*Neural Networks Task 2*

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# Table of Contents

[**Table of Contents 1**](#_bekixvspuwv)

[**Team Information 2**](#_vc2dnmpodze6)

[**Model Analysis 3**](#_kts2chayk200)

[Sigmoid Test: 3](#_g4dbtes1xkzq)

[Given Parameters 3](#_zwih5l8scob)

[Metrics 3](#_udtm4mv4zx2n)

[Confusion Matrix 3](#_lrbn4h93a0ew)

[Hyperbolic-Tangent Test: 4](#_fh8bcw9p8778)

[Given Parameters 4](#_lsc7pp6gwze9)

[Metrics 4](#_f8l2mql5eybj)

[Confusion Matrix 4](#_wye4b8kunz7t)

[**Conclusion 5**](#_xm19zkpw9e1y)

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# Team Information

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# **Model Analysis**

## **Sigmoid Test:**

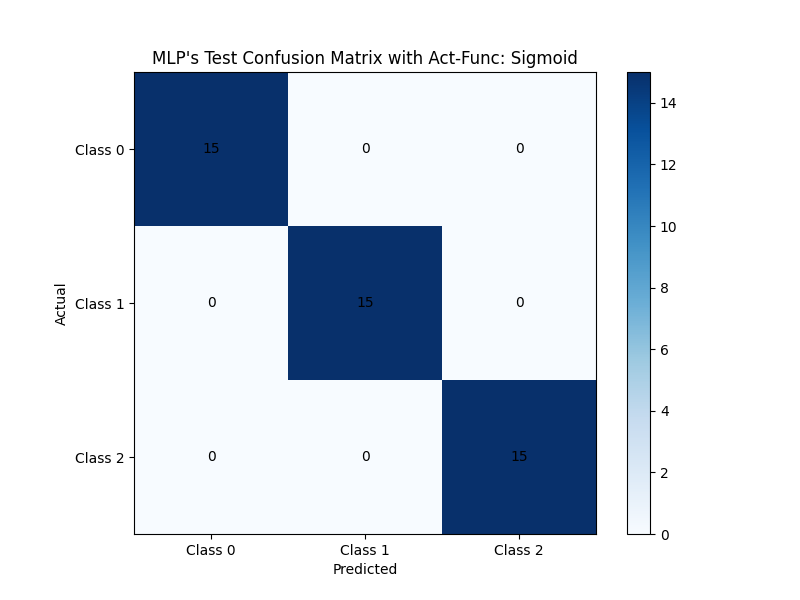
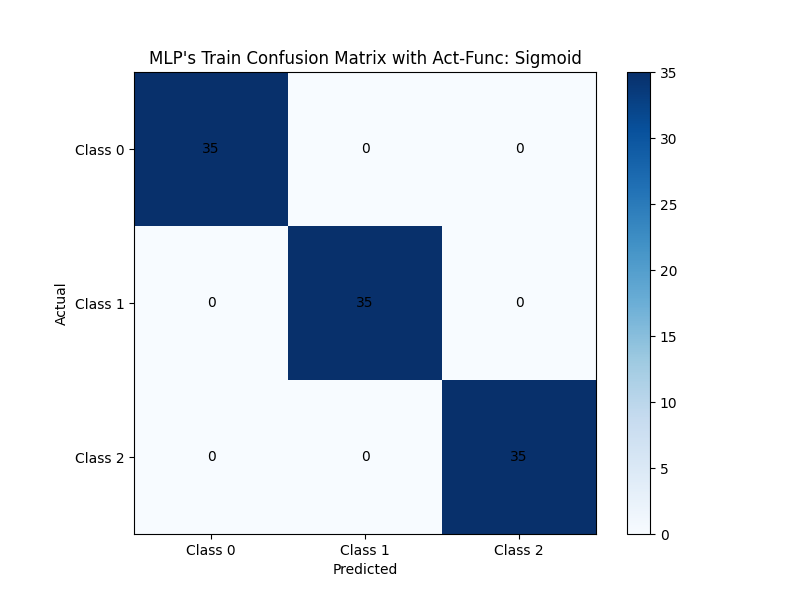
### Given Parameters

| ***Hyper-Parameters*** | ***Values*** |
| --- | --- |
| Epochs | 1000 |
| Learning Rate (ETA) | 0.01 |
| Number of Hidden Layers | 2 |
| Number Of Hidden Parameters | [3, 4] |

### Metrics

| ***Measures*** | ***Values*** |
| --- | --- |
| Mean Squared Error (MSE) | 0.3460667 |
| Train-Accuracy | 100% |
| Test-Accuracy | 100% |

