Applications of Neural Networks
Computer Systems Lab
Patrick Stalcup

Abstract

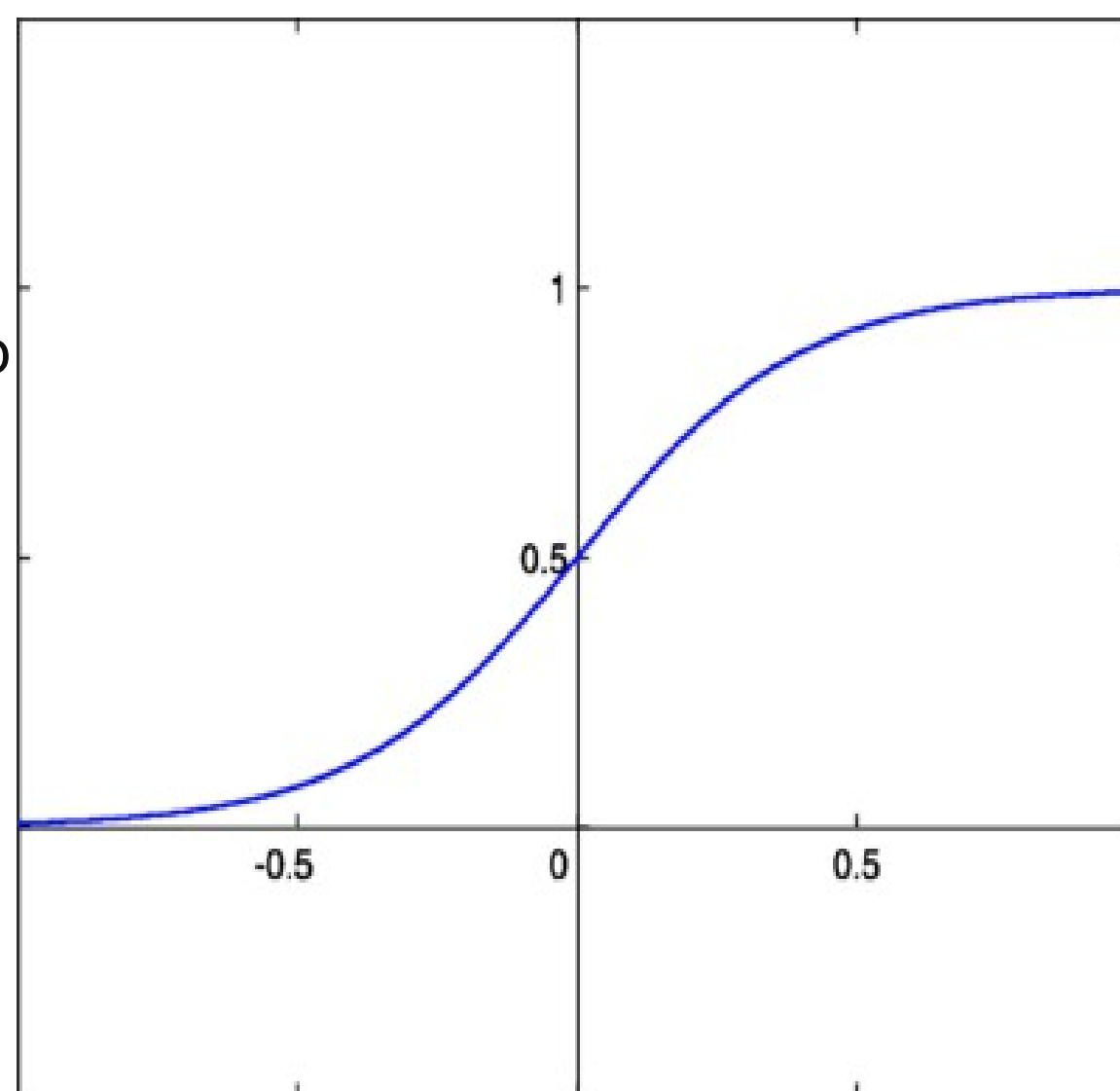To design and prototype a Neural Networks library to promote the rapid develop neural network based applications in the C Programming Language.

Background

Neural networks are a data structure used in computer science modeled after organic structures (nervous systems) that are used in Machine Learning. Because of their exact nature, and modularity, a library containing methods for teaching and using Neural Networks would have wide use.

