Project Report- Computer Vision (Comp 6341)
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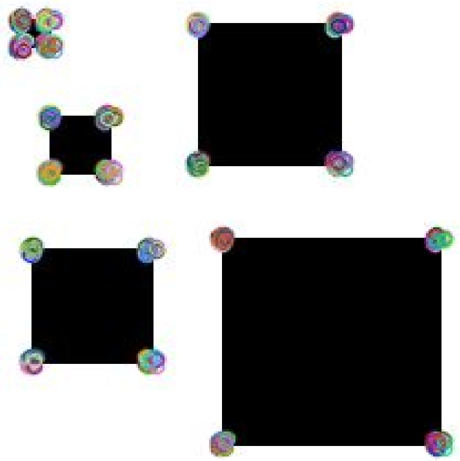
1. There are 3 main files, **main.py** (for Box.png and 2 Rainier images), **mainRainierImagesPanorama.py** (to make a panorama for 6 Rainier Images) **mainCameraImagesPanorama.py** (to make a panorama for camera captured images). There are 2 folders, **images,** and **results**. In the images folder, all images are included and in results folders, all the results are saved.
2. **Important Notes**:
   a. The method name given by the professor in the project description is the same in my project. However, I have changed the parameters, as all the parameters are not useful in my python code.
   b. To reduce running time, I have printed very fewer lines in the console, so I can only show the final result, not the console log.
3. List of sections explained in the report.
   a. Feature detection and matching
   b. Panorama Mosaic Stitching
   c. Panorama for 6 images
   d. Camera captured images

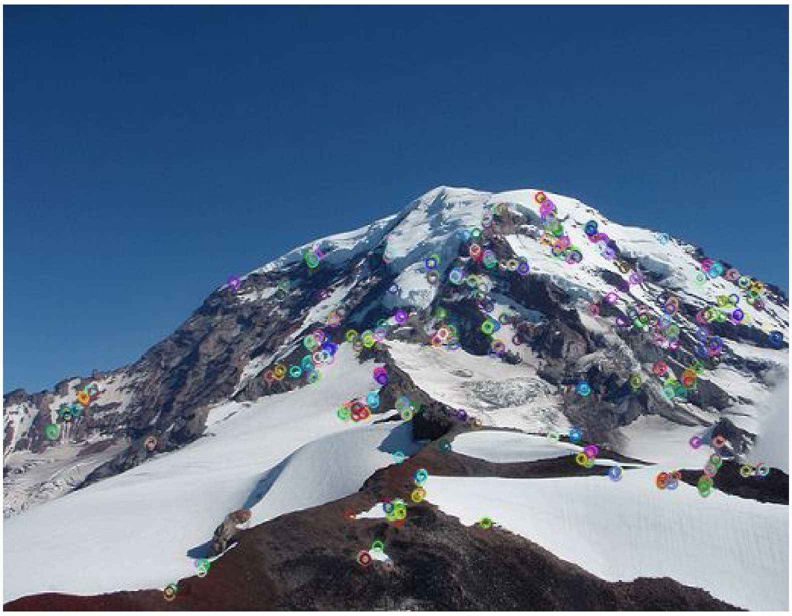
3.1. Feature detection and matching

a. I have used the **assignment 2 code** for Harris corner detection **Boxes.png** to get the result **1a.png**. You can find it in **featureDetector.py** which is called from **main.py**. I have saved the resulting image into the results folder.

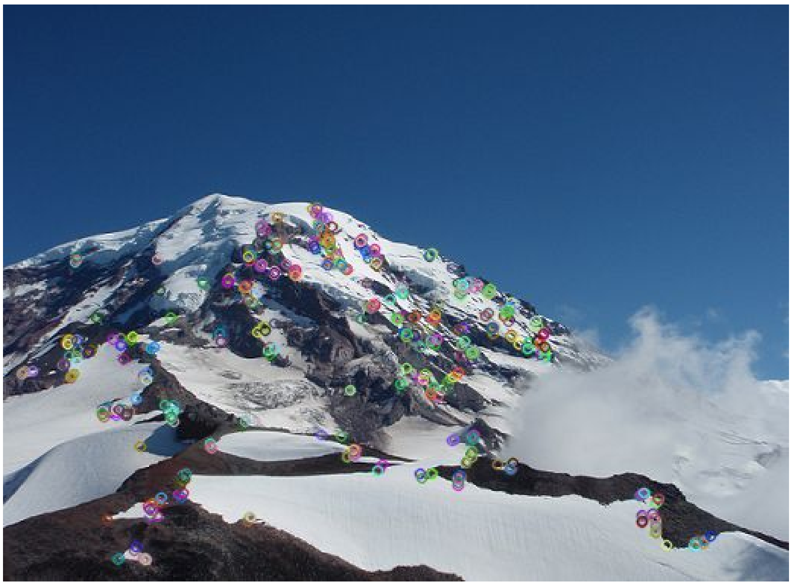


1a.png

b. For detecting features on **Rainier1.png** and **Rainier2.png**, I called all related functions from **main.py.** I have used the code of detector and descriptor which I implemented in **assignment 2**. I have put the code in **featureDetector.py** file. The detected corners I have saved with **1b.png** and **1c.png** for both images respectively.

