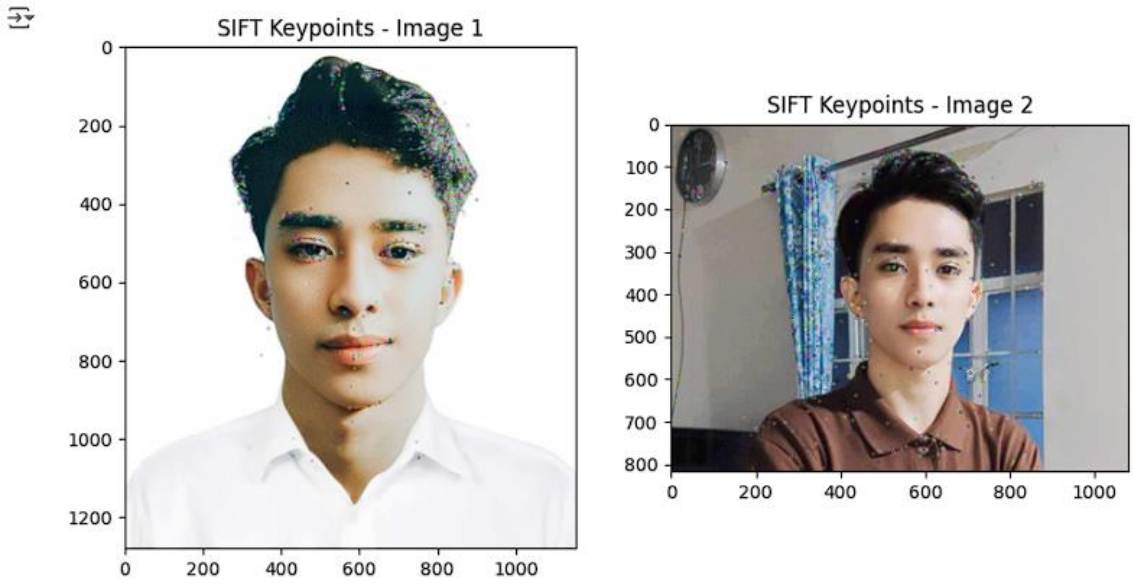
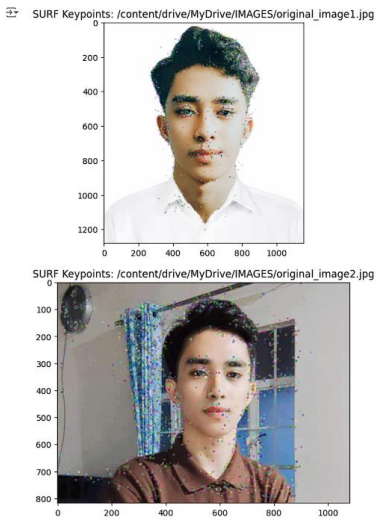
Performance Analysis

