

# Neural and deep learning

## Task 2

### Team 89

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# Sigmoid

With bias

Using learning rate =0.01

Number of hidden layers =2

Neurons =3,4

Number of epochs =1000

```
train :  
Confusion Matrix  
True Class 0: 28.0  
False Class 0: 2.0  
True Class 1: 30.0  
False Class 1: 0.0  
True Class 2: 30.0  
False Class 2: 0.0  
Accuracy: 97.78%  
test :  
Confusion Matrix  
True Class 0: 19.0  
False Class 0: 1.0  
True Class 1: 20.0  
False Class 1: 0.0  
True Class 2: 20.0  
False Class 2: 0.0  
Accuracy: 98.33%
```

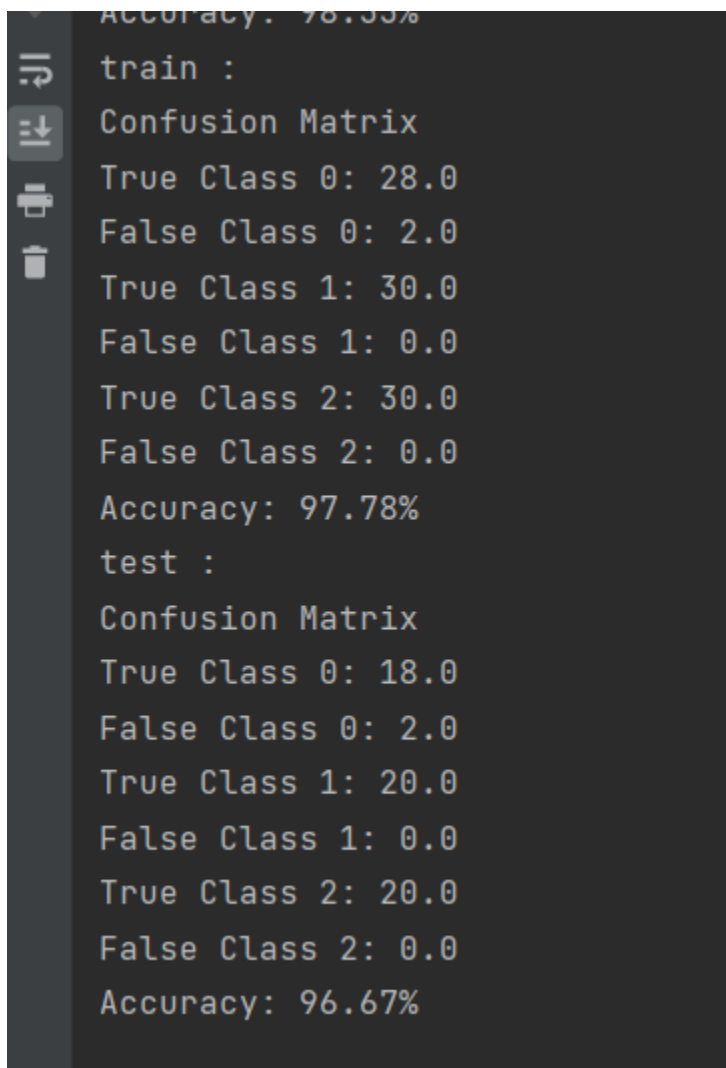
# Without bias

Using learning rate =0.01

Number of hidden layers =2

Neurons =3,4

Number of epochs =1000



```
Accuracy: 98.33%
train :
Confusion Matrix
True Class 0: 28.0
False Class 0: 2.0
True Class 1: 30.0
False Class 1: 0.0
True Class 2: 30.0
False Class 2: 0.0
Accuracy: 97.78%
test :
Confusion Matrix
True Class 0: 18.0
False Class 0: 2.0
True Class 1: 20.0
False Class 1: 0.0
True Class 2: 20.0
False Class 2: 0.0
Accuracy: 96.67%
```

The image shows a terminal window with a dark background and light-colored text. On the left side of the terminal, there is a vertical toolbar with icons for undo, redo, copy, and paste. The main area of the terminal displays the output of a neural network training process. It starts with 'Accuracy: 98.33%' on a previous line. The current output begins with 'train :', followed by a 'Confusion Matrix' for the training data. This matrix shows three classes, all with 100% accuracy (True Class 0: 28.0, False Class 0: 2.0; True Class 1: 30.0, False Class 1: 0.0; True Class 2: 30.0, False Class 2: 0.0). Below this is the training accuracy: 'Accuracy: 97.78%'. Then, the output shows 'test :', followed by a 'Confusion Matrix' for the test data. This matrix also shows three classes with high accuracy (True Class 0: 18.0, False Class 0: 2.0; True Class 1: 20.0, False Class 1: 0.0; True Class 2: 20.0, False Class 2: 0.0). The final line shows the test accuracy: 'Accuracy: 96.67%'.

# Hyperbolic Tangent sigmoid

Without bias

Using learning rate =0.001

Number of hidden layers =3

Neurons =2,3,5

Number of epochs =1000

```
train :  
Confusion Matrix  
True Class 0: 30.0  
False Class 0: 0.0  
True Class 1: 30.0  
False Class 1: 0.0  
True Class 2: 30.0  
False Class 2: 0.0  
Accuracy: 100.00%  
test :  
Confusion Matrix  
True Class 0: 20.0  
False Class 0: 0.0  
True Class 1: 20.0  
False Class 1: 0.0  
True Class 2: 20.0  
False Class 2: 0.0  
Accuracy: 100.00%
```

## With bias

Using learning rate =0.001

Number of hidden layers =3

Neurons =2,3,5

Number of epochs =1000

```
train :  
Confusion Matrix  
True Class 0: 30.0  
False Class 0: 0.0  
True Class 1: 30.0  
False Class 1: 0.0  
True Class 2: 30.0  
False Class 2: 0.0  
Accuracy: 100.00%  
test :  
Confusion Matrix  
True Class 0: 20.0  
False Class 0: 0.0  
True Class 1: 20.0  
False Class 1: 0.0  
True Class 2: 20.0  
False Class 2: 0.0  
Accuracy: 100.00%
```