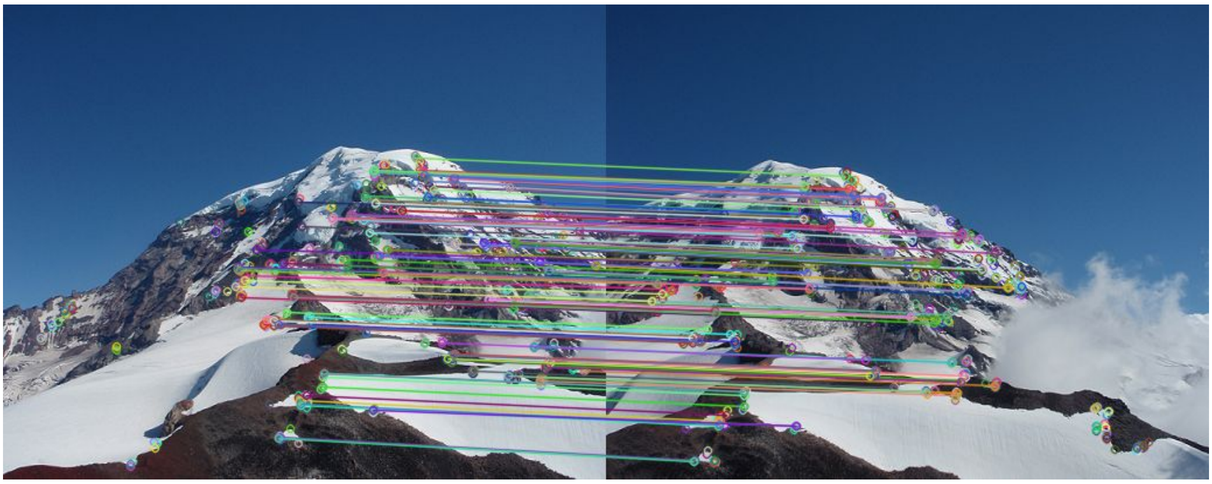


1b.png



1c.png

c. The **matches** I found with the **same method from assignment 2 code**. I save found matches in **2.png** for both **Rainier1.png** and **Rainier2.png.** You can find this file in the results folder.

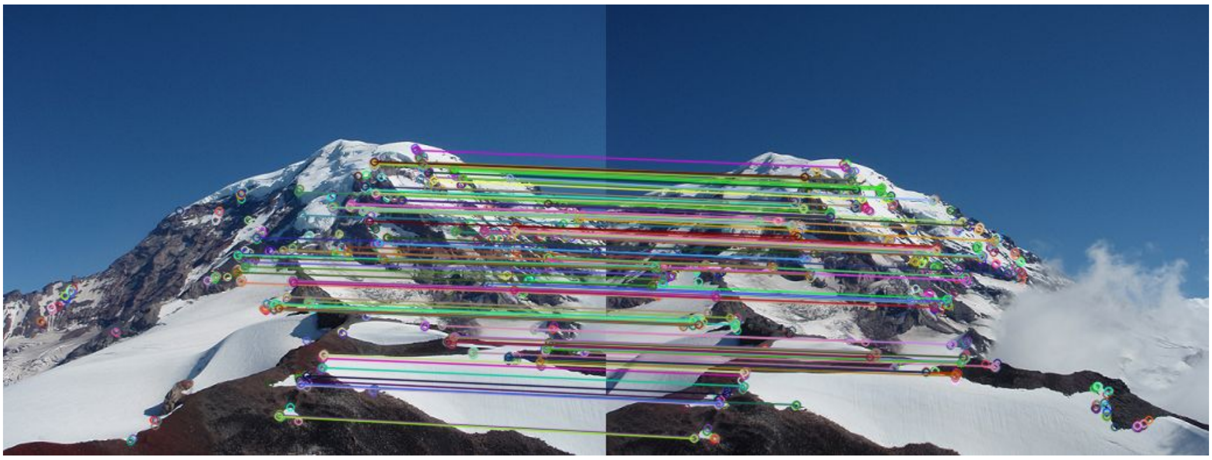


2.png

3.2. Panorama Mosaic Stitching

a. Computed the homography between the images using RANSAC. You can find the following functions in **ransac.py.** The keyPoints and matches I got here are from assignment 2 code which is in **featureDetector.py** file.
   i. ransac(matches, numOfMatches, noOfIterations, inliersThreshold, keyPoints1, keyPoints2):
   ii. project(x1, y1, hom):
   iii. computeInlierCount(hom, matches, numOfMatches, inliersThreshold, keyPoints1, keyPoints2):
   iv. findInliers(homography, matches, inliersThreshold, keyPoints1, keyPoints2):

