HACETTEPE UNIVERSITY

BBM418

ASSIGNMENT-2 REPORT

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Image Panorama Stitching

The problem of this assignment involves implementing a basic form of image stitching, which involves taking two or more images and merging them together to create a single panoramic image. In this assignment, we will look at every step of image stitching.

Methodically approach the problem:

A technique for extracting the feature descriptions for an intriguing point is called a feature descriptor (or the full image). By encoding intriguing information into a string of numbers, feature descriptors act as a kind of numerical "fingerprint" that we can use to distinguish one feature from another.

Descriptor Algorithms:
- SIFT(Scale Invariant Feature Transform) Scale-invariant and model rotation invariant.
- SURF(Speeded Up Robust Feature)
- ORB(Oriented FAST and Rotated BRIEF)

The panorama stitching project consists of these steps:

Step 1:
Detect key points and extract local invariant descriptors (SIFT, SURF, ORB.) from the two input images.
SIFT, for instance, is scale- and rotation-invariant. SIFT offers keypoint descriptors that use picture gradients to describe the key point at a selected scale and rotation.

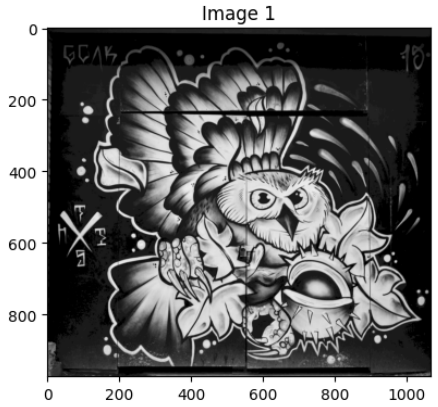
Step 2:
Compare the descriptions of the two pictures.
We contrast the retrieved features from the two input photos. In order to find features that are similar in both photos, this involves comparing the similarity scores of the two images. If their descriptors are similar, a feature from one image is assumed to match a feature from the other.

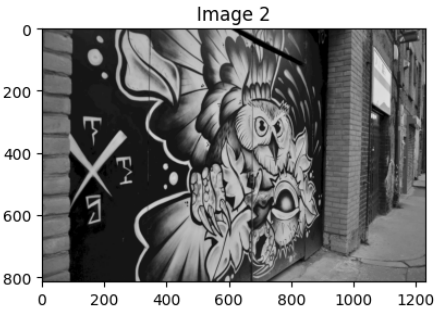
Step 3:
Using our matched feature vectors, estimate the homography matrix using the RANSAC algorithm (RANDOM SAmple Consensus).
This matrix represents the geometric relationship between the two images, including their relative scales, orientations, and locations. RANSAC is an iterative algorithm that selects a subset of matched points, fits a homography matrix using these points, and then evaluates the homography matrix's fitness by examining how well it aligns with the remaining points. This process is repeated until an acceptable matrix is obtained.

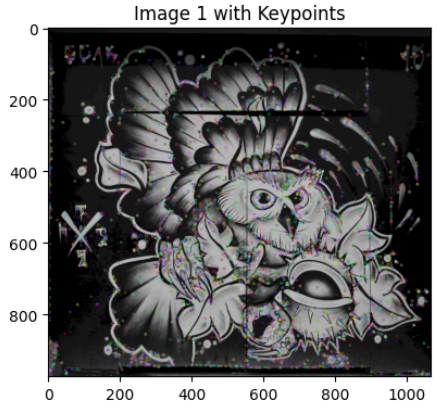
Step 4:
Utilize a warping transformation with the homography matrix you obtained in the previous step.
The pixels of one image must be warped in accordance with the predicted homography matrix in order to align matching spots in the two photographs. Various processes, such as object tracking, image stitching, and augmented reality, can be used with the resulting altered image.

