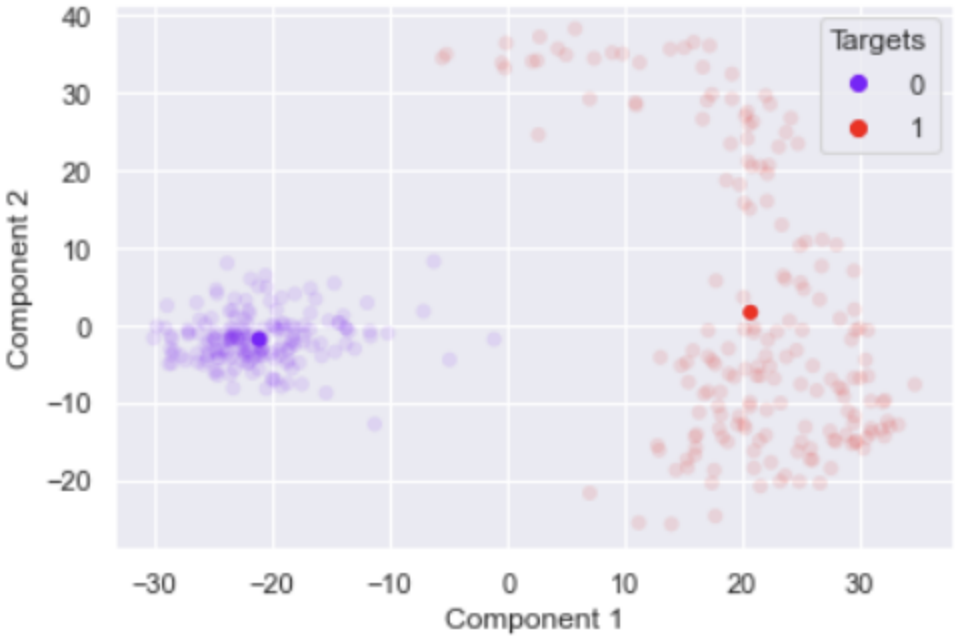
Sample results week 8

1) Fisher Discriminant Analysis (FDA)

1.1) Compute the class means (in PCA space)

```
Mean for class 0: [-21.14447038  -1.75335626]
Mean for class 1: [20.67975675  1.71482096]
```

```
plot_scatter(X, t, alpha=0.1)
plot_scatter(m, [0,1], alpha=1)
```



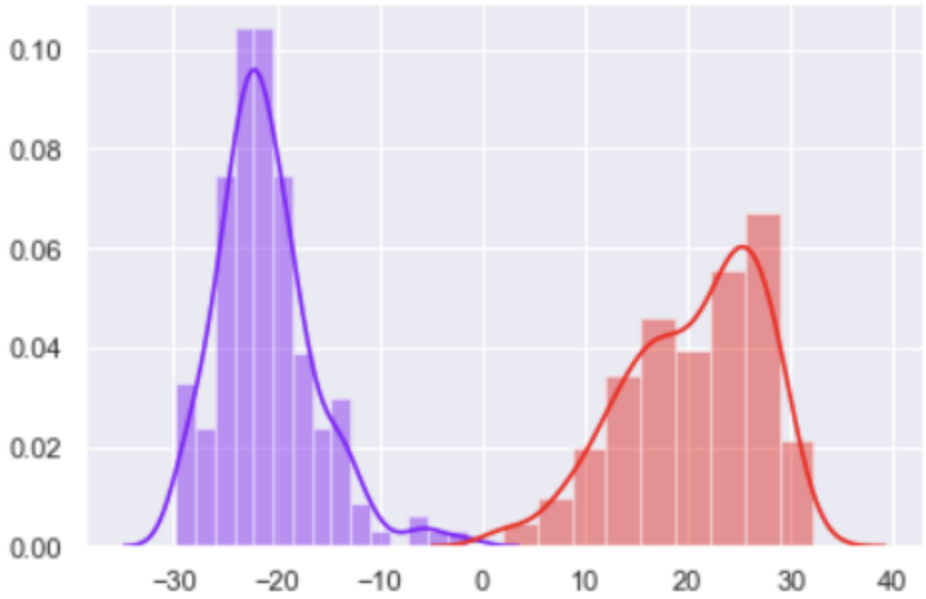
1.2) Compute the within-class scatter matrix $\mathbf{S}_W$ and between-class scatter matrix $\mathbf{S}_B$

```
S_B =
[[1749.26597493  145.05383207]
 [ 145.05383207   12.02825328]]
S_W =
[[ 15041.33444706 -13053.23317691]
 [-13053.23317691  64127.63085988]]
```

1.3) Compute the projection vector $\mathbf{w}$

```
w = [0.97678792 0.21420868]
```

1.4) Compute and plot the 1D projection of the data



1.5) Compute the class separation of the projected values

```
41.596313499803784
```

2) Linear Discriminant Analysis (LDA)

