Monday Meeting

29.09.25 Meeting

Chip Layout Continuation

- Layout finished
- Possibility to run LVS by specifying GDS + schematic netlist
- DRC is still not at the level of commercial tools

Paper on invariant representation of tactile stimuli

- Y.-C. Pei, S. S. Hsiao, J. C. Craig, and S. J. Bensmaia, “Shape Invariant Coding of Motion Direction in Somatosensory Cortex,” 2010
- Study the directional selectivity of neurons in the somatosensory pathway (area 1, 2 and 3b)
- Area 1 neurons seem to contain the most robust representation of motion (through neuronal invariance to motion)

Paper on invariant representation of tactile stimuli

Key takeways :

An invariant representation means that a neuron (or neural population) encodes a feature (like motion direction) in a way that remains stable despite changes in other aspects of the stimulus (stimulus shape)

A population of neurons in area 1 of the somatosensory cortex were found to represent motion direction robustly as they are highly sensitive to the direction of stimulus motion. Moreover, their responses were invariant to stimulus type (bars, dots).

Area 1 also comprises a strong representation of stimulus orientation and texture -> might serve other functions

No directional selectivity on SA and RA afferents

What about engineering point of view ?

- No on edge processing for motion direction detection ?
- Invariant representation algorithm for motion and texture (independent on speed and magnitude)
- Similarities in the neural mechanisms of visual and tactile motion processing
- Importance of directional selectivity ?

=> Further reading on texture recognition and motion detection in biology

TO-DO List

- Test of Ella's chip with the Omega Robot and Robert's piezo
- Continue the collaboration for the paper of BNEW workshop (only encoding of iEEG signals remains for my part)
- Read about parameter tuning in bursting neuron based on error signal