

```
1 import numpy as np
2 import matplotlib.pyplot as plt
3
4 def fix_target(target,n_classes):
5     n_target = len(target)
6     new_target = np.zeros((n_target,n_classes))
7     for i in range(n_target):
8         vector_target = np.zeros((1,n_classes))[0]
9         vector_target[target[i]]+=1
10        new_target[i]=vector_target
11    new_target = np.reshape(new_target,(len(target),n_classes))
12    return new_target
13
14 def sigmoid(z):
15     return 1/(1+ np.exp(-z))
16
17 def calculate_MSE(gk,tk):
18     return 0.5*np.matmul((gk-tk).T,(gk-tk))
19
20 def calculate_grad_W_MSE(g, t, x):
21     return np.matmul(((g-t)*g*(1-g)).T,x.T)
22
23
24 def _removeFeature(data, features, featureToBeRemoved):
25     n_features = len(features)
26     newFeature = np.array([]) ##hard to preallocate string as you need to know the
size, bad for efficiency but whatever
27     n_data = len(data)
28     newData = np.array([[0.]*(n_features-1) for j in range(n_data)])
29
30     j = 0 #ugly hack to get correct index for newFeature
31     for i in range(n_features):
32         if i%n_features != featureToBeRemoved:
33             newFeature = np.append(newFeature, features[i])
34             j+=1
35
36     for i in range(n_data):
37         k = 0
38         for j in range(n_features):
39             if j%n_features != featureToBeRemoved:
40                 newData[i][k] = data[i][j]
41                 k+=1
42
43     return newData, newFeature
44
45 def removeListOfFeatures(data, feature, featureRemoveList):
46     newData = data
47     newFeature = feature
48     for i in range(len(featureRemoveList)):
49         newIndex = np.where(newFeature == feature[i])[0][0]
50         newData, newFeature = _removeFeature(newData, newFeature, newIndex)
51
52     return newData, newFeature
53
54 def hist(data, features, classes, file = 0):
55     histData = data.T
```

```
56     fig = plt.figure()
57     plt.suptitle('Histograms of the different features and classes',
fontweight='bold')
58
59     featuresLeftToPlot = len(features)
60     for f in range(len(features)):
61         if featuresLeftToPlot>=2:
62             xdir = 2
63         else:
64             xdir = 1
65         plt.subplot(int(np.ceil(len(features)/2)), xdir, f+1)
66         for c in range(3):
67             plt.hist(histData[f][c*50:(c+1)*50], bins=30, alpha=0.5,
label=classes[c])
68
69         plt.title(features[f])
70         plt.legend(loc='upper right')
71
72     # Adding a plot in the figure which will encapsulate all the subplots with
axis showing only
73     fig.add_subplot(1, 1, 1, frame_on=False)
74
75     # Hiding the axis ticks and tick labels of the bigger plot
76     plt.tick_params(labelcolor="none", bottom=False, left=False)
77
78     #Make common x- and y-labels
79     plt.xlabel('Length (cm)', fontweight='bold')
80     plt.ylabel('Occurrences', fontweight='bold')
81
82     if file != 0:
83         plt.savefig(file)
84
85     plt.show()
86     return
```