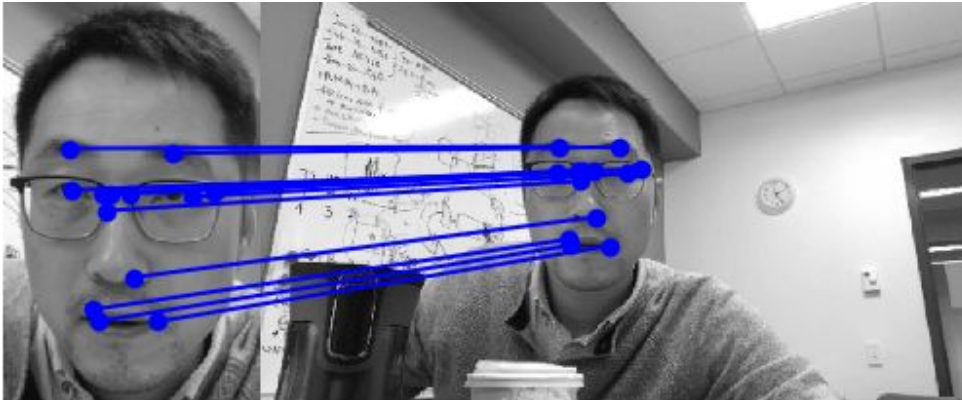


HW2 Writeup

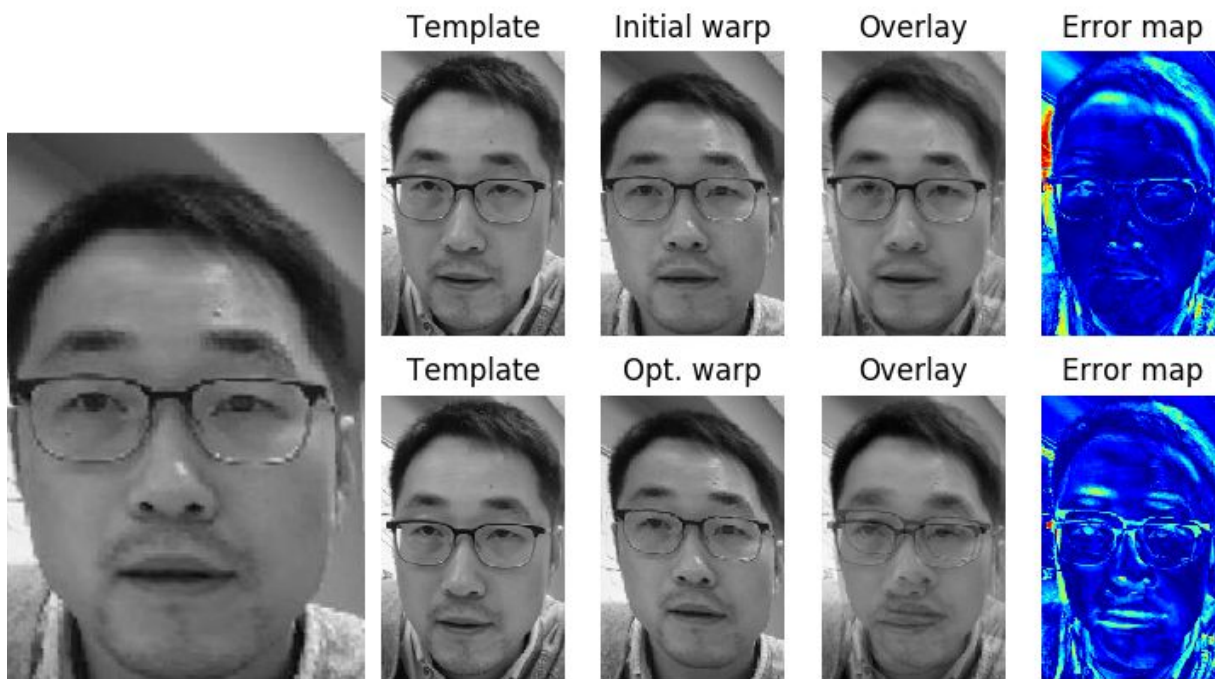
Below is the initial visualization of the bidirectional matching without the RANSAC filtering. A threshold of 0.8 was used.



After RANSAC the following points remained, all of which were precise matches.

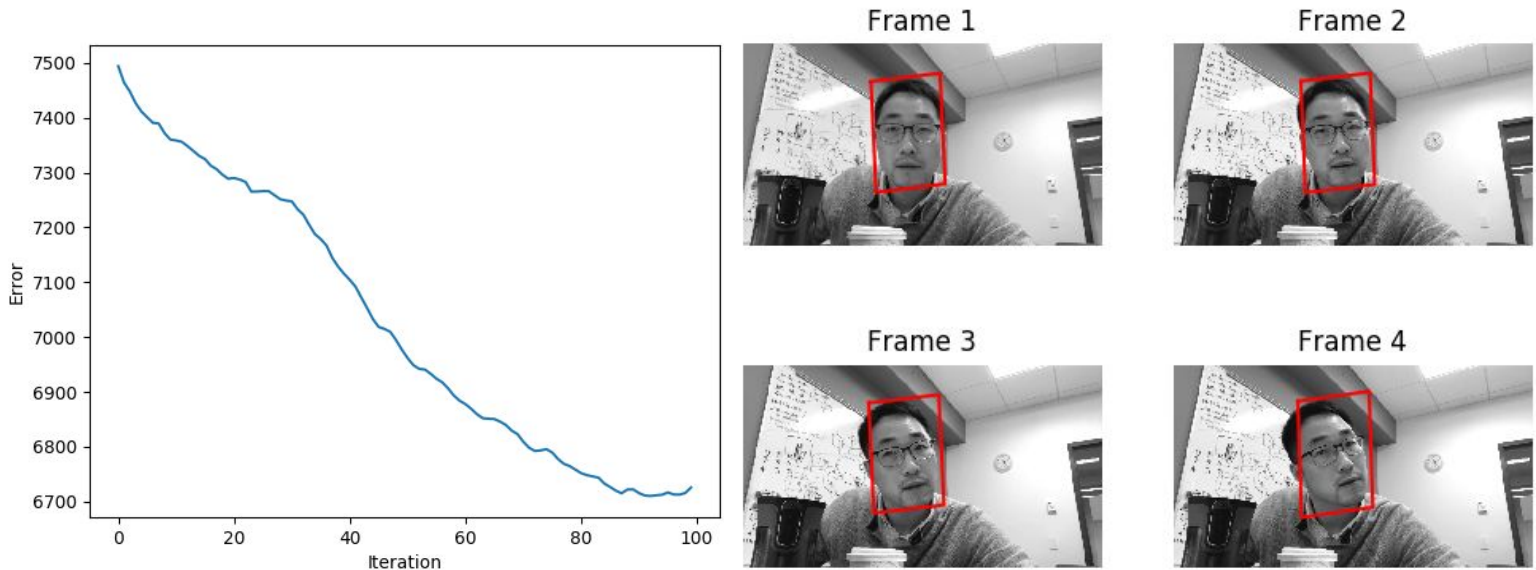


This resulted in the initial warp below.



I was unable to get my inverse compositional alignment working as well as shown in the assignment instructions. I got the gradient descent working however it hit a minimum and rose back up after around 50 iterations. I ended up implementing a system to halt the algorithm after it increased for more than 5 iterations in a row. This resulted in the overlay above and the error graph below (I'm not sure why the scale isn't similar to the instructions as I divided the error by the size of the image to get the average error per pixel).

It can be seen that the algorithm corrects most of the error on the left side of the image, however this comes at the expense of the rest of the face as the glasses are worse in after the inverse compositional alignment than they were before. I was unable to determine what was wrong with my code.



After tracking multiple frames I ended up with the tracking image above. Since the gradient couldn't fully descend the boxes don't quite match the face, however they do rotate with the face.

Finally, the below graph shows the gradient without the stopping algorithm which shows a clear minimum around the 50th iteration.

