University of Tripoli

Faculty of Engineering

Electrical and Electronic Engineering Department

EE569 – Deep Neural Networks

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Brief report for

Assignment 1 – Part B

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Task 1: XOR Problem

Generate a dataset consisting of two classes, each with 50% of the total samples. Each class should be drawn from two Gaussian distributions, resulting in a total of four Gaussian distributions. Position the means of the distributions such that the classes are not linearly separable, creating an XOR-like problem. Train a logistic regression model on the generated dataset. Evaluate the performance of the logistic regression model and comment on its ability to solve the XOR problem.

Result of XOR like-problem code:

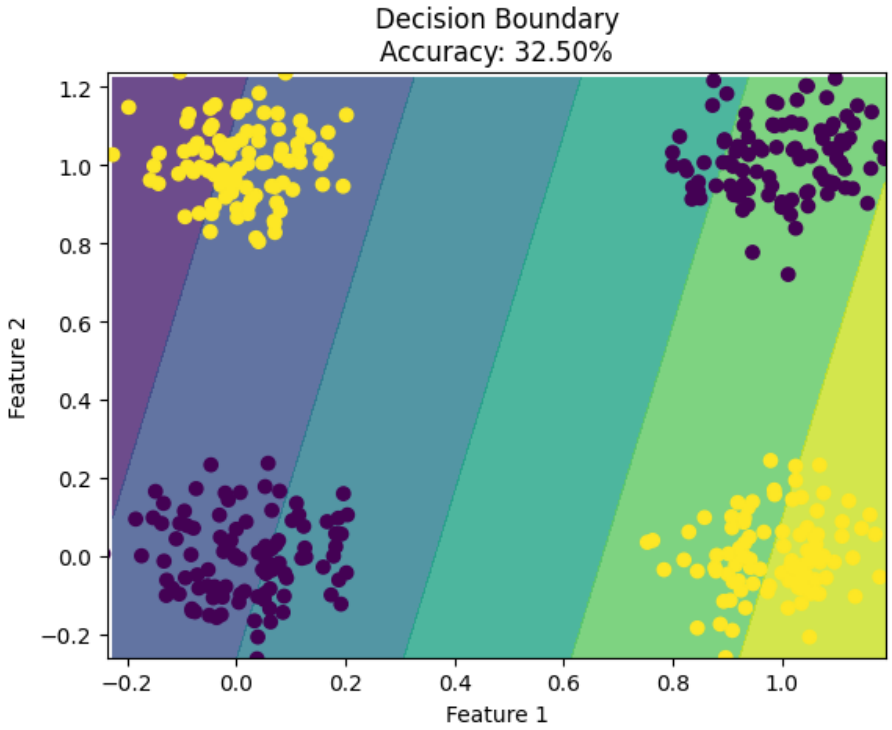

Fig.1 - Logistic Regression model

Comment:

Logistic regression forms a linear decision boundary. However, the XOR problem is non-linear, meaning that the data cannot be separated with a single linear decision boundary. From the Result, we can observe that the model's boundary cannot effectively separate the two classes corresponding to the XOR pattern.

An accuracy of 32.50% confirms that the logistic regression model is performing poorly on the XOR problem.