Lab 5 Report

Github Link

https://github.com/joey-public/su22_software_emb_sys/tree/main/assignments/5_assignment5

Compile and Run Instructions

Python Tensor flow example

```
python3 lab5/tf_mnist_example.py
```

Lab 5 GPU Neural Network

The instructions will run the `AND` gate example

```
cd lab5
make
./lab5
```

To run the `XNOR_GATE` you must edit `lab5/src/dataset.cu` to uncomment line 3. Then remake the project and run.

Final Code

All final Code it in the lab5 directory.

Results for AND Gate

```
Cost : 0.046890
Total number of epochs : 4999
Data : [0.000000, 0.000000] / Pred (pred) - Real : 0.048753 (0.000000) - 0.000000
Data : [1.000000, 0.000000] / Pred (pred) - Real : 0.176688 (0.000000) - 0.000000
Data : [0.000000, 1.000000] / Pred (pred) - Real : 0.176613 (0.000000) - 0.000000
Data : [1.000000, 1.000000] / Pred (pred) - Real : 0.754628 (1.000000) - 1.000000
Data : [0.000000, 0.000000] / Pred (pred) - Real : 0.048753 (0.000000) - 0.000000
Data : [1.000000, 0.000000] / Pred (pred) - Real : 0.176688 (0.000000) - 0.000000
Data : [0.000000, 1.000000] / Pred (pred) - Real : 0.176613 (0.000000) - 0.000000
Data : [1.000000, 1.000000] / Pred (pred) - Real : 0.754628 (1.000000) - 1.000000
Data : [0.000000, 0.000000] / Pred (pred) - Real : 0.048753 (0.000000) - 0.000000
Data : [1.000000, 0.000000] / Pred (pred) - Real : 0.176688 (0.000000) - 0.000000
Data : [0.000000, 1.000000] / Pred (pred) - Real : 0.176613 (0.000000) - 0.000000
Data : [1.000000, 1.000000] / Pred (pred) - Real : 0.754628 (1.000000) - 1.000000
Data : [0.000000, 0.000000] / Pred (pred) - Real : 0.048753 (0.000000) - 0.000000
Data : [1.000000, 0.000000] / Pred (pred) - Real : 0.176688 (0.000000) - 0.000000
Data : [0.000000, 1.000000] / Pred (pred) - Real : 0.176613 (0.000000) - 0.000000
Data : [1.000000, 1.000000] / Pred (pred) - Real : 0.754628 (1.000000) - 1.000000

Accuracy: 1

real    0m9.029s
user    0m3.760s
sys 0m3.088s
```

Results for XNOR_GATE

```
Cost : 0.134367
```

```
Total number of epochs : 4999
Data : [0.000000, 0.000000] / Pred (pred) - Real : 0.841592 (1.000000) - 1.000000
Data : [1.000000, 0.000000] / Pred (pred) - Real : 0.291635 (0.000000) - 0.000000
Data : [0.000000, 1.000000] / Pred (pred) - Real : 0.311149 (0.000000) - 0.000000
Data : [1.000000, 1.000000] / Pred (pred) - Real : 0.482373 (0.000000) - 1.000000
Data : [0.000000, 0.000000] / Pred (pred) - Real : 0.841592 (1.000000) - 1.000000
Data : [1.000000, 0.000000] / Pred (pred) - Real : 0.291635 (0.000000) - 0.000000
Data : [0.000000, 1.000000] / Pred (pred) - Real : 0.311149 (0.000000) - 0.000000
Data : [1.000000, 1.000000] / Pred (pred) - Real : 0.482373 (0.000000) - 1.000000
Data : [0.000000, 0.000000] / Pred (pred) - Real : 0.841592 (1.000000) - 1.000000
Data : [1.000000, 0.000000] / Pred (pred) - Real : 0.291635 (0.000000) - 0.000000
Data : [0.000000, 1.000000] / Pred (pred) - Real : 0.311149 (0.000000) - 0.000000
Data : [1.000000, 1.000000] / Pred (pred) - Real : 0.482373 (0.000000) - 1.000000
Data : [0.000000, 0.000000] / Pred (pred) - Real : 0.841592 (1.000000) - 1.000000
Data : [1.000000, 0.000000] / Pred (pred) - Real : 0.291635 (0.000000) - 0.000000
Data : [0.000000, 1.000000] / Pred (pred) - Real : 0.311149 (0.000000) - 0.000000
Data : [1.000000, 1.000000] / Pred (pred) - Real : 0.482373 (0.000000) - 1.000000

Accuracy: 0.75

real    0m9.502s
user    0m3.924s
sys 0m3.188s
```