

# Neural Networks

## Task 3 – Dataset (Penguins)

**Team\_ID: CS\_H5**

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## Sigmoid Activation Function:

	# Layers	# Neurons	Learning Rate	Epochs	Bias	Test Accuracy	Train Accuracy
1)	1	5	0.01	5000	Yes	95%	100%
2)	3	4,6,8	0.04	2000	Yes	85%	97.77%
3)	2	3,2	0.05	3000	No	86.66%	92.22%
4)	4	3,4,6,5	0.08	3000	No	100%	96.66%

```
Epochs= 5000 ,Learning Rate= 0.01 ,Biasflag= 1 ,Activate= 1
,NumHiddenLayers= 1 ,NeuronsInHiddenLayers= ['5']
```

```
Confusion Matrix
C1    C2    C3
-----
C1  19     0     1
C2   0    19     1
C3   1     0    19
-----
```

```
Count: 57
accuracy: 95.0
```

```
Confusion Matrix
C1    C2    C3
-----
C1  30     0     0
C2   0    30     0
C3   0     0    30
-----
```

```
Count: 90
accuracy: 100.0
```

1

```
Epochs= 2000 ,Learning Rate= 0.04 ,Biasflag= 1 ,Activate= 1
,NumHiddenLayers= 3 ,NeuronsInHiddenLayers= ['4', '6', '8']
```

```
Confusion Matrix
C1    C2    C3
-----
C1  17     0     3
C2   0    14     6
C3   0     0    20
-----
```

```
Count: 51
accuracy: 85.0
```

```
Confusion Matrix
C1    C2    C3
-----
C1  29     0     1
C2   0    30     0
C3   1     0    29
-----
```

```
Count: 88
accuracy: 97.77777777777777
```

2

```
Epochs= 3000 ,Learning Rate= 0.05 ,Biasflag= 0 ,Activate= 1
,NumHiddenLayers= 2 ,NeuronsInHiddenLayers= ['3', '2']
```

```
Confusion Matrix
C1    C2    C3
-----
C1  16     4     0
C2   0    17     3
C3   0     1    19
-----
```

```
Count: 52
accuracy: 86.66666666666667
```

```
Confusion Matrix
C1    C2    C3
-----
C1  25     5     0
C2   0    29     1
C3   0     1    29
-----
```

```
Count: 83
accuracy: 92.22222222222223
```

3

```
Epochs= 3000 ,Learning Rate= 0.08 ,Biasflag= 0 ,Activate= 1
,NumHiddenLayers= 4 ,NeuronsInHiddenLayers= ['3', '4', '6', '5']
```

```
Confusion Matrix
C1    C2    C3
-----
C1  20     0     0
C2   0    20     0
C3   0     0    20
-----
```

```
Count: 60
accuracy: 100.0
```

```
Confusion Matrix
C1    C2    C3
-----
C1  30     0     0
C2   0    30     0
C3   3     0    27
-----
```

```
Count: 87
accuracy: 96.66666666666667
```

4

## Tanh Activation Function:

	# Layers	# Neurons	Learning Rate	Epochs	Bias	Test Accuracy	Train Accuracy
1)	2	3,4	0.001	3000	Yes	90%	97.7%
2)	1	8	0.001	2000	Yes	91.66%	93.33%
3)	3	8,6,3	0.0001	6000	No	75.0%	70.0%
4)	4	8,6,3,5	0.01	2000	No	96.67%	100%

```
Epochs= 3000 ,Learning Rate= 0.001 ,Biasflag= 1 ,Activate= 0
,NumHiddenLayers= 2 ,NeuronsInHiddenLayers= ['3', '4']
```

```
Confusion Matrix
C1  C2  C3
-----
C1  18   0   2
C2   1  19   0
C3   3   0  17
-----
```

```
Count: 54
accuracy: 90.0
```

1

```
Confusion Matrix
C1  C2  C3
-----
C1  30   0   0
C2   0  30   0
C3   2   0  28
-----
```

```
Count: 88
accuracy: 97.77777777777777
```

```
Epochs= 2000 ,Learning Rate= 0.001 ,Biasflag= 1 ,Activate= 0
,NumHiddenLayers= 1 ,NeuronsInHiddenLayers= ['8']
```

```
Confusion Matrix
C1  C2  C3
-----
C1  20   0   0
C2   1  16   3
C3   1   0  19
-----
```

```
Count: 55
accuracy: 91.66666666666666
```

2

```
Confusion Matrix
C1  C2  C3
-----
C1  28   0   2
C2   0  28   2
C3   2   0  28
-----
```

```
Count: 84
accuracy: 93.33333333333333
```

```
Epochs= 6000 ,Learning Rate= 0.0001 ,Biasflag= 0 ,Activate= 0
,NumHiddenLayers= 3 ,NeuronsInHiddenLayers= ['8', '6', '3']
```

```
Confusion Matrix
C1  C2  C3
-----
C1  12   0   8
C2   0  18   2
C3   5   0  15
-----
```

```
Count: 45
accuracy: 75.0
```