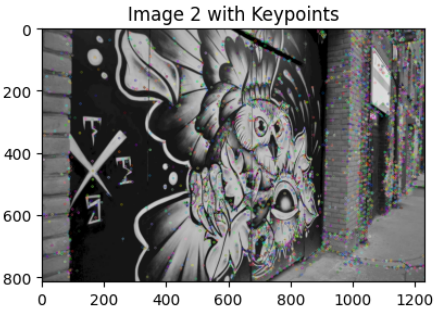
My Program Outputs:

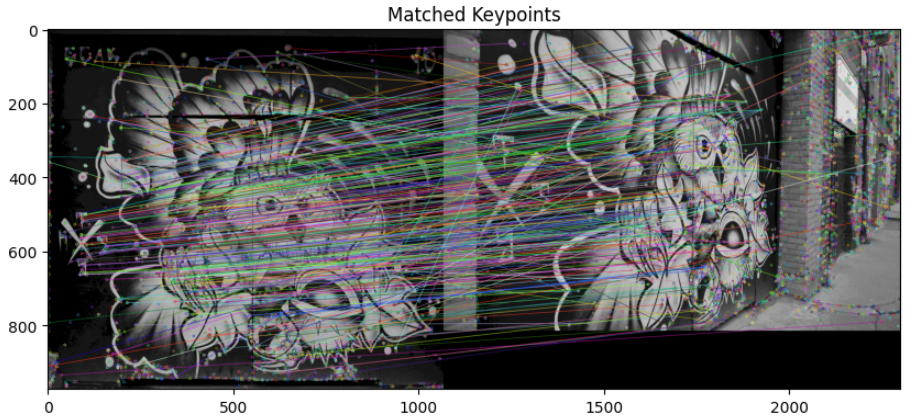
1)Bird Output

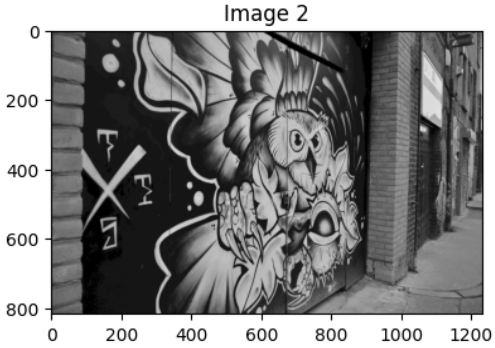


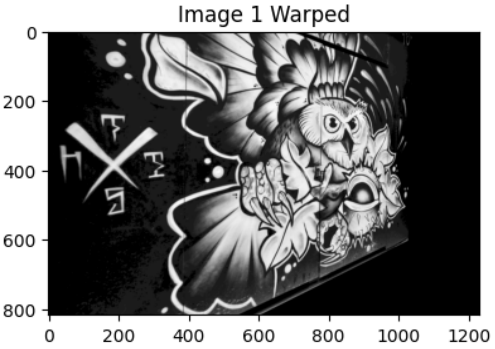




