Q1.1.1 (5 points): What properties do each of the filter functions pick up? Try to group the filters into broad categories (e.g. all the Gaussians). Why do we need multiple scales of filter responses?

The gaussian filter reduces the noises and high frequency responses in images. When the high frequency responses are less, it is easier for the classifier to find similarities between two images.

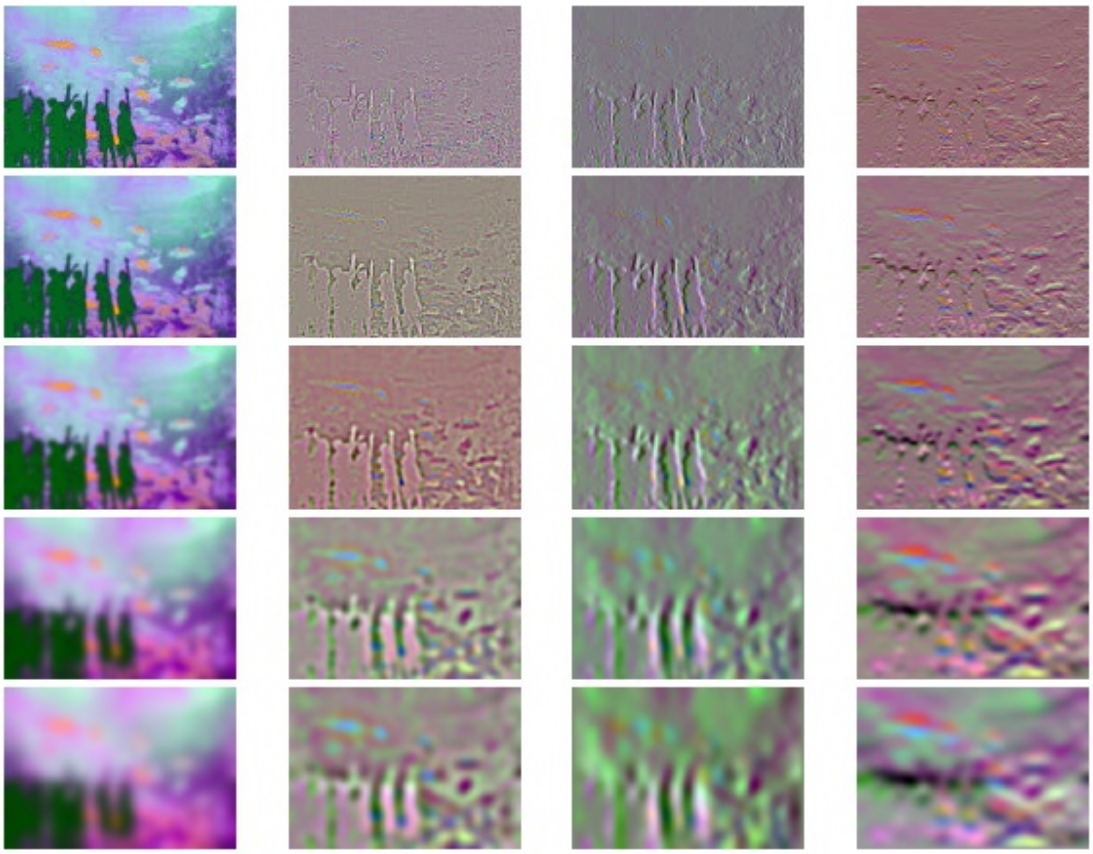
The gaussian laplacian filter picks up the contours in the images.

The derivative of gaussian filter in X direction picks up distinct vertical features

The derivative of gaussian filter in Y direction picks up distinct horizontal features

We need multiple scales of filter response so that the image classifier can work with image of varying sizes.

