Hadir Khan
Gian Bisma

CSE122/222 Final Project

Motivation of project

To create an analog design and custom layout that simulates a couple silicon-neurons for a spiking neural network. Additionally, use SPICE simulation to verify design. Show that cells can be tiled together to form multiple levels of neural network.

Open-source repositories

For this project, we will use the SKY130-pdk (https://skywater-pdk.readthedocs.io/en/main/).

Technical work

Using Magic with SKY130 technology, I will design an inverter. The purpose of this step is to familiarize myself with the Magic VLSI layout tool.

The, I will create a simple RC circuit to incorporate the devices in the Magic layout tool.

Then, I will hierarchically create the circuit in the following figure.

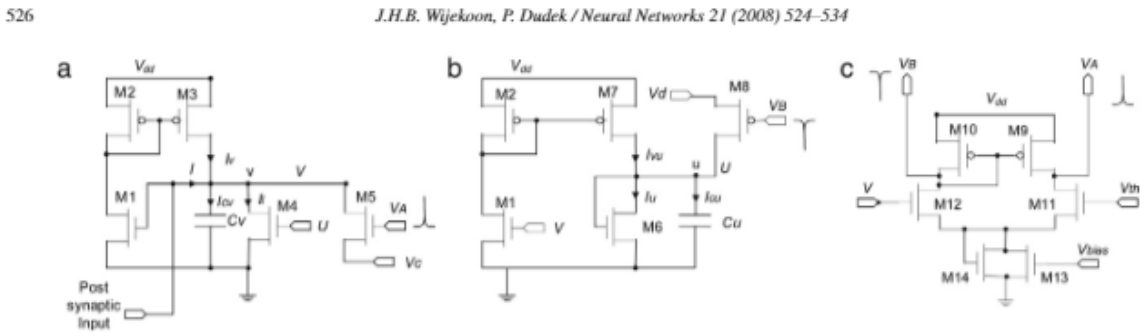

Fig. 2. Sub-circuits of the silicon cortical neuron: (a) Membrane potential circuit, (b) Slow variable circuit, (c) Comparator circuit.

Description of deliverables

We will submit the following:

- Behavioral simulation of the neural network
- DRC
- LVS
- STA with back-annotated timing in multiple corners
- Gate-level simulation