Extract Keypoints using SIFT



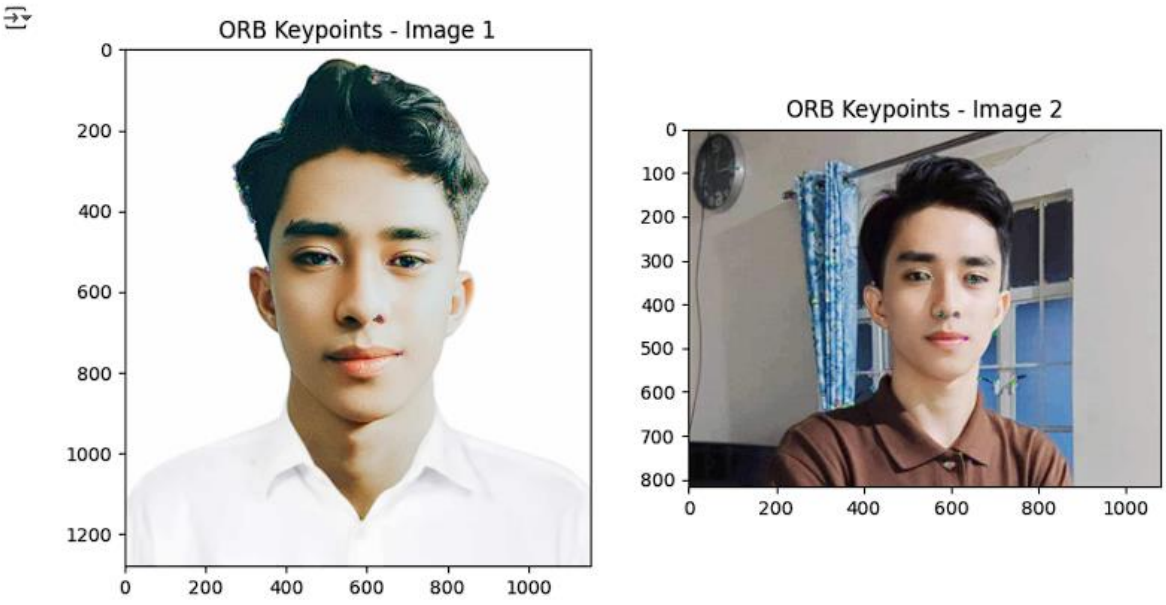
Based on the output of my code it shows that SIFT identified a substantial number of keypoints, significantly outperforming both SURF and ORB in accuracy and detail retention. This indicates that SIFT captured more detailed features in my Image.

Extract Keypoints using SURF



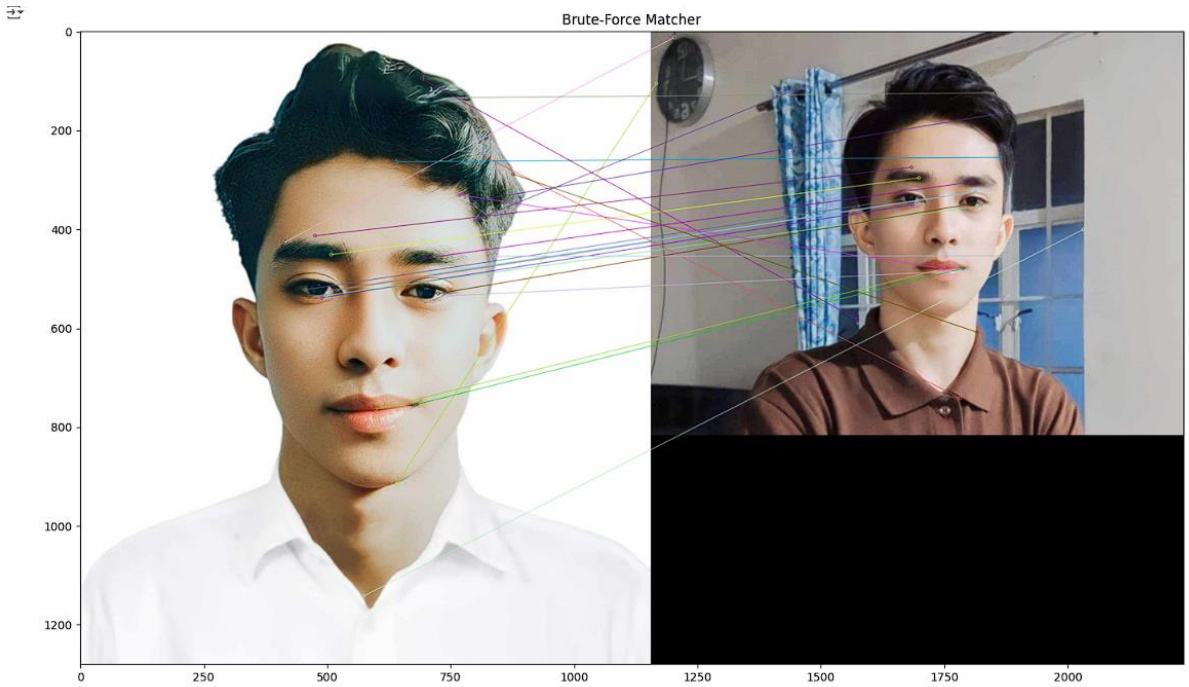
The Speeded-Up Robust Features (SURF) method provided a balanced approach to keypoint detection, offering faster performance than SIFT while maintaining reasonable accuracy. Although it detected more keypoints than SIFT.

