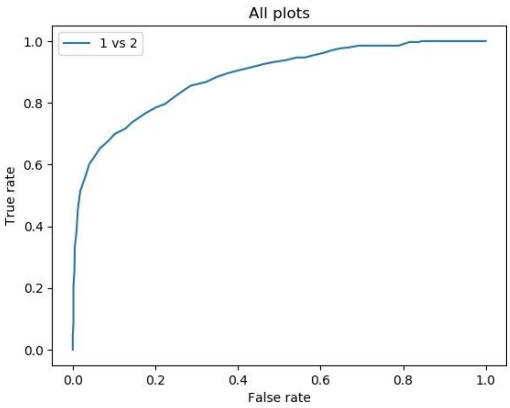

Figure 4. Simple and SSD
Average AUC: 0.8851878717539531

As shown in the above four figures, the configuration of MOPS descriptor and Ratio distance gives the highest AUC and is the best among four configurations.

- Include the harris image on **yosemite/yosemite1.jpg**. Comment on what type of image regions are highlighted. Are there any image regions that should have been highlighted but aren't?

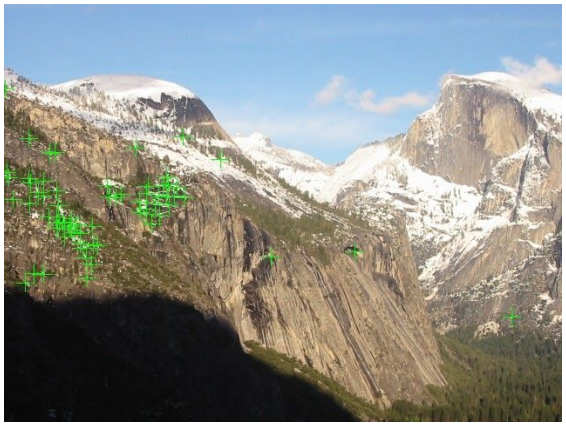

Figure 5. Threshold = 10^-0.5

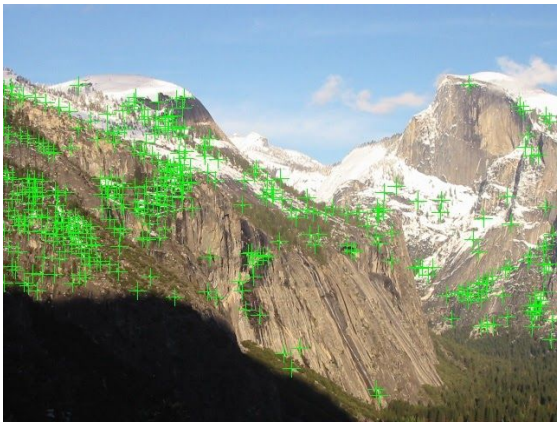

Figure 6. Threshold = 10^-1.0

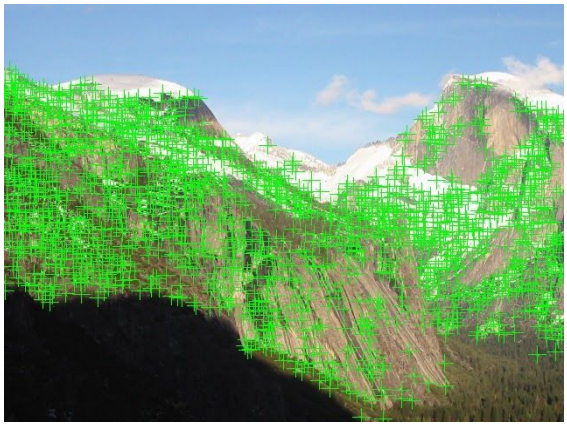

Figure 7. Threshold = 10^-2.0

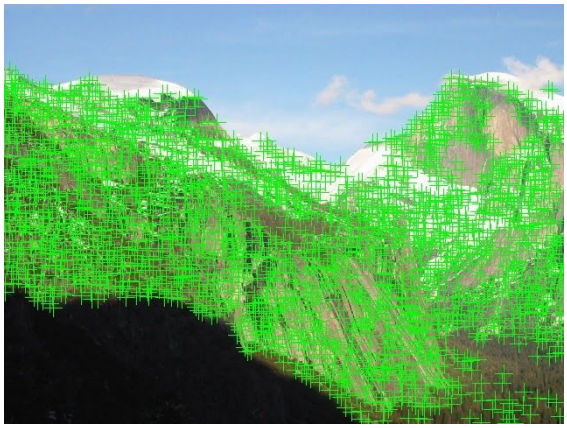

Figure 8. Threshold = 10^-3.0

Regions that have both a higher color contrast and a sharp edge are highlighted.
The forest in the lower right section did not have nearly as many highlighted harris image points. With a higher image contrast or lower threshold, perhaps this region could have been populated with more points.

- Take a pair of your own images and visually show feature matching performance of MOPS + Ratio distance, by including a screenshot from featuresUI.py feature matching tab.

Figure 9: MOPS + Ratio Distance Test of own image

Figure 9 is the screenshot of a MOPS + Ratio Distance test of our own image. These two were pictures taken in Seoul, Korea by Samuel Choi in broad daylight. The building is the Samsung Electronics headquarters in Gangnam, Seoul. The feature matching between these two images appears to work pretty well. This is because the lighting conditions are similar, and the geometric shapes make it easy to distinguish features. Furthermore, there aren't many artifacts in the image, resulting in there not being too much noise in the detected features.