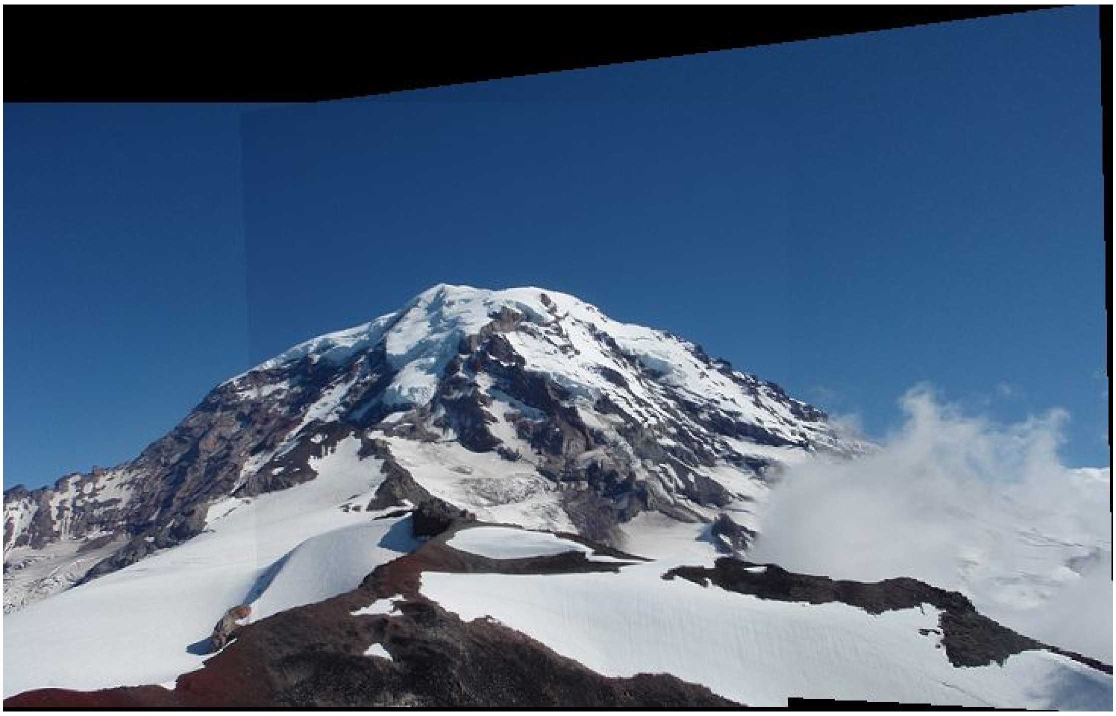
b. I saved the Ransac matches for both **Rainier1.png** and **Rainier2.png** in **3.png.** You can find it in the results folder.



3.png

c. Stitched the images together using the computed homography. I have used the following function for stitching 2 images, **Rainier1.png** and **Rainier2.png** and saved it as **4.png**. You can find the function in the **stitching.py** file. The stitching.py in turn also used **blend.py** file.

stitch(image1, image2, hom, homInv):
blend(image2, homography, minX, minY, stitchedImage):

