

Brain Criticality Hypothesis Simulation - Implementation

Drew Smith

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1 Overview

1.1 Summary

The NN will be implemented in C++ and CUDA. Activations will all happen concurrently, but not asynchronously. This means that on every 'tick', all of the activations will occur at the same time in terms of simulation time. Each tick will include several steps. These steps are enumerated below along with the hardware they will run on:

1. Assign input values (CPU)
2. Apply excitatory postsynaptic potentials decay (GPU)
3. Feed-forward
4. Determine activations (GPU)
5. Pass output values to simulation (CPU)
6. Adjust connection weights (GPU)
7. Determine then kill dead neurons (GPU)
8. Create new neurons (CPU)
9. Do simulation tick (CPU)

In this document, I will explain the implementation details specific to the NN. The game simulation details will be explained in another document. Each of the steps above will be explained further in its own section below.

- 2 NN Architecture
- 3 Applying Excitatory Postsynaptic Potentials Decay
- 4 Feed-Forward
- 5 Determine Activations
- 6 Adjusting Connection Weights
- 7 Determining Then Killing Dead Neurons
- 8 Creating New Neurons