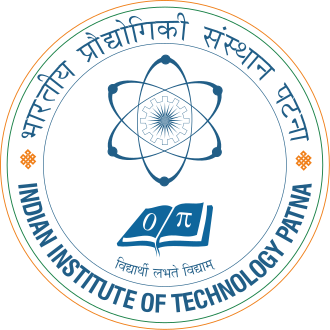
**CS571: Artificial Intelligence Lab**

Indian Institute of Technology Patna



# **ASSIGNMENT 10**

Neural Networks

**Group Members**

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**Q1**: Artificial Neural Network to simulate a 2-input XOR gate.

**Result**

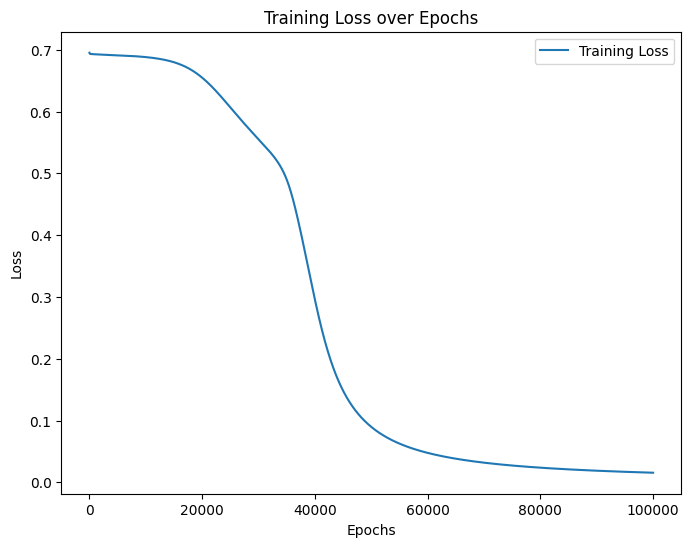
Learning Rate: 0.01

Epochs: 100,000

A screenshot of a computer program

Description automatically generated

**Loss Graph**



**Accuracy Graph**

A graph with blue lines

Description automatically generated

**Test Prediction:**

A computer screen with white text

Description automatically generated

**Conclusion:**

The XORNN successfully learns the XOR function, as evidenced by the decreasing loss and increasing accuracy. The chosen hyperparameters contribute to the convergence of the network. Further analysis and experimentation may involve varying hyperparameters or exploring additional network architectures for similar problems.

**Q2**: Multi-Layer Perceptron (MLP) classifier

**Result for IRIS Dataset:**

A screenshot of a computer screen

Description automatically generated

A screenshot of a computer screen

Description automatically generated

A screenshot of a computer

Description automatically generated

**Result for CIFAR10 Dataset:**

A screenshot of a computer screen

Description automatically generated

A screenshot of a computer screen

Description automatically generated

A screenshot of a computer screen

Description automatically generated

A screenshot of a computer screen

Description automatically generated

A screenshot of a computer screen

Description automatically generated

A screenshot of a computer screen

Description automatically generated

**Accuracy vs No. of Neurons Graph**

**A graph of a number of neurons

Description automatically generated**

**Conclusion**

**IRIS Dataset:**

* ReLU and LeakyReLU activations perform well.
* Increasing the number of neurons generally improves performance.

**CIFAR-10 Dataset:**

* ReLU and LeakyReLU activations exhibit moderate performance.
* Increasing the number of neurons shows marginal improvements.