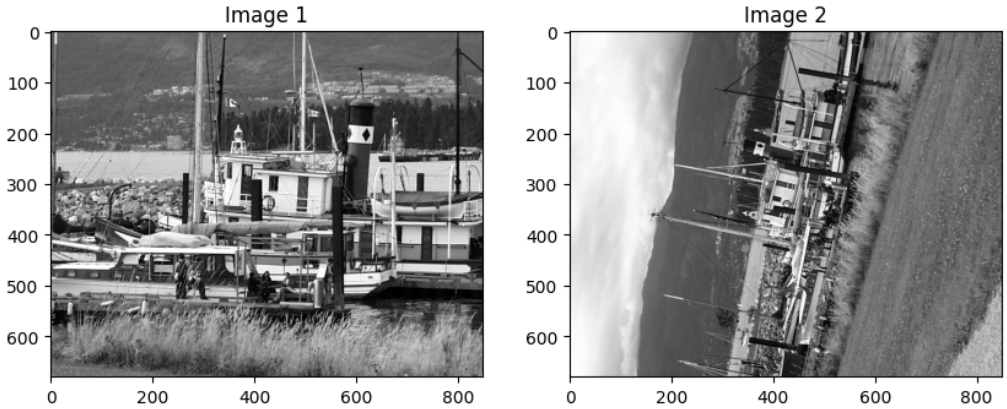


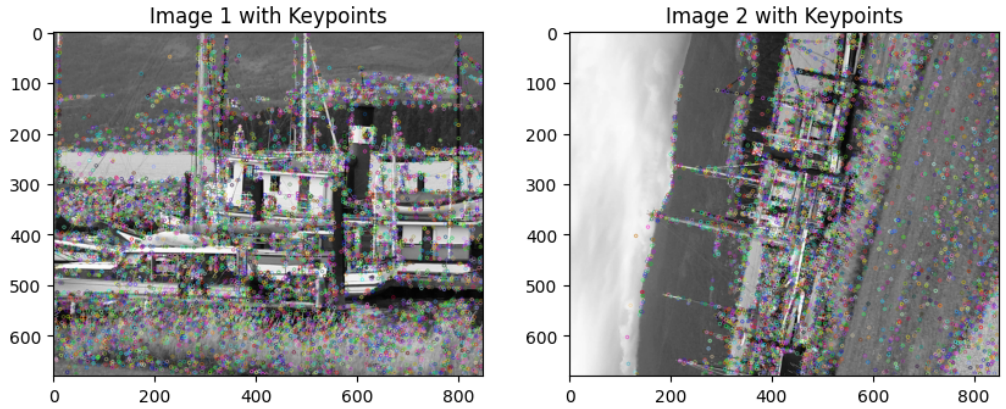


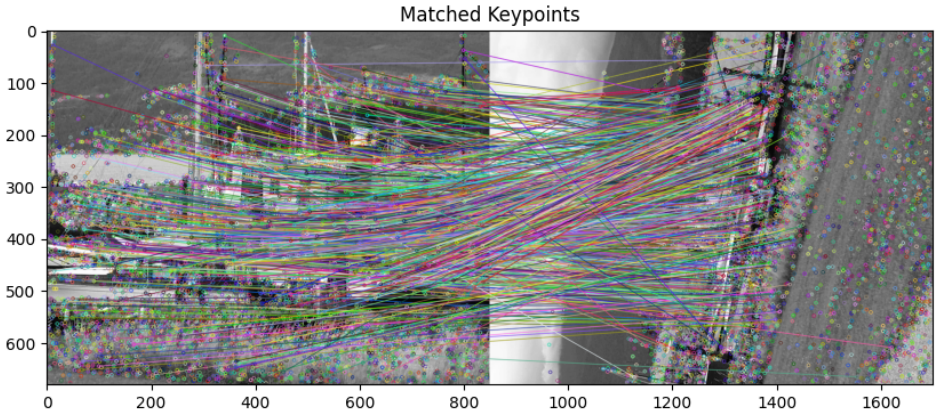


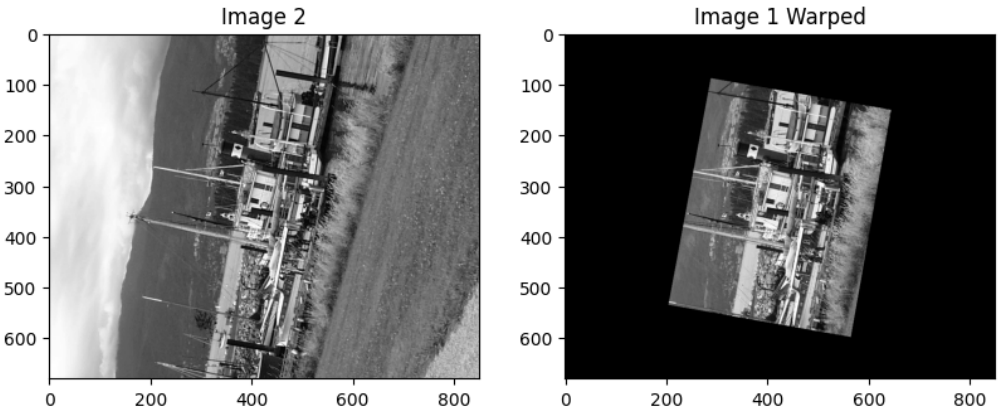


2)Boat Output