Q 1.1.2 Collage of 20 Images



Q1.3 RGB images & Wordmaps

Image 1: /laundromat/sun_afrrjykuhhlwiwun.jpg

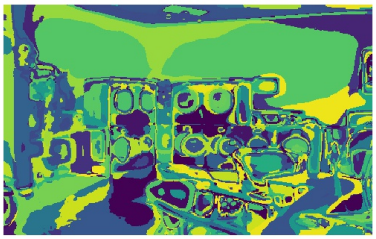


Image 2: /desert/sun_aaqyzvrweabdxjzo.jpg

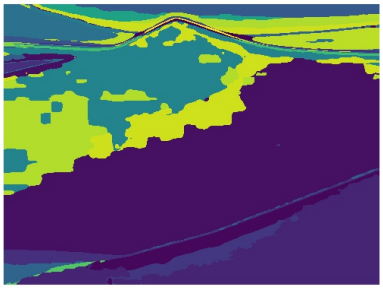
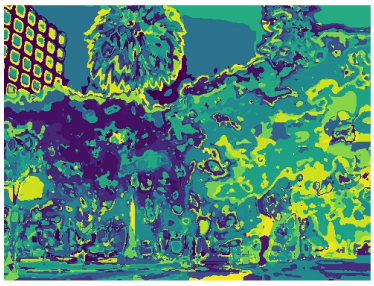


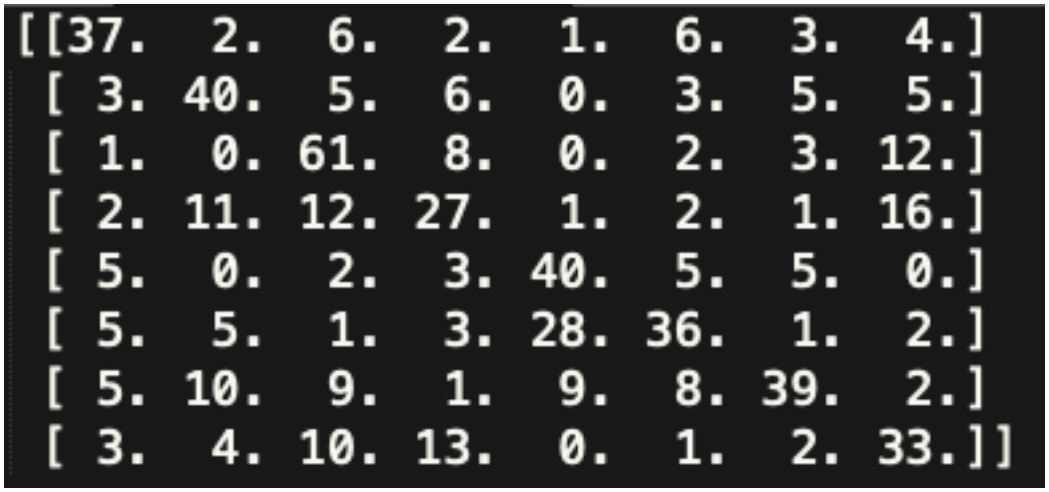
Image 3: /park/labelme_aacpgupgzvdjapw.jpg



Comment: I can pretty easily math the wordmap boundaries with shadows, highlights and contours in the RGB image.

Q2.5 (a confusion matrix, and an accuracy value)

Confusion Matrix:



Accuracy: 54.24%

Q2.6 : In your writeup, list some of these hard classes/samples, and discuss why they are more difficult than the rest.

Many of the highway images were identified as windmill. Some of the samples are listed below:

Sample 1: highway/sun_brtkgnmocygcexrv.jpg

Sample 2: highway/sun_byinrjsphbeujidj.jpg

In sample 1, the highways are filled with blue color which really resembles the color of the blue sky in many of the windmill images.

In same 2, a significant portion of the image was the blue sky which again resembles the blue sky in many of the windmill images.

Many of the highway images were also identified as desert. Some of the samples are listed below:

Sample 1: highway/sun_acjigxjvgcqwbcsy.jpg

Sample 2:highway/sun_awythsrixnznqfzu.jpg

In both of these images, there are exposed dirts on the sides of the highway which really resemble the look of desert.

Additionally, many of the desert images were identified as windmill. Some of the samples are listed below.

Sample 1: desert/sun_brjsnqgpttyhhxhx.jpg

Sample 2:desert/sun_bdcttfhebcktjrep.jpg

I think the reason is that the color of the sand resembles the color of ground in many windmill pictures. Large portion of blue sky is also a common characteristic between these two categories of images.