### Confusion Matrix



## 

## **Hyperbolic-Tangent Test:**

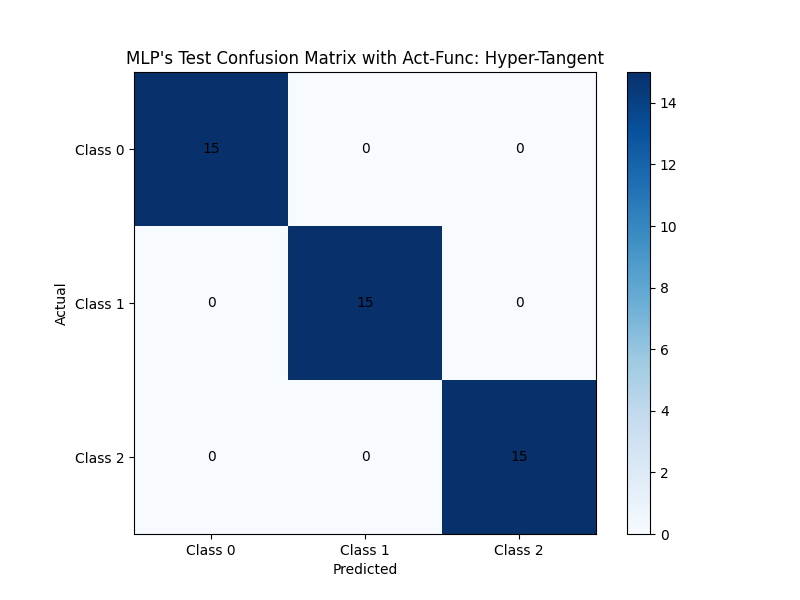
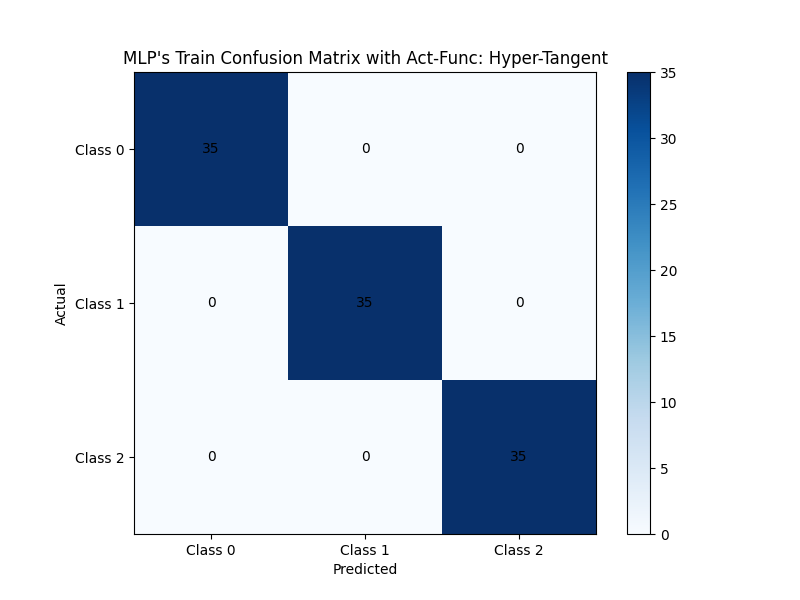
### Given Parameters

| ***Hyper-Parameters*** | ***Values*** |
| --- | --- |
| Epochs | 5000 |
| Learning Rate (ETA) | 0.001 |
| Number of Hidden Layers | 1 |
| Number Of Hidden Parameters | [5] |

### Metrics

| ***Measures*** | ***Values*** |
| --- | --- |
| Mean Squared Error (MSE) | 0.002397 |
| Train-Accuracy | 100% |
| Test-Accuracy | 100% |

### Confusion Matrix



# 

# **Conclusion**

In conclusion, There are multiple factors that affects accuracy of Multi-Layer Perceptron with both activation functions Sigmoid and Hyperbolic-Tangent.

1. Initial Weights: As they are randomly generated in each fit, different accuracies (also different MSE) appears with low variations ~0.9 to ~1.
2. Increasing the epochs or decreasing the learning rate, makes a highly positive change in the performance of each activation function and vice versa.
3. Increasing the number of neurons in a layer mostly resulting better in accuracy.
4. Increasing the number of layers too much causes an overfitting.

Number of layers mostly fitted well is 1 with number of neurons higher than 4 and 2 with number of neurons higher than 3 in each layer.

To have the most likely weights in a current hyper-parameters, using the method of fitting the model multiple times and save/use the weights with the highest accuracy and lowest MSE.