3

```
Confusion Matrix
C1  C2  C3
-----
C1  21   0   9
C2   0  21   9
C3   9   0  21
-----
```

```
Count: 63
accuracy: 70.0
```

```
Epochs= 2000 ,Learning Rate= 0.01 ,Biasflag= 0 ,Activate= 0
,NumHiddenLayers= 4 ,NeuronsInHiddenLayers= ['8', '6', '3', '5']
```

```
Confusion Matrix
C1  C2  C3
-----
C1  18   0   2
C2   0  20   0
C3   0   0  20
-----
```

```
Count: 58
accuracy: 96.66666666666667
```

4

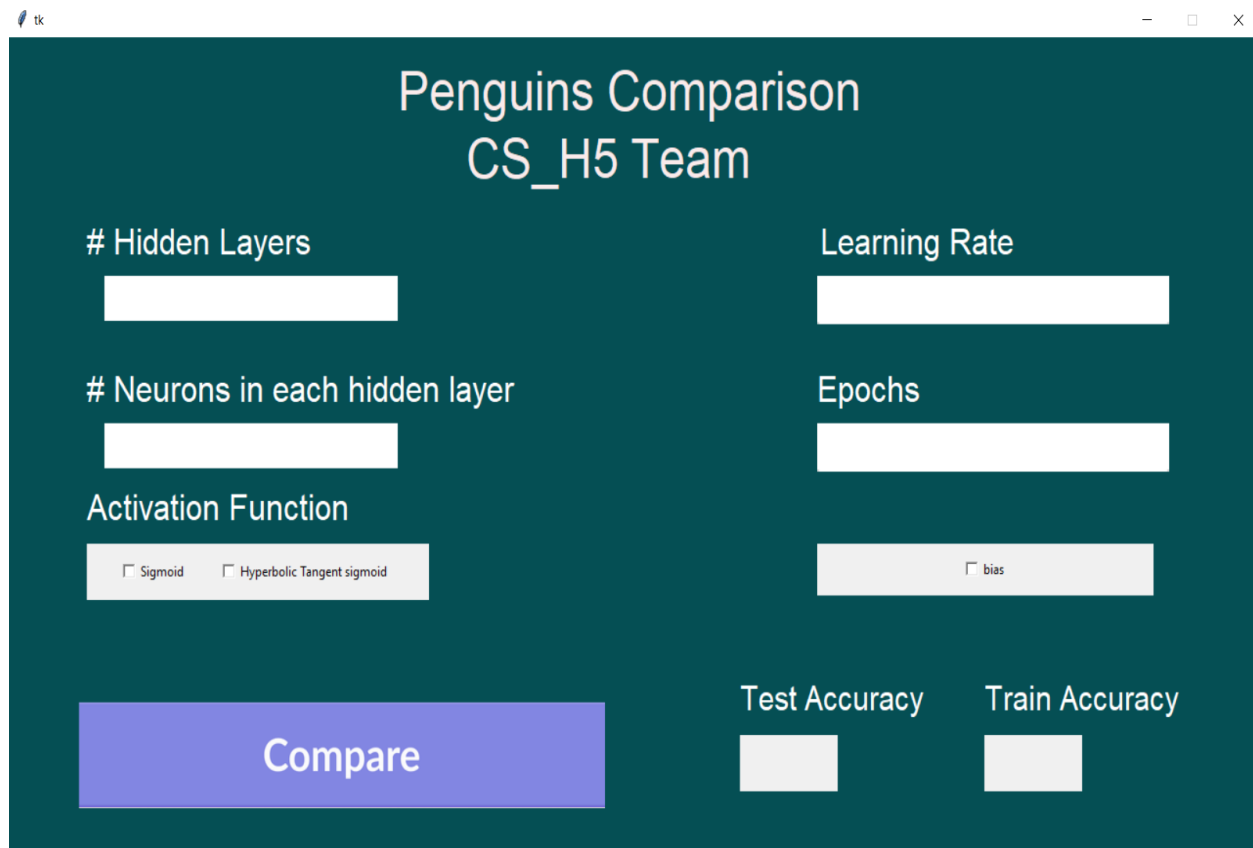
```
Confusion Matrix
C1  C2  C3
-----
C1  30   0   0
C2   0  30   0
C3   0   0  30
-----
```

```
Count: 90
accuracy: 100.0
```

## GUI:

We create GUI Using tkinter Library

GUI includes Number of Hidden Layers and Number of Neurons in each hidden layer and Activation Function and Learning Rate and Epochs and Bias as inputs and Test Accuracy and Train Accuracy and Confusion Matrix as output.



Penguins Comparison  
CS\_H5 Team

# Hidden Layers

Learning Rate

# Neurons in each hidden layer

Epochs

Activation Function

☐ Sigmoid ☐ Hyperbolic Tangent sigmoid

bias

Compare

Test Accuracy

Train Accuracy