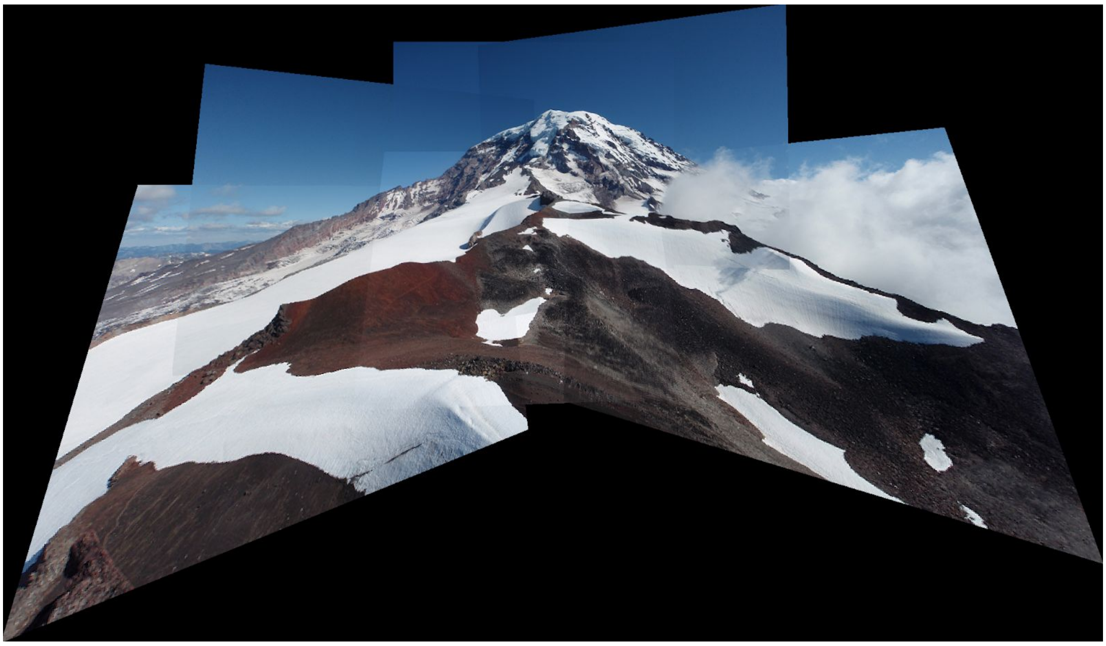


4.png

3.3 Panorama for 6 images

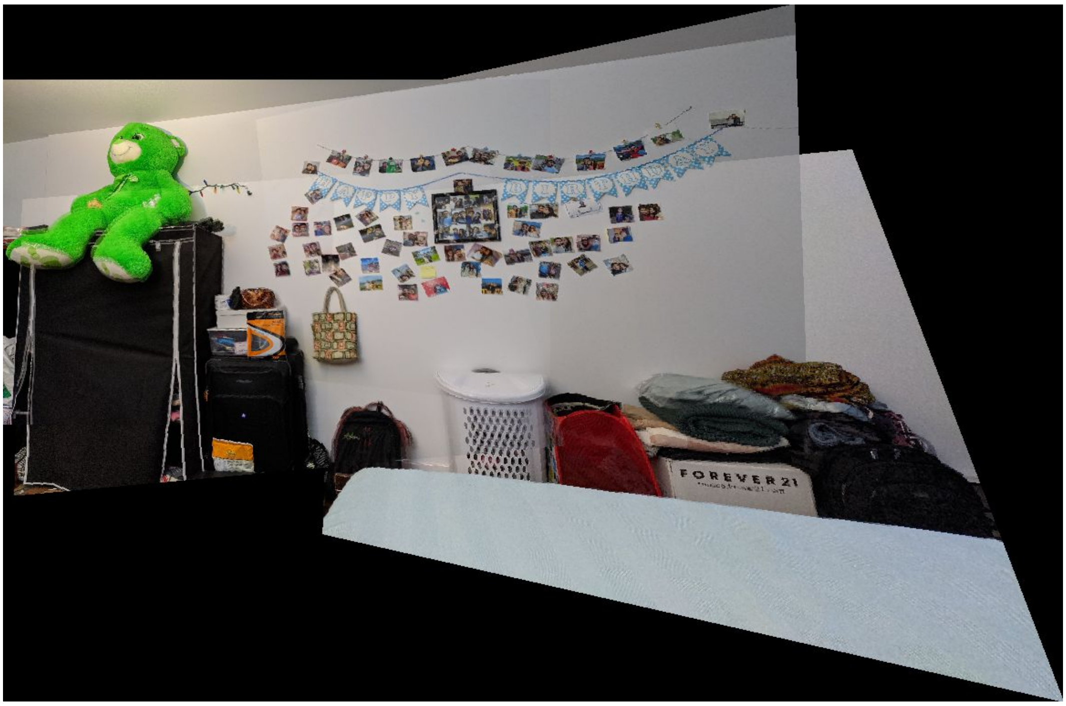
I made a new file, where I am calling all the functions related to 6 Rainier Images which is **mainRainierImagesPanorama.py** and I am calling other functions from this file. In the main function, I called the function, **loadRainierImages()**

a. **loadRainierImages():** It'll load all six Rainier Images, and do the all above operations and saved it as **finalSixImages.png** in the results folder. Here I have used an **inbuilt SIFT function** to find descriptors for all the images.



finalSixImages.png

b. I made one new main file named **mainCameraImagesPanorama.py** which have the following function:
   loadCameraImages(): This function will load **all 4 images captured by phone** camera. I saved all camera images into **images folder** namely **camera1.jpg, camera2.jpg, camera3.jpg, camera4.jpg.** I **downsample** all images with **cv.resize** function. The result is saved in the results folder named as **finalCameraImages.png**. All images will use the same functions as Rainier images.



finalCameraImages.png