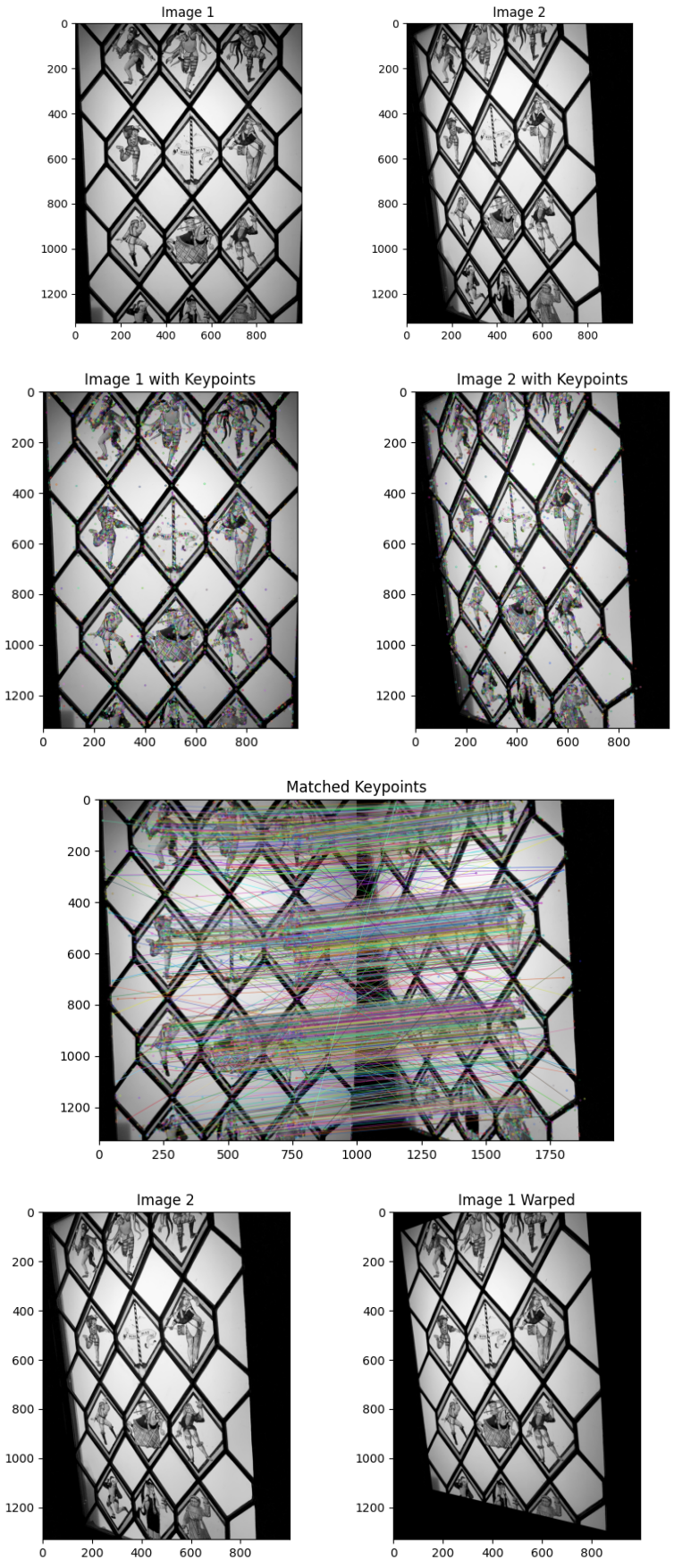




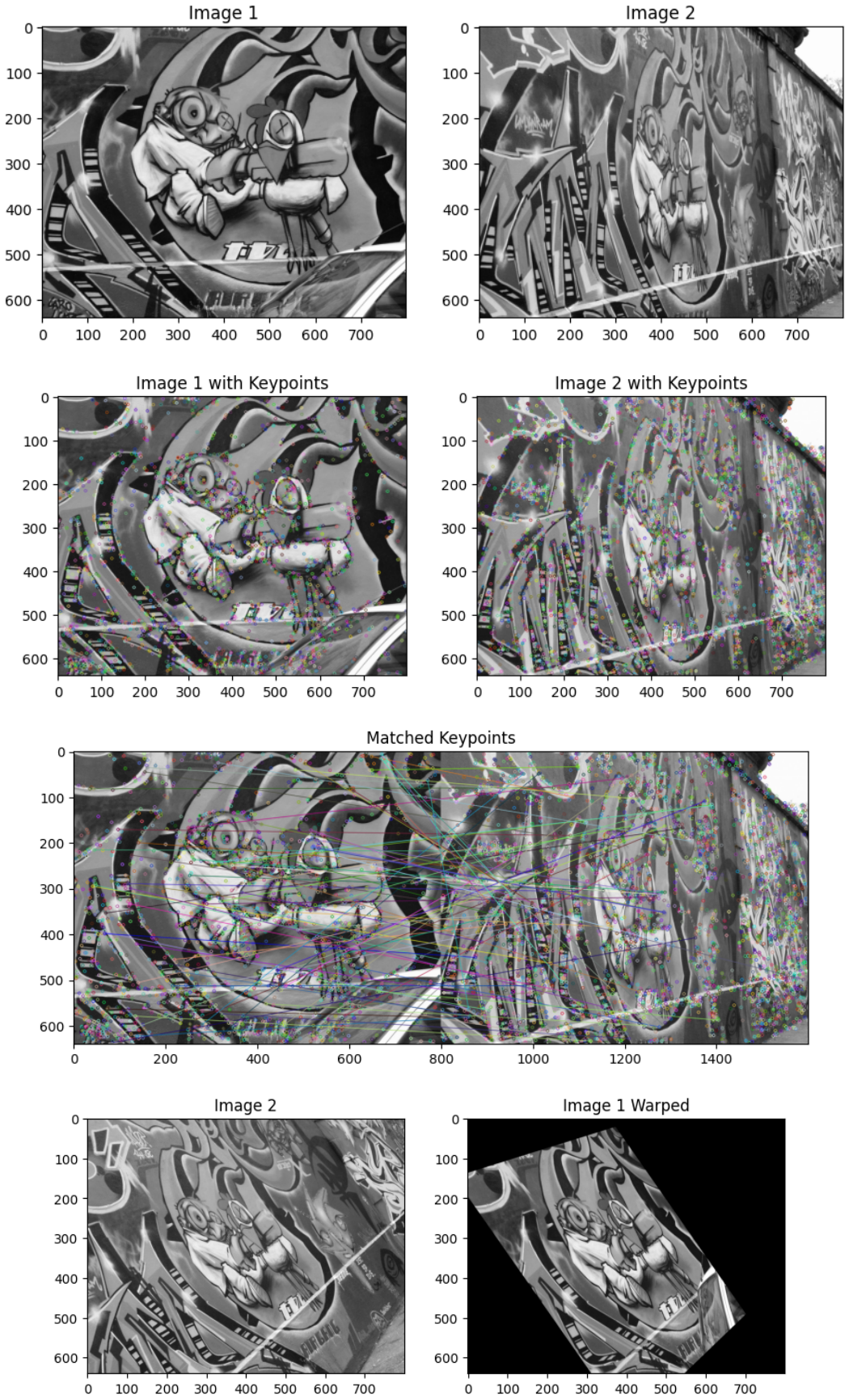




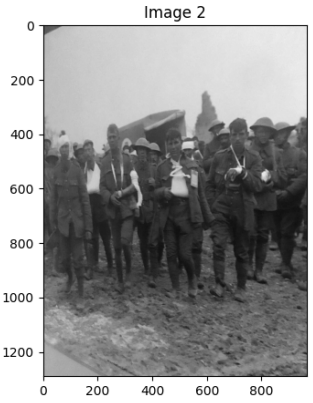
3)Circus Output

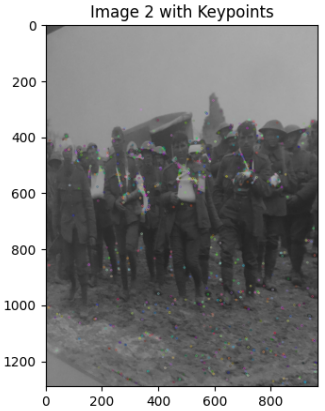


