CS4110 – High Performance Computing with GPUs
Batch 2022 CS-6A
Project Deliverable 1

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Folder Structure:

- makefile
- nn.c
- data/
  - t10k-images.idx3-ubyte
  - t10k-labels.idx1-ubyte
  - train-images.idx3-ubyte
  - train-labels.idx1-ubyte

Execution Time of baseline application (without using -pg flag during compilation):

These results were gathered from an average of 5 runs on an AMD Ryzen 7 5800H CPU:

	Loss	Train Accuracy (%)	Time (s)
Epoch 1	0.26768	91.85%	7.0514s
Epoch 2	0.10536	96.868%	7.0618s
Epoch 3	0.0729	97.844%	7.0394s

Total Time: 21.1526s
Test Accuracy: 96.866%

Gprof Flat Profile (using -pg flag during compilation):

% time	Cumulative seconds	self seconds	calls	self s/call	total s/call	name
70.81	13.1	13.1	190000	0	0	forward
27.95	18.27	5.17	180000	0	0	backward
1.19	18.49	0.22	2	0.11	0.11	loadMNISTImages
0.05	18.5	0.01				_init
0	18.5	0	2	0	0	loadMNISTLabels
0	18.5	0	1	0	0	createNetwork
0	18.5	0	1	0	0.69	evaluate
0	18.5	0	1	0	0	freeNetwork
0	18.5	0	1	0	17.58	train

Column definitions, explanations, and further granularity details can be found by modifying the makefile to include the `-pg` flag so gprof may collect data, then by running:

```
make
gprof nn.exe gmon.out > analysis.txt
```

and then viewing the `analysis.txt` file. The table above is a small portion of the file in question.