Extract Keypoints using ORB



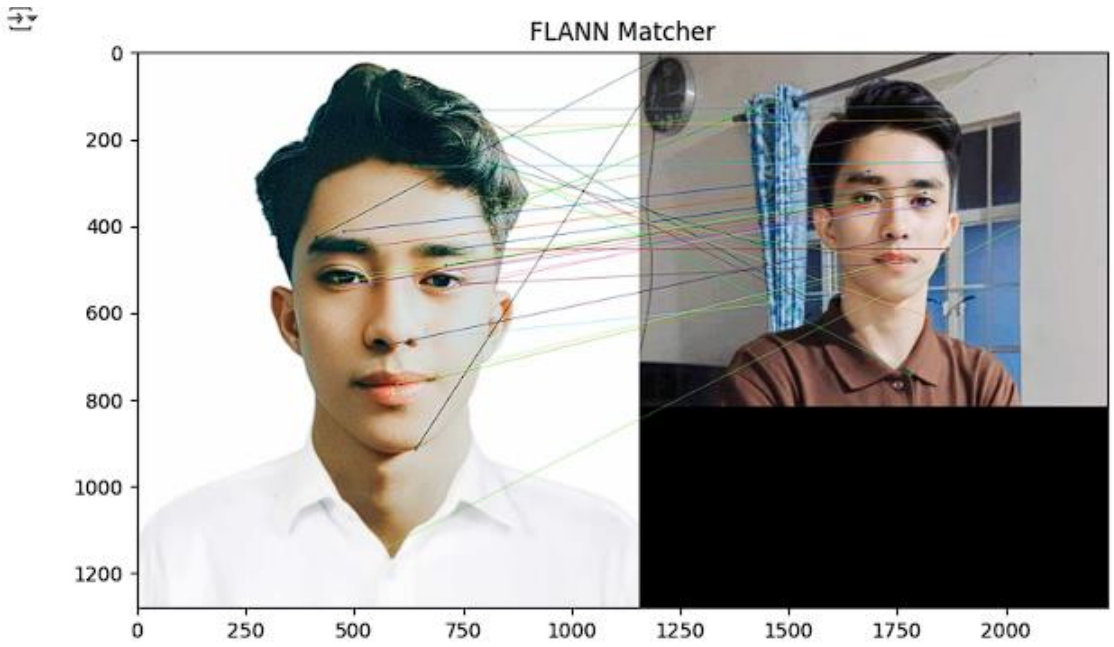
The Oriented FAST and Rotated BRIEF (ORB) is the fastest among the three feature extraction techniques, providing faster keypoint detection and descriptor computation. While ORB identified fewer keypoints compared to SIFT and SURF, its efficiency makes it an excellent choice for real-time applications or situations where computational resources are limited.

Brute-force Matcher



The results indicates that Brute-Force Matcher provided a straightforward yet effective method for matching features between the images. While it is easy to implement and works well for smaller datasets, it exhibited slower performance and fewer good matches compared to Flann.

Flann Matcher



Based on my observation Flann Matcher significantly outperformed the Brute-Force Matcher in both speed and accuracy. FLANN achieved a higher number of good matches between the keypoints, making it the preferred choice for handling large datasets efficiently and effectively.

Conclusion

The analysis shows that SIFT is the best feature extraction method for scenarios demanding high accuracy, while ORB offers a fast alternative for applications prioritizing processing speed. Somehow the FLANN Matcher outperformed the Brute-Force Matcher in both speed and accuracy, making it the optimal choice for feature matching in larger datasets. Therefore, for tasks involving detailed feature detection and matching, I prefer using SIFT with FLANN, while ORB can be used in situations where speed is more needed.