ICS 352-50 Machine Learning

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<div align="center">Perceptron Training to Learn AND Logic Function</div>

This report outlines the process of training a perceptron neural network to accurately model the AND logic function. The perceptron is a foundational machine learning algorithm used for binary classification.

The methodology was implemented in Python. The perceptron was initialized with weights $w_0 = 0.2$, $w_1 = 0.5$, $w_2 = -0.1$, a bias input $x_0 = -1$, and a learning rate of 0.25. The step function was used as the activation function. For positive sums of weighted inputs, 1 was outputted. Otherwise, it was 0.

Over two training iterations, the perceptron updated its weights after comparing its output against the expected results from the AND function's truth table. Starting weights and adjustments led to final weights of $w_0 = 0.2$, $w_1 = 0.5$, $w_2 = 0.4$. Therefore, the perceptron successfully predicts the correct outputs for the AND function.

In conclusion, the perceptron efficiently learned the AND function, adjusting its weights effectively over just two iterations. This lab demonstrated the perceptron's capacity for simple binary classification tasks and provided practical insight into neural network training dynamics.