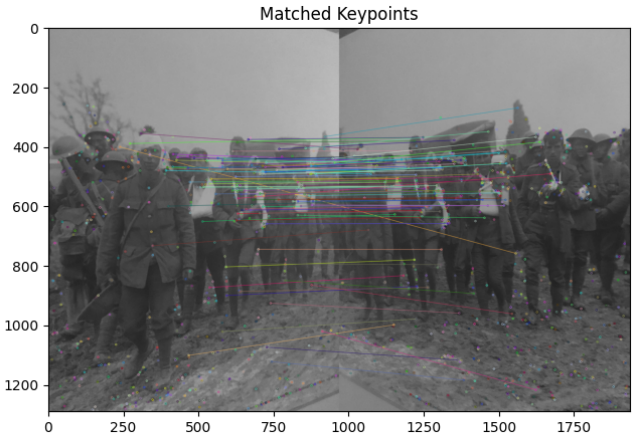
4)Graffiti Output

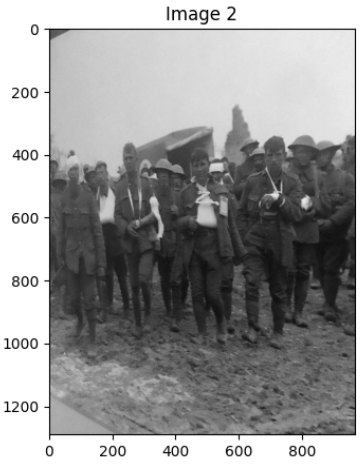


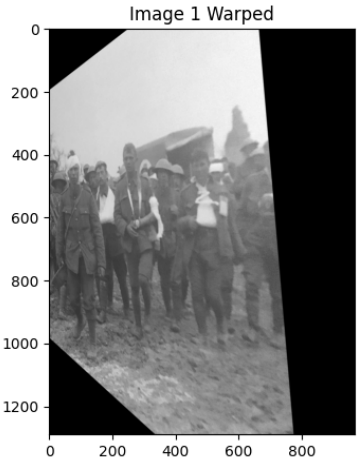
5) Soldiers Output



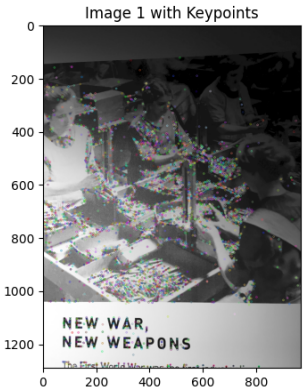


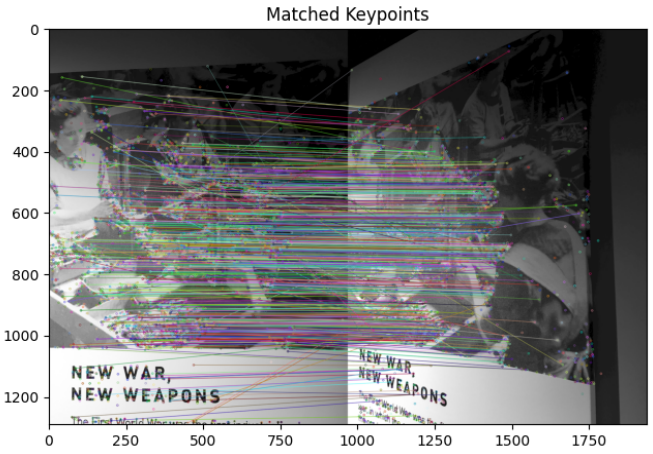






6) Weapons Output





Time Comparison

If I was to compare the methods, the SIFT method was the slowest working method. ORB and SURF worked close to each other.