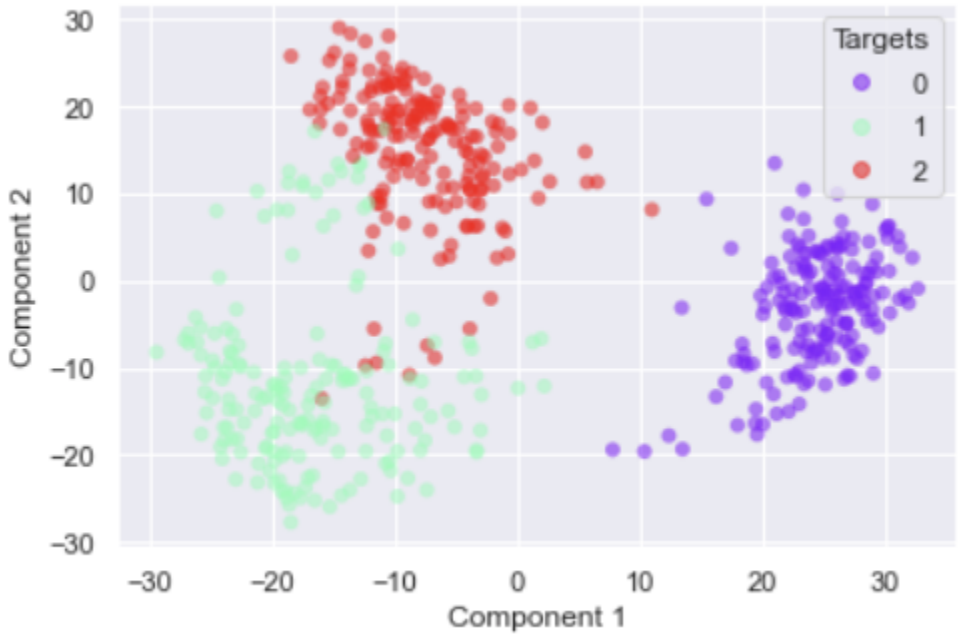
2.1) Compute the within-class scatter matrix $\mathbf{S}_W$ and between-class scatter matrix $\mathbf{S}_B$

```
S_B =
[[ 940.97091044 -105.70818718  108.09286122]
 [-105.70818718  355.60359542  105.02314347]
 [ 108.09286122  105.02314347   52.35533309]]
S_W =
[[ 27768.47732327  19720.58431494 -19025.65781907]
 [ 19720.58431494  51486.18363136 -18774.45506704]
 [-19025.65781907 -18774.45506704  56959.24511386]]
```

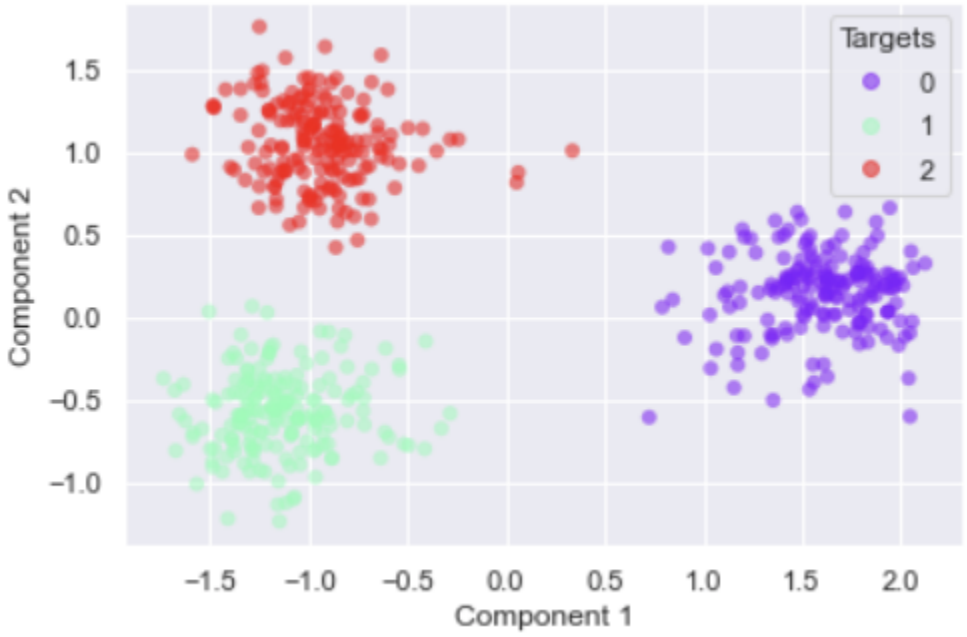
2.2) Compute the projection matrix $\mathbf{W}$

```
array([[ 0.91774901, -0.12699267],
       [-0.33159215, -0.8266237 ],
       [ 0.21859416, -0.54823911]])
```

2.3) Compute and plot the 2D projection of the data



2.4) Compute and plot the 2D LDA projection of the original 64D data



3) Extra: Laplacian Embedding

3.1) Create the 2D Laplacian Embedding of the dataset