Gaussian Discriminant Analysis

Author(s): Anne Kunstmann (6651481), Alina Munir (7251819)

Parameters:

In our GDA Training we extracted each image into 6 features i.e. Ravg, Gavg, Bavg, Rmin, Gmin, Bmin. Average and minimum values of Red, Green and Blue in every image of 24*24*3 were considered to be the primary features of an image.

Our model's GDA Parameters are shown below (fig. 1): a

```
Parameters of GDA :
ϕ : 0.5
μ0 :
  [[163.71302083]
 [126.82800926]
 [127.34149306]
 [139.86666667]
 [102.8       ]
 [103.4       ]]
μ1:
  [[176.17256944]
 [139.52424769]
 [142.91741898]
 [ 90.73333333]
 [ 47.16666667]
 [104.73333333]]
Σ:
  [[172.54299836 192.66638956 139.31006222 132.80980903 118.72046296
  129.04273148]
 [192.66638956 252.26656152 170.48462059 161.27900656 176.06197242
  170.19188465]
 [139.31006222 170.48462059 130.96070379 104.79792438 113.03316069
  128.62404707]
 [132.80980903 161.27900656 104.79792438 282.35555556 170.22555556
   86.80777778]
 [118.72046296 176.06197242 113.03316069 170.22555556 221.08277778
  133.87888889]
 [129.04273148 170.19188465 128.62404707  86.80777778 133.87888889
  186.98444444]]
```

fig. 1

Analysis:

We trained our model with 30 positive images and 30 negative images and calculated the parameters (φ,μ0,μ1,Σ). We tested our model with all 60 examples to see the correctness in class prediction. We found that one example from negative class was incorrectly assigned to class 1 (positive class). Below shown (fig. 2) is a bar graph of both correct and wrong predictions:

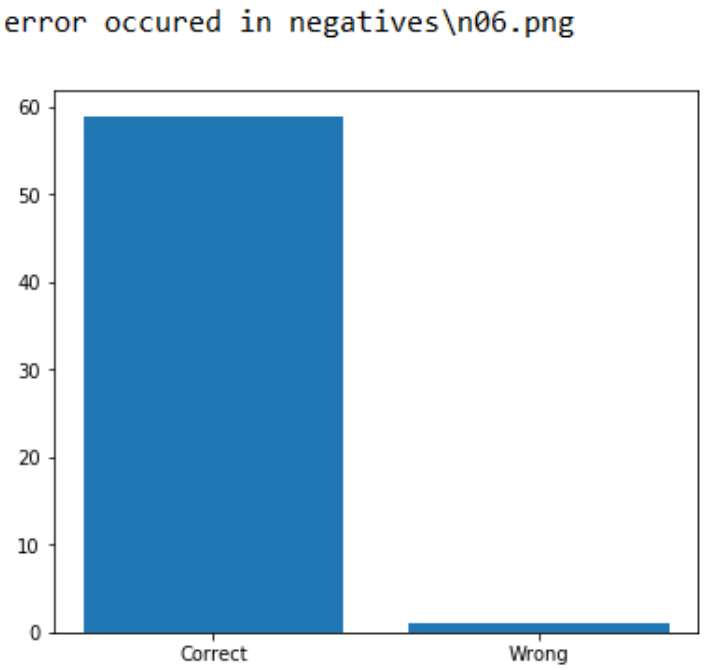

fig. 2

Conclusion:

Our system correctly predicted 59 tested examples out of 60, but misclassified 1 example due to higher values of Bavg and Bmin and lower values of Gavg and Gmin for negative\n06.png file in comparison to these features of other negative examples. It is better to use some other features for our images too, than just color concentrations in order to have better prediction rates.

Classification via linear regressing was way easier because we did not have to extract features like we do here in this image classification in GDA. Maybe for a bigger scale or more complex dataset we should use Convolutional Neural Networks techniques to extract local features from input images and classify the testing examples based on those learnt features.