

Week 4: Summer Internship

14 June 2021- 20 June 2021



Tasks

The main task in this week is to get the features from an image to compare two images using features and give a similarity score.

The first part is to separate the face from the image and then apply the comparison algorithm.

Comparison-1

For this, we will use the notion of “norm” in a vector space. Using linear algebra, we know that “norm” behaves similarly as the distance and the difference in norm would thus become the parameter for comparison.

We used the standard norm function from opencv called **cv.NORM_L2**.

Matching the features

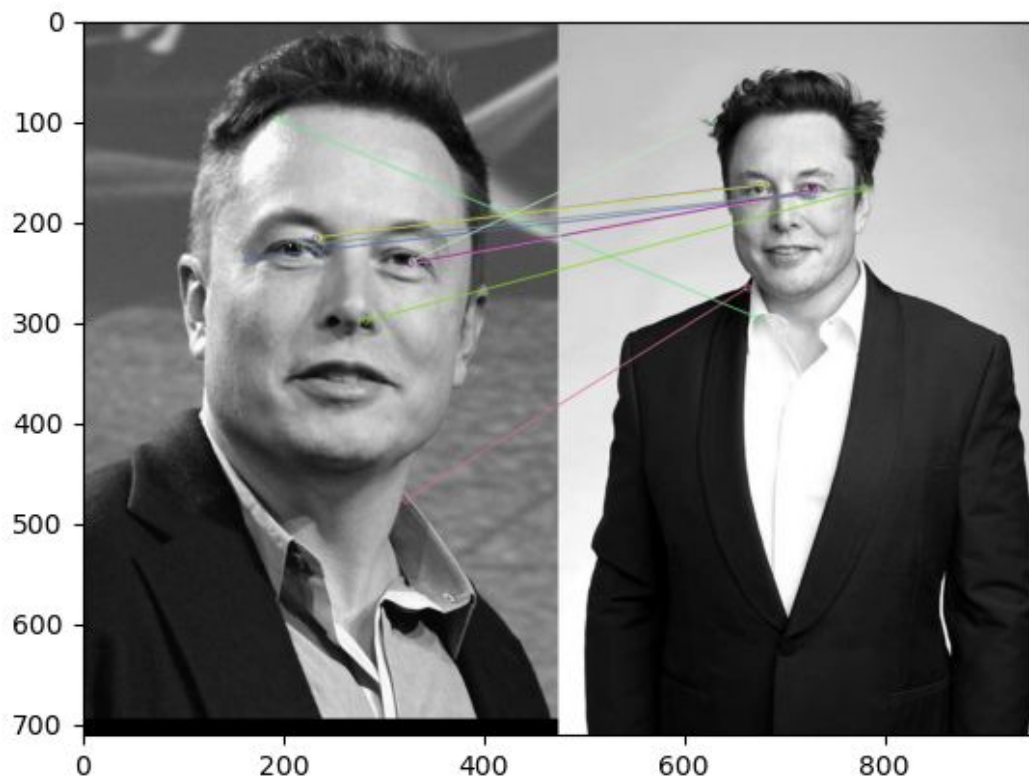
For this, we will use the ORB Descriptors.

This will return the similar parts from two images and arrange them in increasing order of norm.

It is thus stored in decreasing order of similarity. You can choose to find first “M” similar features from the image.

