Rapport Lab 3 (SIFT)

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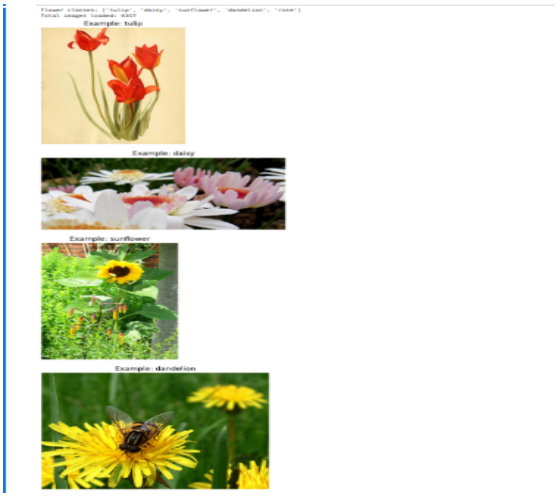
SIFT :
It stands for Scales Invariant Feature Transform, and it is one of the computer vision algorithms we use for the detection and description of the main points, or let's say the key features, such as the corners, texture …

Data Loading :
Here is some examples of each folder images within the main folder flower :



SIFT Feature Extraction :
As mentioned above, SIFT is used to detect the key features, and to use it we do the SIFT initialization first :

```
sift = cv2.SIFT_create()
```

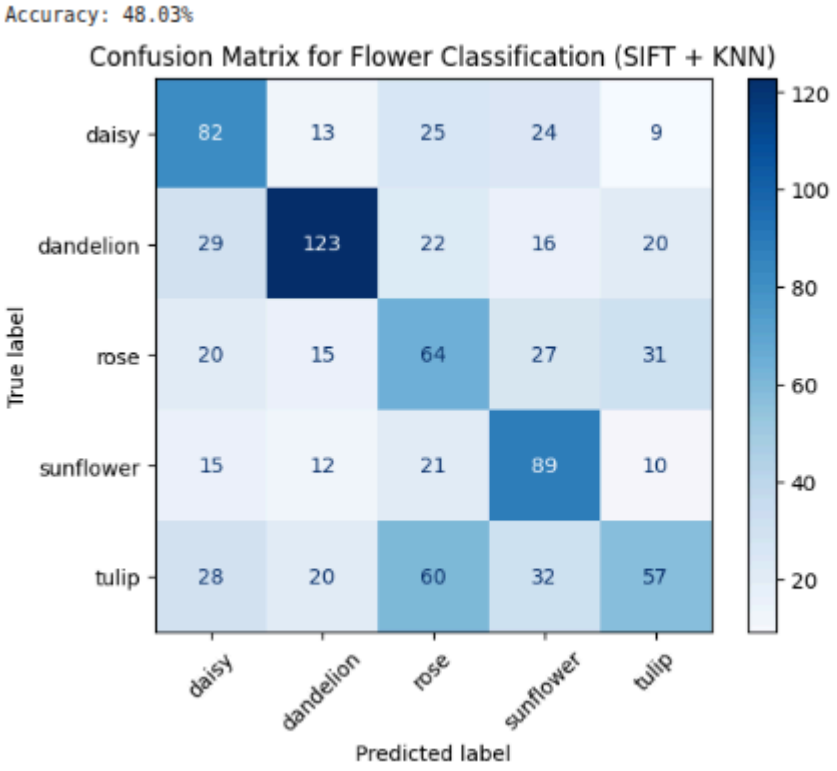
After iterating through each flower folder, we detect and compute SIFT descriptors :

keypoints, descriptors = sift.detectAndCompute(gray, None)

We use the mean of descriptors to represent the image :

```
features.append(np.mean(descriptors, axis=0))
labels.append(flower_class)
```

After converting, splitting, training the KNN classifier, and retesting on the test set, we ended up with this accuracy :



The accuracy wasn't that perfect tbh, but it correctly classifies around **half of the test images**.
Dandelion (123 correct) and **Sunflower (89 correct)** are doing **best**, meaning their texture or shape is distinctive enough for SIFT to capture.
Rose (64 correct) and **Tulip (57 correct)** are often **confused** — likely due to similar petal textures and shapes.
Daisy (82 correct) performs moderately well.
and since SIFT captures gray-scale textures, not color, and many flowers are differentiated mostly by color and overall shape.

Taking the mean of SIFT descriptors loses detailed information, and sometimes we can have a few similarities between the roses and the tulips, so we can say that the SIFT captures some textural information but has issues with discriminative power for classes that differ mainly in color or global shape.