Assignment1

October 22, 2020

```python
[1]: import numpy as np
     import pandas as pd

     df = pd.read_csv('Assignment1.csv')

     X = df[df.columns[:-1]]
     Y = df['y']
```

```python
[2]: def MPneuron(x, t=None, *args):
         '''
         returns 1 if sum(x) is >= t
         x is a boolean vector and t is an int.
         '''
         x = np.array(x)
         val = np.sum(x)

         if t is not None:
             if val >= t:
                 return 1
             else:
                 return 0
         return np.nan
```

```python
[3]: accuracies = {}
     for threshold in range(11):
         Y_pred = X.apply(MPneuron,axis=1,args=([threshold]))
         accuracy = np.sum(Y_pred == Y) / Y.shape[0]
         accuracies[threshold] = accuracy
         print(f'For threshold value {threshold}, the accuracy is {accuracy}.')
```
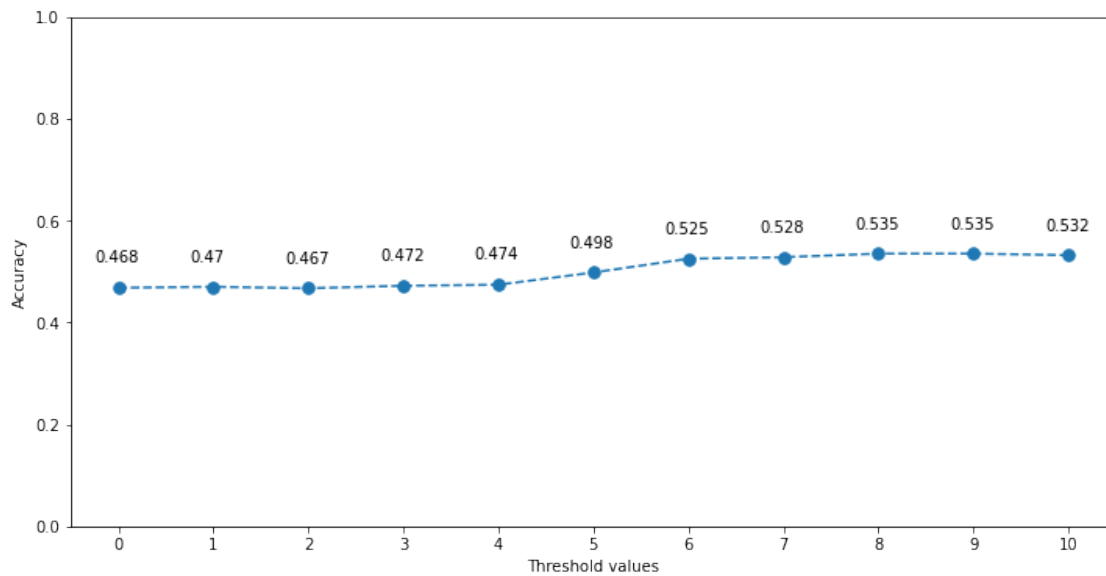
```
For threshold value 0, the accuracy is 0.468.
For threshold value 1, the accuracy is 0.47.
For threshold value 2, the accuracy is 0.467.
For threshold value 3, the accuracy is 0.472.
For threshold value 4, the accuracy is 0.474.
For threshold value 5, the accuracy is 0.498.
For threshold value 6, the accuracy is 0.525.
For threshold value 7, the accuracy is 0.528.
```

For threshold value 8, the accuracy is 0.535.
For threshold value 9, the accuracy is 0.535.
For threshold value 10, the accuracy is 0.532.

```
[4]: import matplotlib.pyplot as plt
     %matplotlib inline
```

```
[5]: x_vals = list(accuracies.keys())
     y_vals = list(accuracies.values())
```

```
[6]: plt.figure(figsize=(12,6))
     plt.plot(x_vals,y_vals,'.--',markersize=15)
     plt.ylim(0,1)
     plt.xticks(x_vals)
     plt.xlabel('Threshold values')
     plt.ylabel('Accuracy')
     for i,j in zip(x_vals, y_vals):
         plt.text(i-0.25, j+0.05, str(j))
     plt.show()
```