Output-1

Feature comparison of
two images using norm



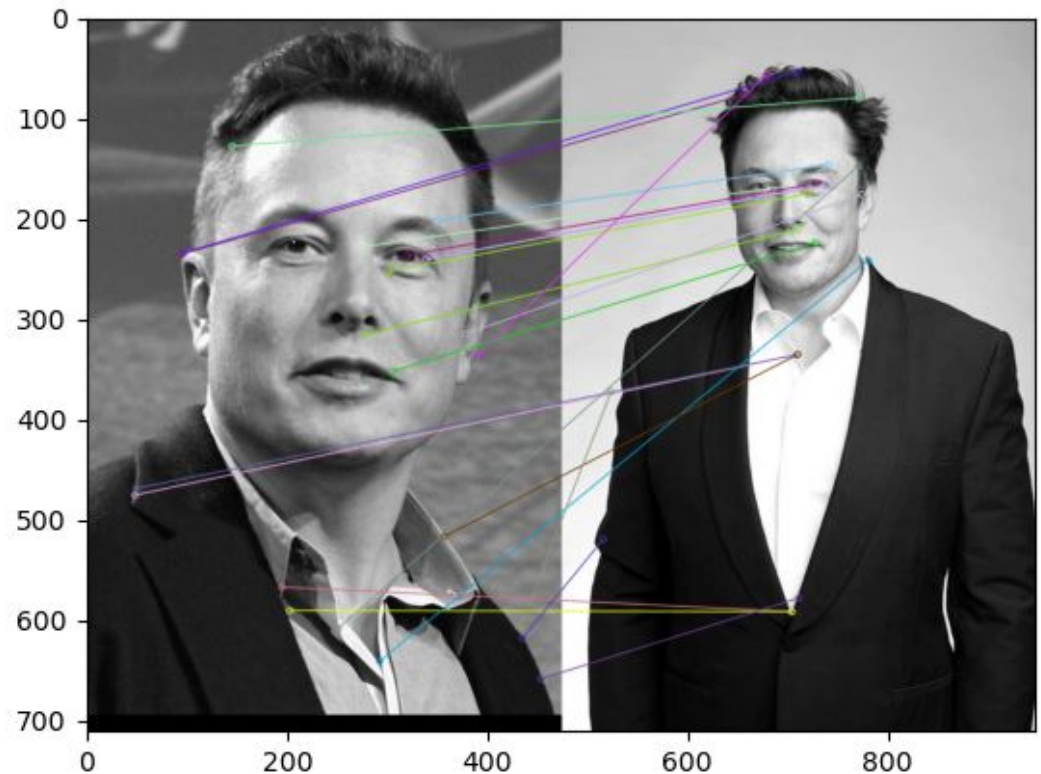
Comparison-2

Another way is to use the Brute Force Matcher to get k best matches.

It uses SIFT Descriptors and machine learning to do feature comparison.

Output-2

Feature comparison of two images using BF Matcher.



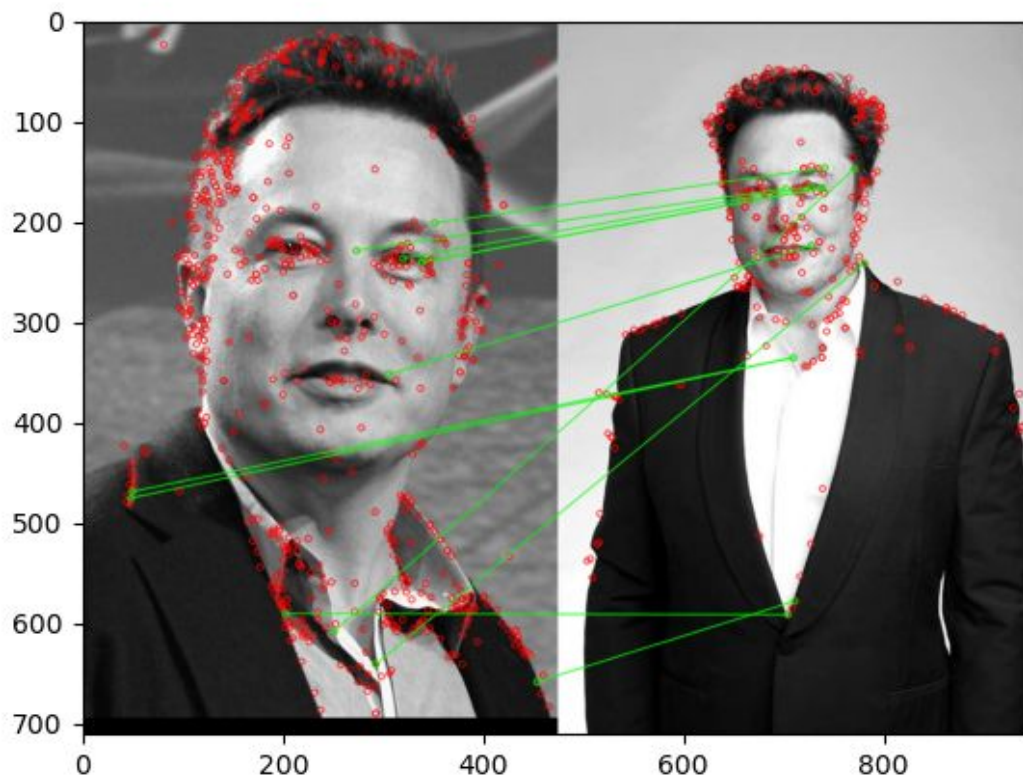
Comparison-3

Another way is to use the FLANN based matcher.

FLANN stands for Fast Library for Approximate Nearest Neighbours. For large datasets and for higher dimensions, it works better than BF Matcher.

Output-3

Feature comparison of
two images using
FLANN matcher.



