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Github Link: https://github.com/bpfinnerty/DeepLearningLibrary

Deep Learning Framework: Final Proposal

In this project, we have created a Deep Learning Library that allows users to create and implement a deep learning model to train. Our library has been implemented in C++ to leverage the speed provided by C++ while avoiding some of the costly overheads associated with utilizing Python. Modeling after PyTorch we provide an easy framework for users to build their own networks, including many functions that are detailed in the project's README.md. In this project, we utilize the powerful mathematics behind matrix multiplication to provide fully connected multi-layer perception support with a multitude of activation functions and two loss functions. In addition, we provide a high-performance CPU option that allows users to multithread their network to reap the benefits of embarrassingly parallelizable matrix multiplication. To take inspiration of PyTorch we also provide multi-language support through the use of Pybind to provide usage in Python as well. Our system is only designed to compile and run on Ubuntu Linux 20.04.4 LTS. To ensure that nothing goes awry, we also provide robust illegal input handling to prevent users from running undefined networks, mismatched layer dimensions, or invalid input vector sizes. Our network can currently be trained on Classification tasks given classification data. To provide a solid benchmark between our system and others, we also provide a PyTorch implementation to serve as a comparison. All in all more information and how to implement and use our system can be found on the project's README.md.

Point Breakdown:

- Proposal: 10pts
- Demo: 10pts
- Defend: 10pts
- High-Performance CPU: 5pts
- Pytorch Benchmark: 5pts

- Illegal Input Handling: 2pts
- Multi-Language Support (Python) 1pt
- Documentation: 2pts
- Classification: 1pt

Ideal Total: 46pts