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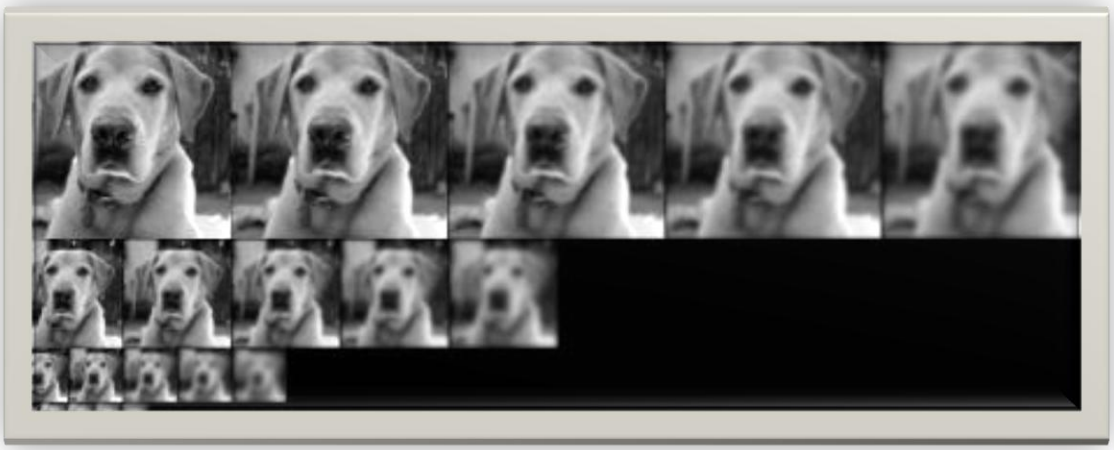
Problem 1:

Results are in the same folder. I have chosen dog image in the database because of its unique features on the face, around ears and nose. I rotated the image by 30 degree and got the same Affine matrix for both the cases with some differences in last digits. The results of matrices are in Problem1 Folder.

The results are shown below:

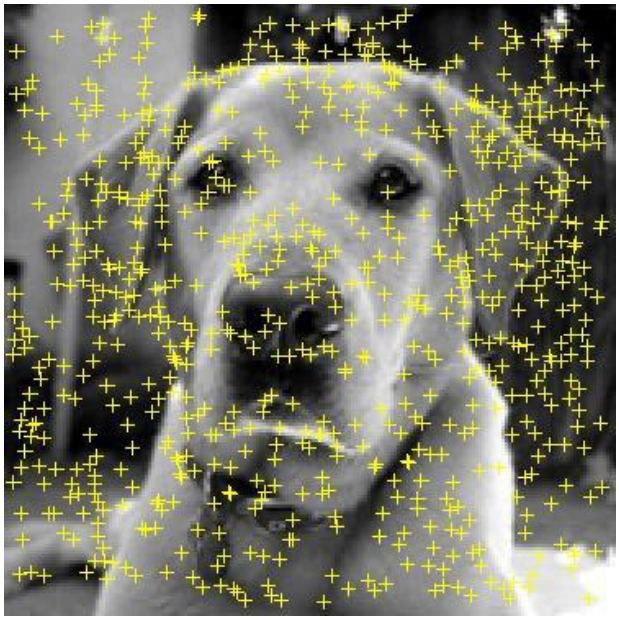
Real Image Intermediate Results:

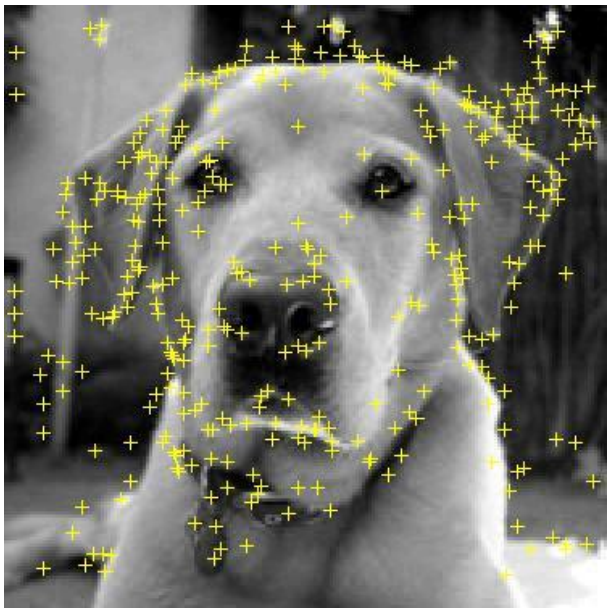
Gaussian Pyramid:

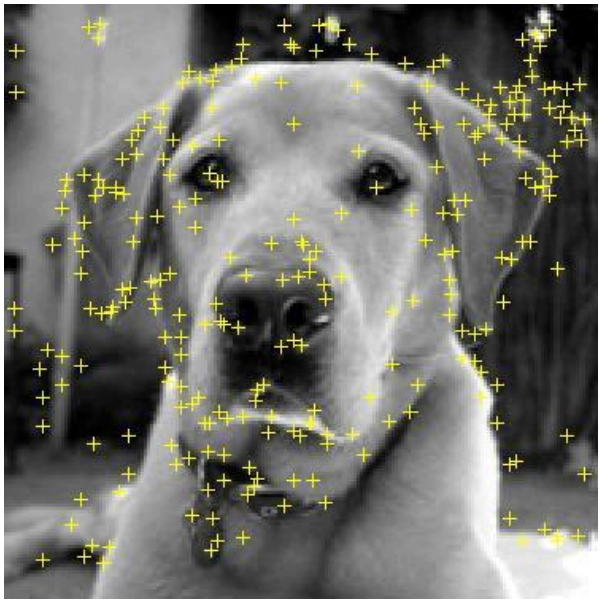


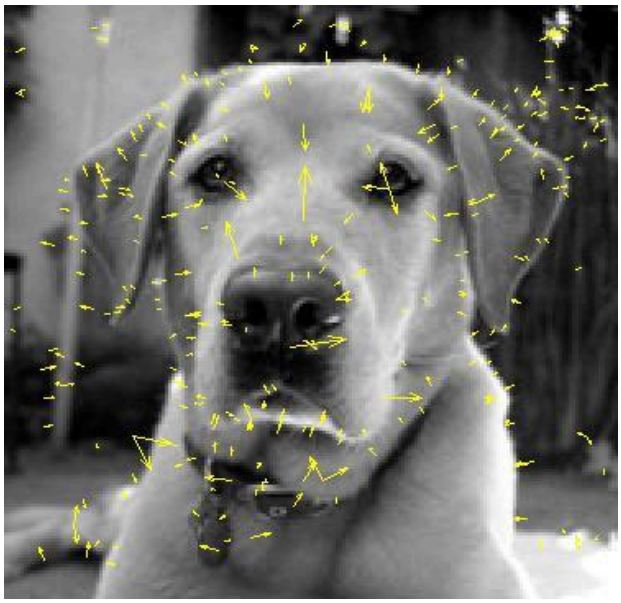
Difference of Gaussian:

Features at different scales:





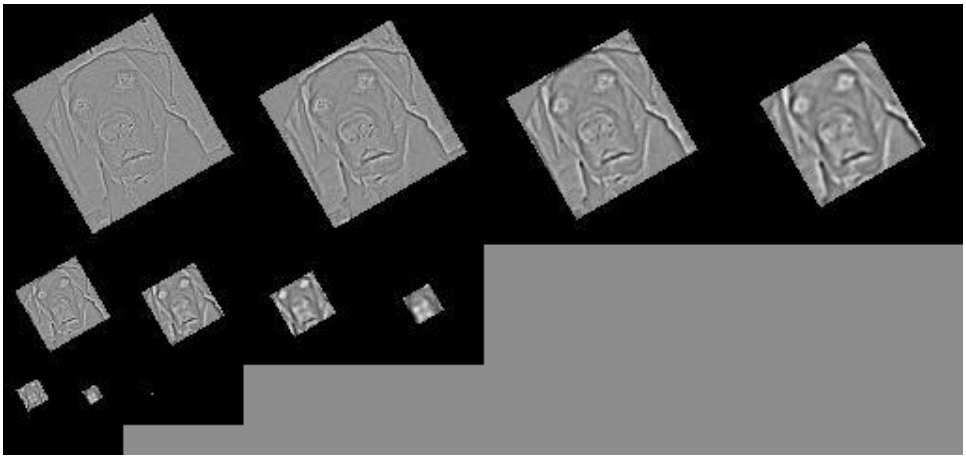




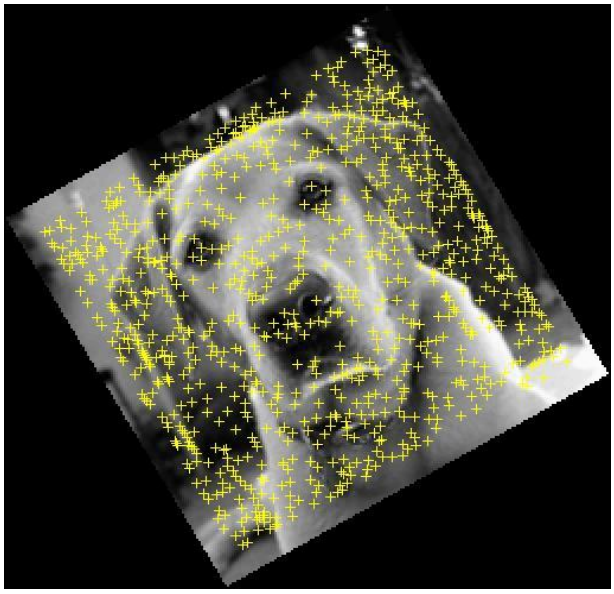
Rotated (30 degree) Image intermediate Results:

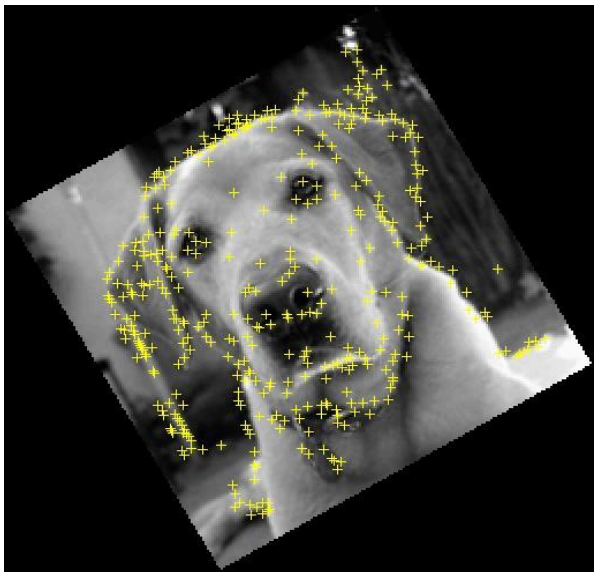
Gaussian Pyramid:

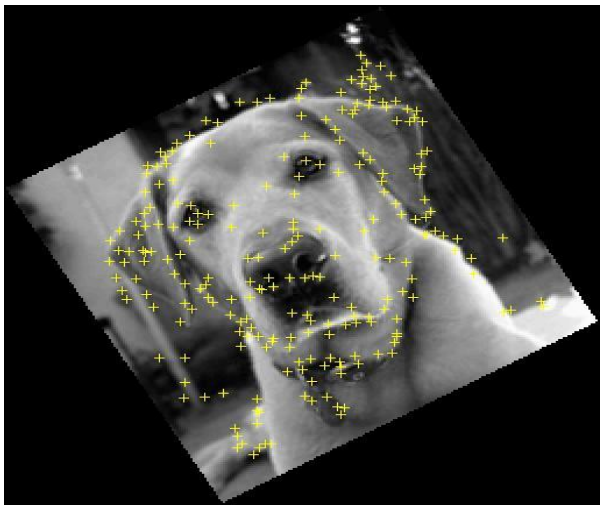
Difference of Gaussians:

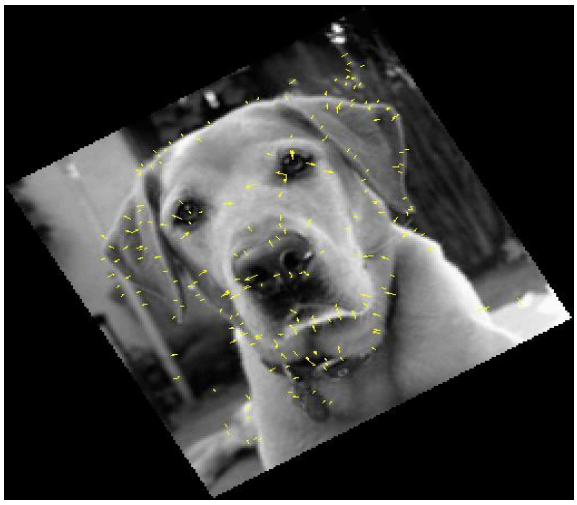


Features at different scales:









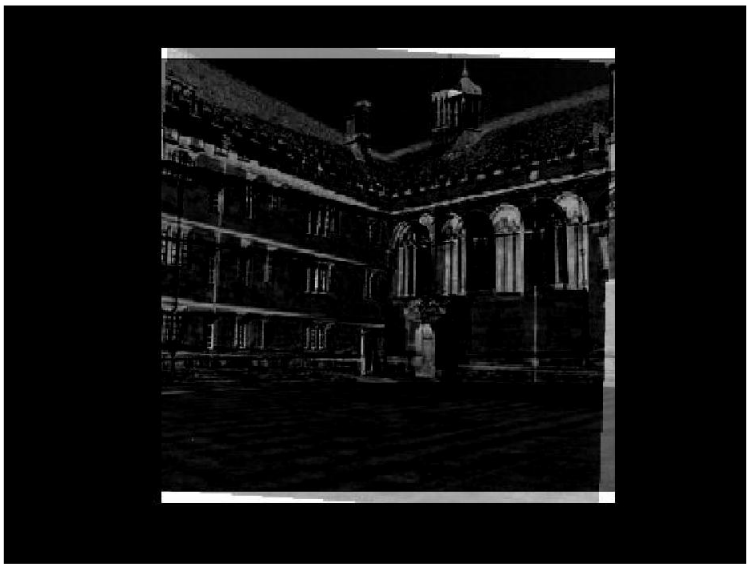
Problem 2.

The results of problem2 are shown below. The resultant matrix is in the Problem2 folder.

Orig Left

Orig Right

Aligned Image



Difference of Aligned and reference (This is difference image Avg image in folder2)

Problem3.

We apply object recognition for phone and nutshell images. Here are the results for both. The codes and affine matrices are in result section.

Phone Image Reference Model

Below is the results of average of reference and aligned image. These are interesting results as we can use them to identify the hidden objects.

Phone 16 Aligned with Ref

Phone 17 aligned

Phone 17 Aligned + reference

Phone 18 Aligned

Phone 7 Aligned

Nutshell:

Model Images

Nutshell 4

Nutshell 7

Nutshell 8 + ref (To show the difference)

Nutshell 8

Nutshell 9

Nutshell 11

Nutshell 12