Key features of the comparison algorithm

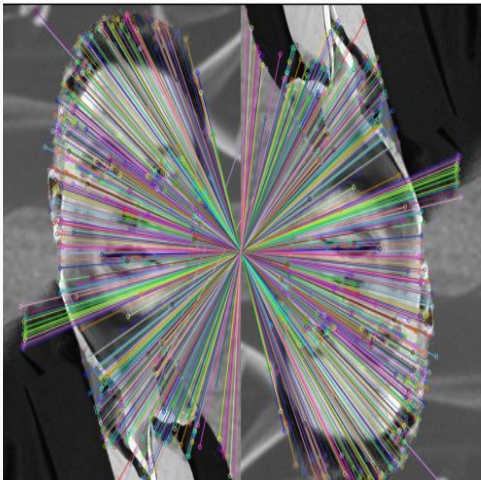
Some of the main features are:

- The algorithm is fast and takes <1 sec/image.
- The algorithm is able to take into consideration the rotations and alignment of view.
- The algorithm compares the features and 2 out of 3 algorithms can be given a mathematical quantity for the similarity extent.

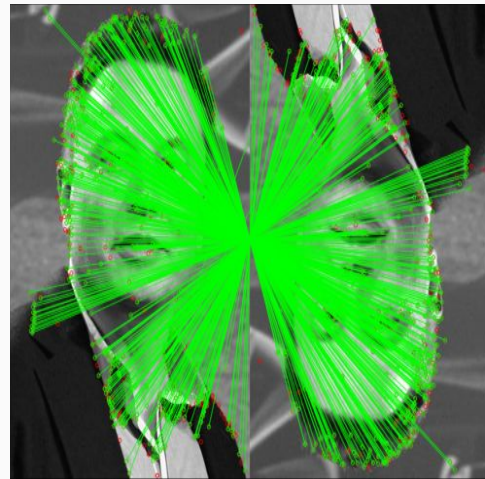
Output with rotated but same image



Algorithm-1



Algorithm-2



Algorithm-3

Output with rotated and different image



Algorithm-1



Algorithm-2



Algorithm-3

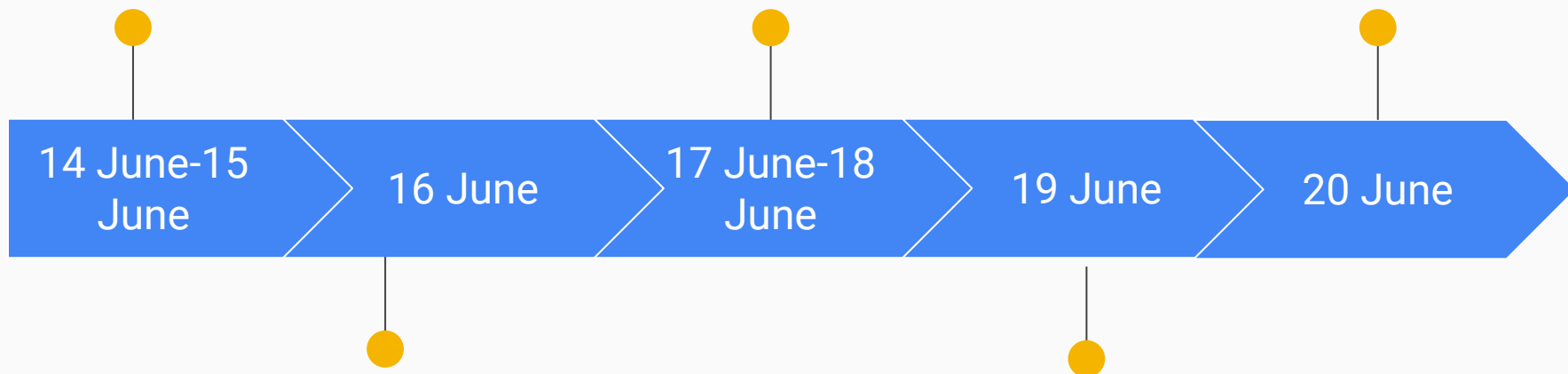
References

- Research paper on FLANN Algorithm:
https://www.researchgate.net/publication/339170738_FLANN_Based_Matching_with_SIFT_Descriptors_for_Drowsy_Features_Extraction
- Comparison of various feature detection algorithms:
https://www.researchgate.net/publication/312634655_Comparison_of_OpenCV's_feature_detectors_and_feature_matchers
- https://www.researchgate.net/publication/292995470_Image_Features_Detection_Description_and_Matching

Working on previous week's code on eigenface detection

Writing code for algorithms for our dataset

Report work + Summarising



Meeting and reading research papers for finding similarity search algorithms

Testing the algorithm for different possibilities