# Class Documentation

Documentation for Neural Networks



Figure 1: Utah State University

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# Neural Nets Overview

This section covers the basic workings and theory behind a neural net. It is divided up into 3 sections; vocabulary, structure, and updating.

## Vocabulary

This section goes over the nomenclature used in this chapter. Variables are all defined as well as other terminology.

- **Performance Function** $(g(x, \theta))$: The performance function defines how close the output of the neural net is to the expected value. This is used with a gradient descent to help train the net.
- **Gradient descent**: A mathematical procedure used to find the local minima based on a derivative. The derivative is subtracted from the total and then rerun again. Once the derivative equals zero, a minima has been located.
- **Step Size** $(\mu)$: a coefficient used to control how large the step size will be in the gradient descent function.
- **theta** $(\theta)$: a vector representing both the weights ($\mathbf{x}$) and the bias term $b_0$
- **A**: the result of a single layer neuron before the non-linear function is applied.
- **Z**: the result of applying the non-linear function to A

# Pre Lab