

CGRA352 Assignment 4:

How to run the program:

To run the program, ensure that in the res folder there is a folder named 'input' which includes all the frames/images. After running the program, it will open a new window for each part of the assignment as well as saving each stabilizedImage where the application is run from, where each frame is titled 'Stable<Frame#>'.

FeatureMatching():

This method takes two ints to specify two different images, and uses Sift to find any distinguishing features between the two images. It then concatenates the images together, and draws green lines between each pair of points.

Ransac():

Ransac is used to find the best homography transformation, by taking 4 random pairs of points and, using a given epsilon, checks how many inliers are found by using the 4 pairs of points. This is then iterated on, saving the best pair of points where the best pair of points are the 4 pairs that have the most inliers. Next, each inlier found is drawn green while 'outliers' are drawn red.

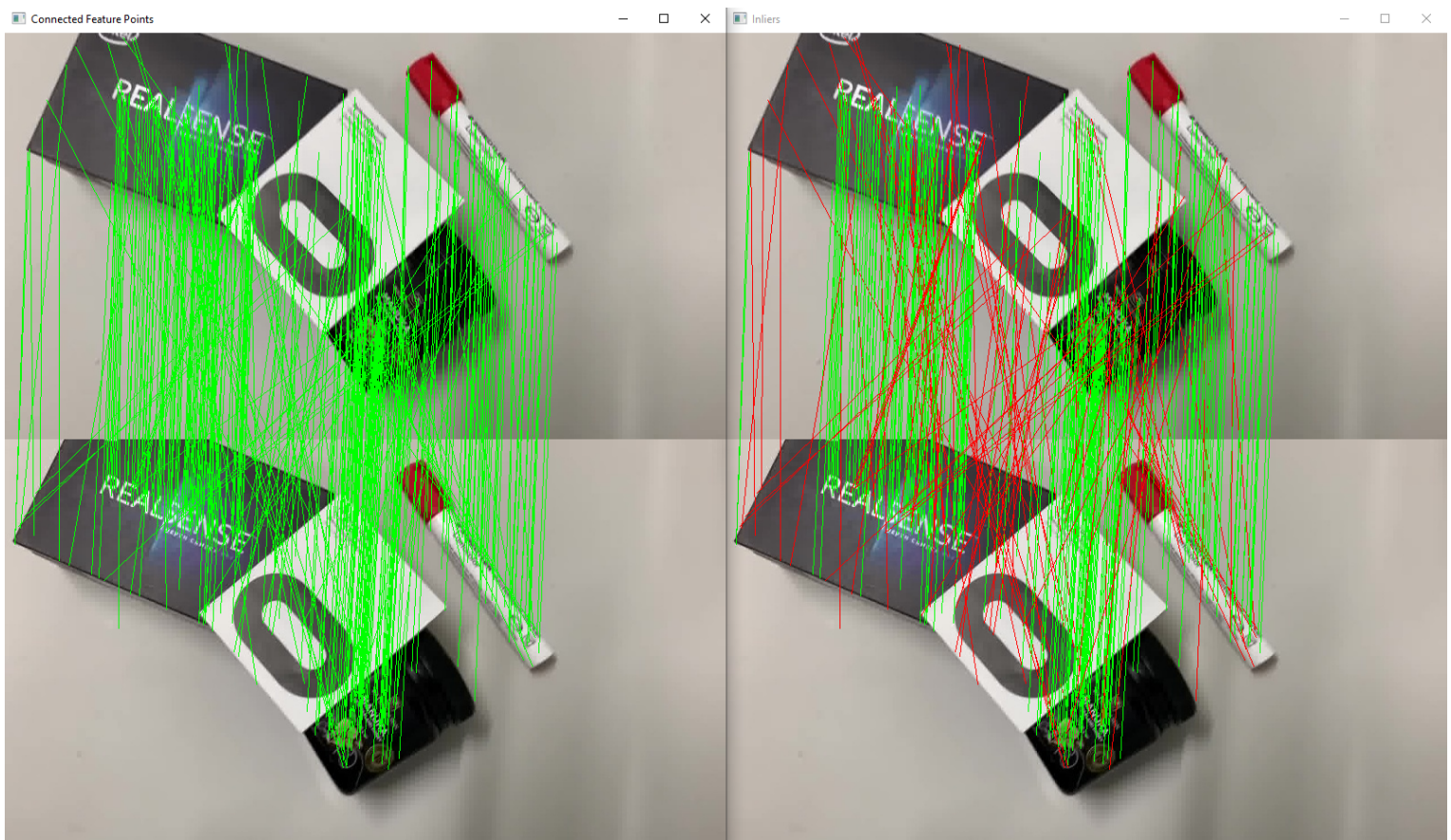
Warp:

After calling ransac, we are able to apply the homography transformation onto one of the given images, to align it with the other image. We then redraw the other image ontop, to 'merge' the image together. In order to do this, we also increase the size of the image, and set the background to green.

videoStabilization():

For an Array of Images, we apply a transformation onto them, so that the images have a smoother motion between them. The new frames are then exported and saved as separated images. To do this, we create a cumulativeHomography by multiplying each homography together as we calculate it. We also use a filter to smooth out the transformations between frames, using the cumulative Homography as it is a better representation of the motion of the frames. For this, we have a set window/filter size, that we apply the filter to. After this we create a new Matrix which is the inverse smoothed Matrix just calculated, as well as the saved homography for the frame at the edge of the window as it won't be looked at again, so we can now apply smooth and warp the image appropriately. We then look at the next image and repeat.

Matching Points Connected Together:



Homography Transformation used to warp and 'merge' images:



Video Stabilization - Frames 000 - 004:

