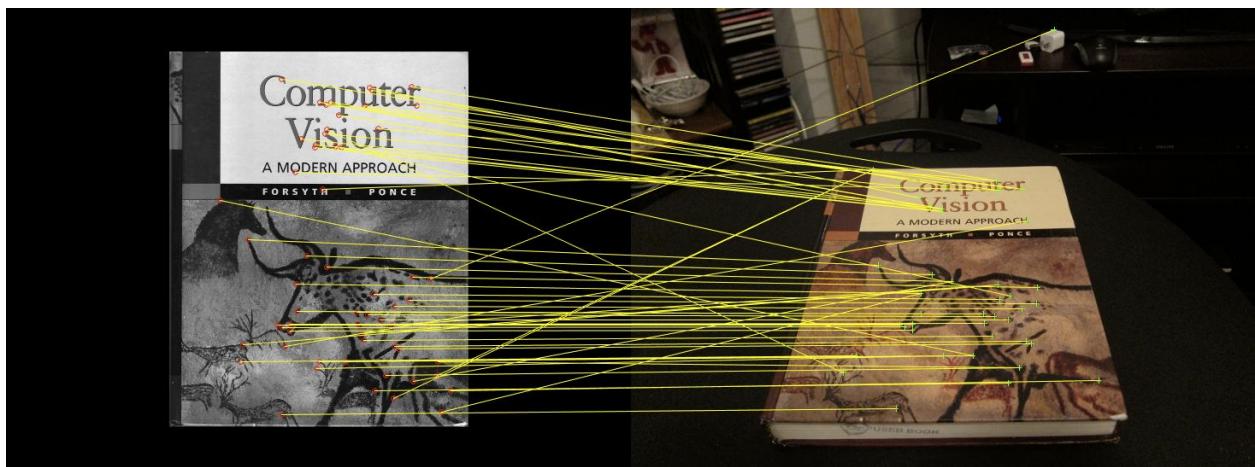


1. Feature Detection, Description, and Matching

For this section, I compared my results with different maxRatio values for the BRIEF algorithm and noticed that MaxRatio of 0.68 yielded the best results. Here is the output of my module:



In comparison, here is the results when I used Matlab's extractFeatures instead of computeBRIEF:

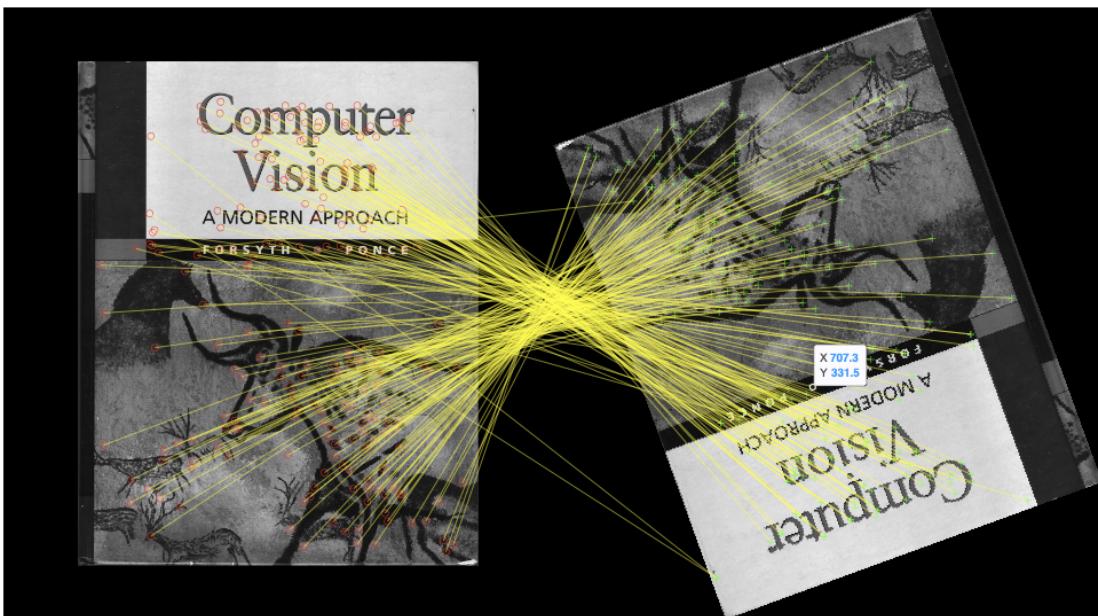


2. BRIEF and Rotations

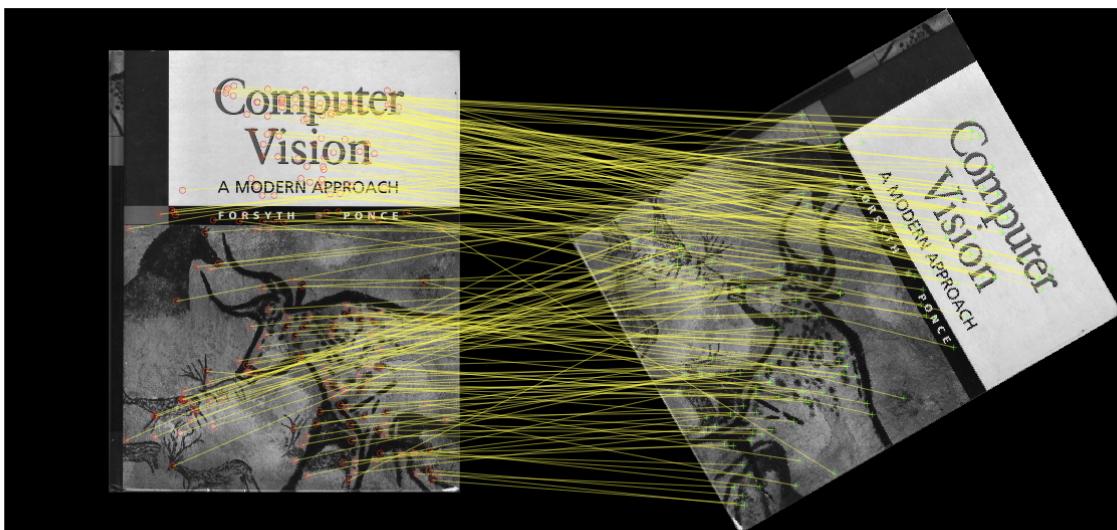
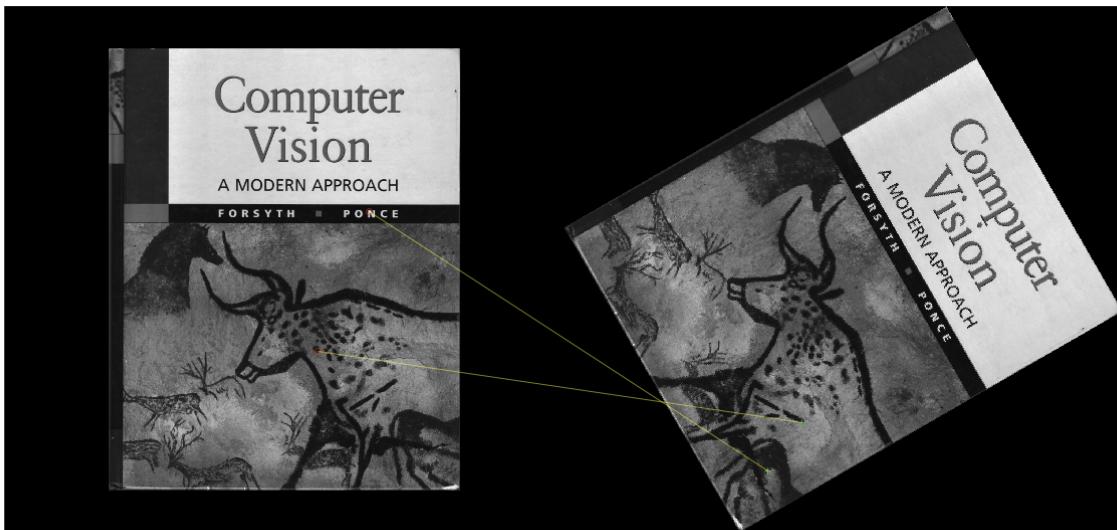
Here is matching points at 100 degrees (BRIEF on top and SURF on the bottom):



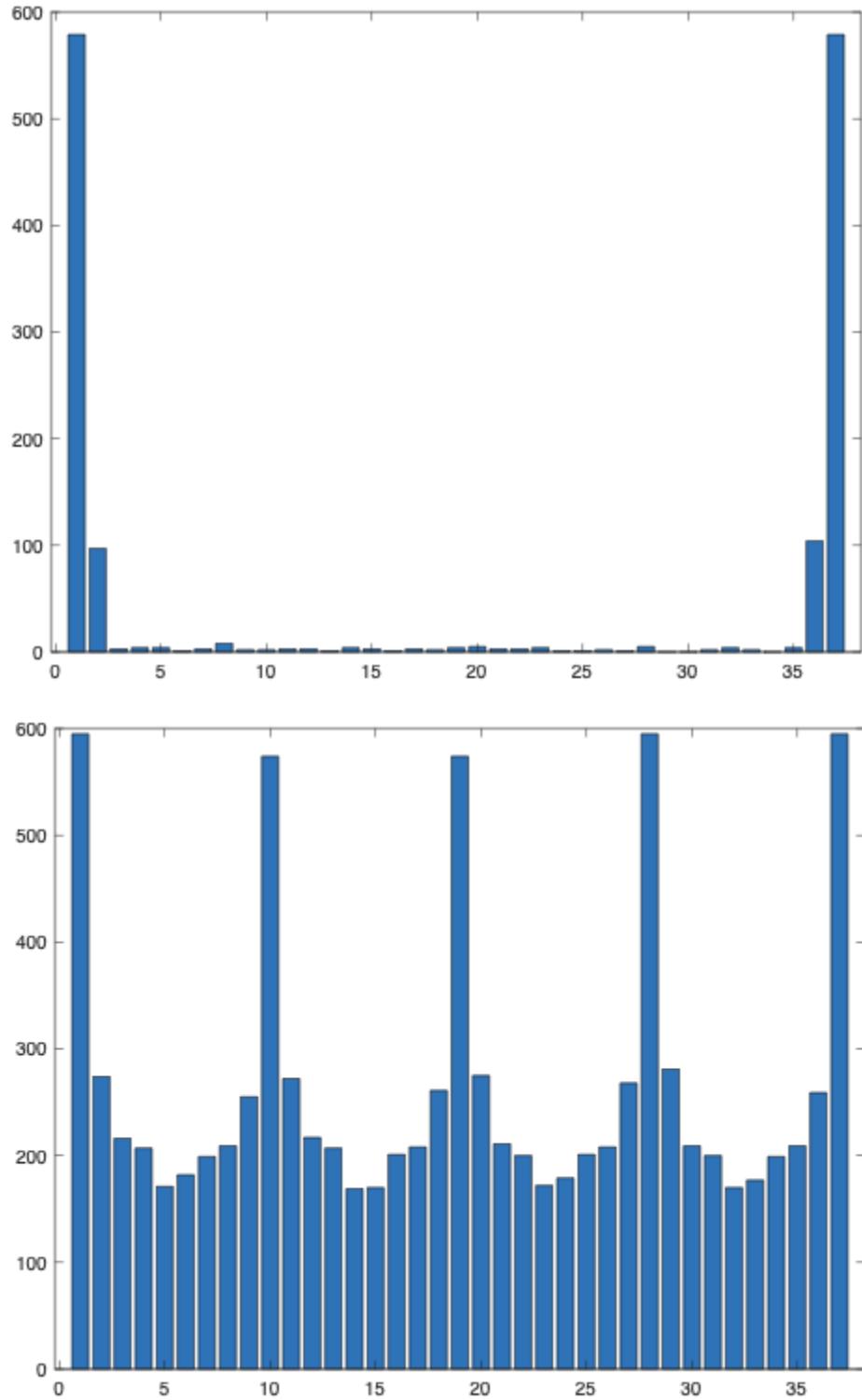
200 degrees:



300 degrees:



Below is the histogram of points matched for BRIEF (top) and SURF (bottom):

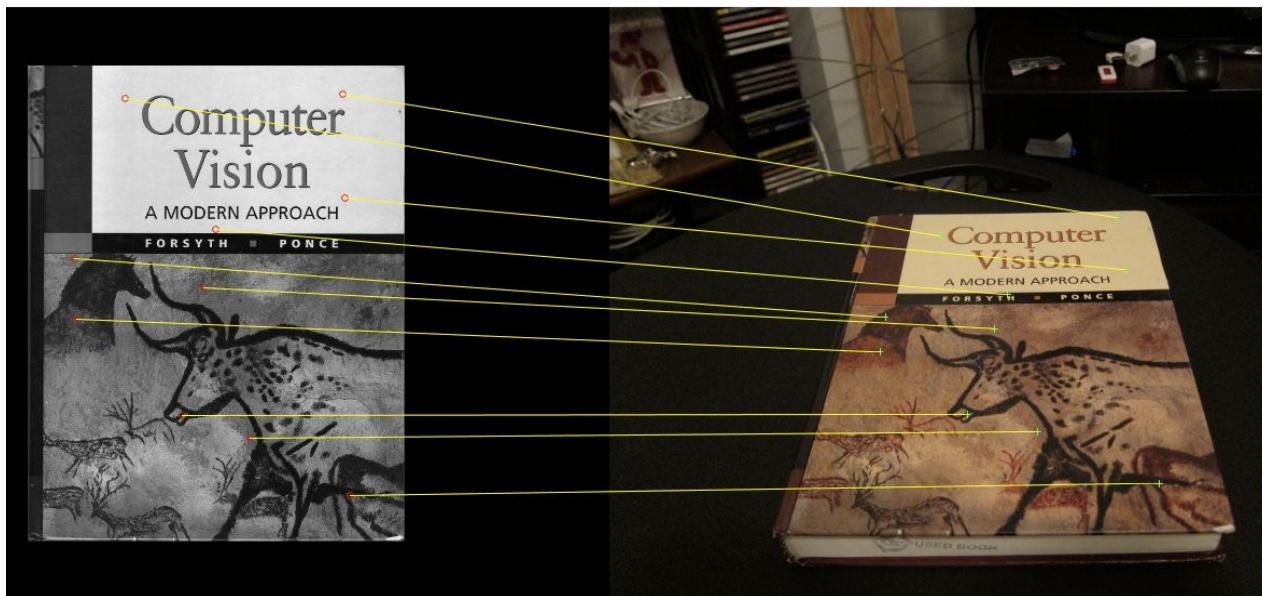


BRIEF was not designed to perform well in rotations. Looking back at the histograms we see that for small degrees (<5 degrees) it somewhat works but after that it completely fails. In

contrast, SURF has a better performance during rotations, and seems to work the best when the angle is a multiple of 90 degrees. The chart starts from 1 but the angles start from 0, therefore SURF's performance at 90,180 and 270 degrees is on par with a non-rotated image.

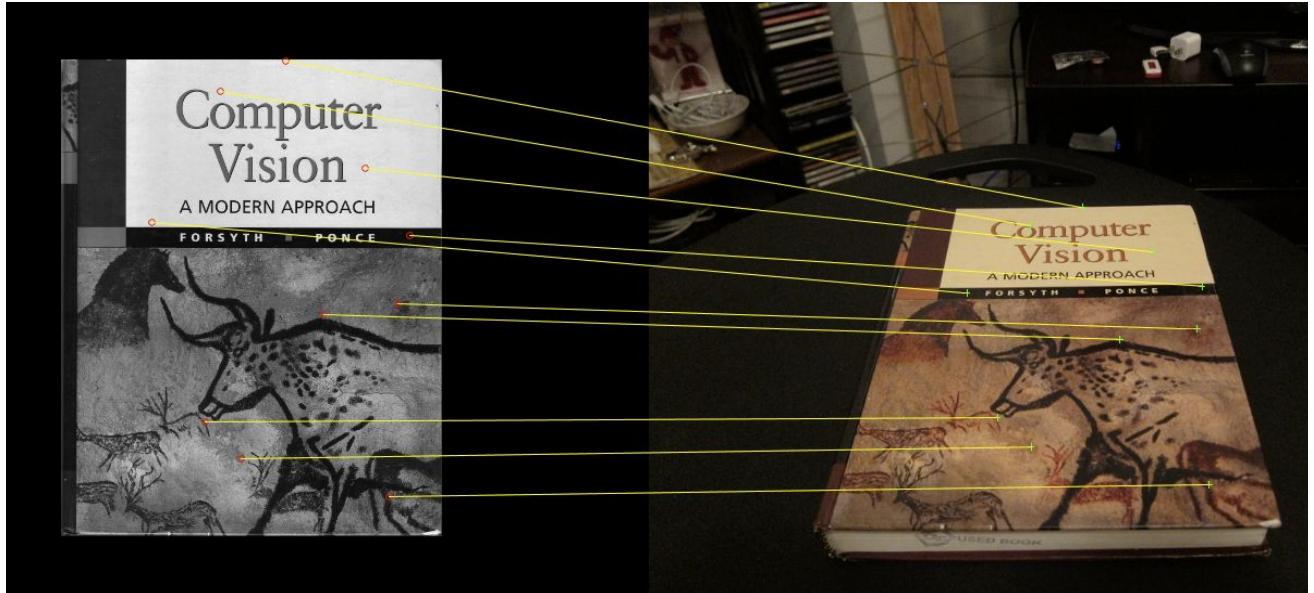
3. Homography Computation

Using the matchPics, I got 11 points from the desk and cover pictures, which I used to calculate the transformation matrix. I then used the transformation matrix to 10 randomly chosen points from the cover image and displayed the results on the desk image:



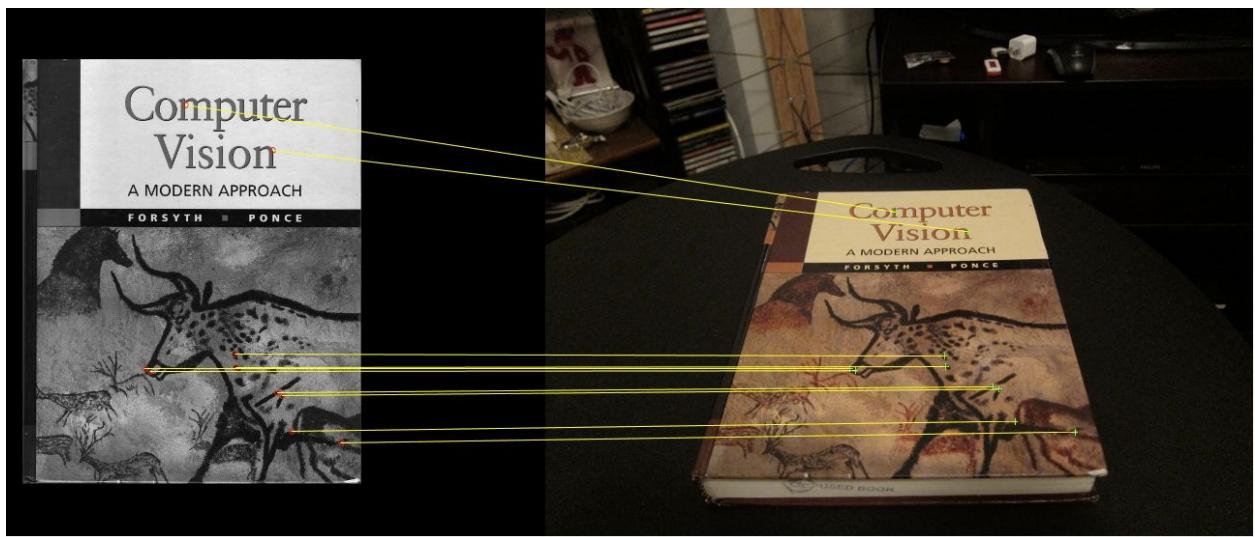
4. Homography Normalization

Similarly I got the transformation matrix from the feature points and applied to 10 randomly chosen points and here is the result:

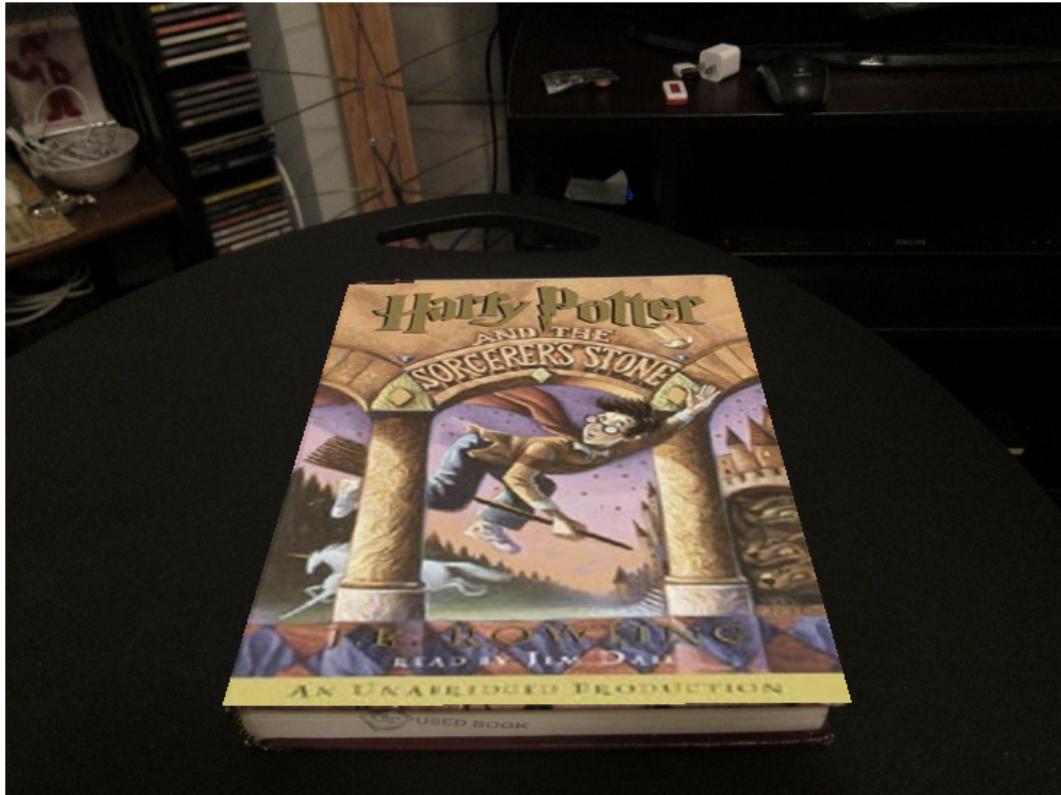


5. RANSAC

Here is the results after the transformation on inliers and 4 random points:



6. HarryPotterizing a Book



7. Creating your Augmented Reality application

The video is saved as `vid.mp4` in the results folder. You can either watch that or run the code for `ar.m`. For this I only ran the code until I ran out of frames from panda's video since it had less frames compared to the book video.

PS. All images and videos are available in the results folder, in case it's hard to see them clearly here in the report.