Implementing and Optimizing Neural Network in C++

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Anticipated Goal:

The application of Neural Networks (NN) has become widespread in recent years and shows no signs of slowing down in the foreseeable future. Understanding how NN works is crucial for students like us in related programs (Electrical and Computer Engineering). Therefore, our goal is to implement a neural network in C++ from scratch and optimize it. By completing this project, we can not only learn how neural networks work but also advancing our knowledge and programming skills in C++ such as using classes, vectors, cmath, and other functions/libraries.

Overall Technical Approach:

In our C++ project, we will implement a neural network using two classes: Neuron and Net (Layer). The Neuron class will represent a single neuron and include functions for weight and bias initialization, output computation, and parameter updating during training. The Net class will represent a layer of neurons, containing an array or vector of neurons and functions for layer initialization, output computation, and parameter updating. In the main function, we will create instances of the Net class for each layer, link them together to form the neural network, and provide input data for training. By running the program, we can observe the network's performance by evaluating metrics such as loss and accuracy, allowing us to refine the network's architecture and training process for better results.

Tool Used:

1. Cygwin C++ Complier
2. Xcode
3. Sublime Text

Execution Plan and Timeline:

Task ID	Task description	Meeting date	Duration	Notes
1	Discuss for final project proposal	March 26	90 min	
2	Finish most of the requirements for final project proposal	March 28	90 min	
3	Complete the final project proposal presentation slides	March 30-31	90 min	
4	Explore resources for implementing neural networks in C++ and learning	April 1-5	90 min	
5	Discuss implementing neural networks	April 9	90 min	
6	Having the first version of the neural network in C++ and discuss	April 16	90 min	
7	Optimizing our neuron network	April 20-21	90 min	
8	Starting to write the final project	April 25	90 min	