The Sigmoid Function $\frac{1}{(1-e^{-x})}$

Library API

```
*network init_network(int
n layers, int *layers);

Void eval_network(network
* n, float *inputs);

Void train_network(network
*n,float **inputs, float
**outputs, int cases, int
trials);
```

Example Neural Network

Conclusions and Results

During my research, I was able to successfully research, develop, and prototype a simple neural network library. Using this library, support was provided to other student researchers about their applications of Neural Networks and simple examples, such as an XOR model, were developed and tested. This project has shown that neural networks can be rapidly developed.
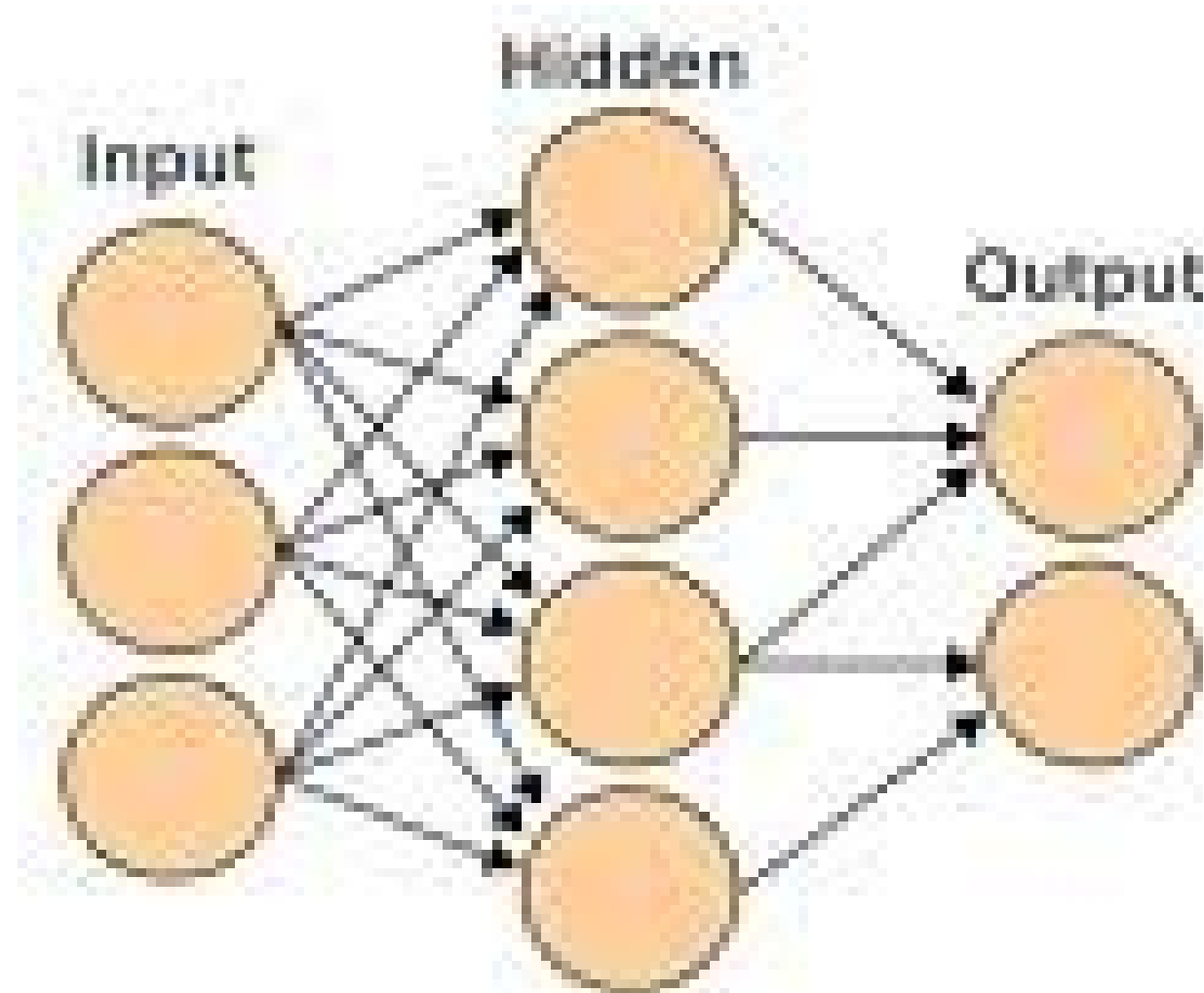
Algorithms

This project used several algorithms to assist in evaluating neural networks. The most important were Feed-Forward, or feeding values from the top of the network to the bottom in order to evaluate the network, and Back-propagation, which takes the error from the final output nodes (evaluated using the expected values, and propagates that error back along the network in order to change the weights associated with each node to better mat the solution.