A Bio-Inspired Model of Sound Source Localization on Neuromorphic Hardware

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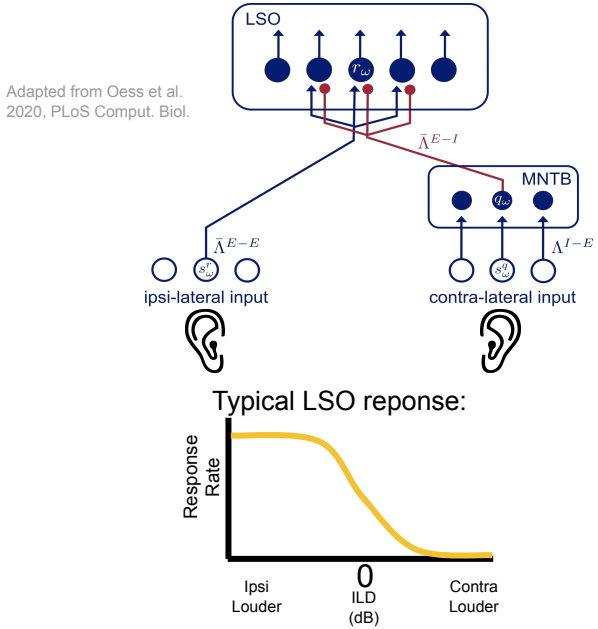
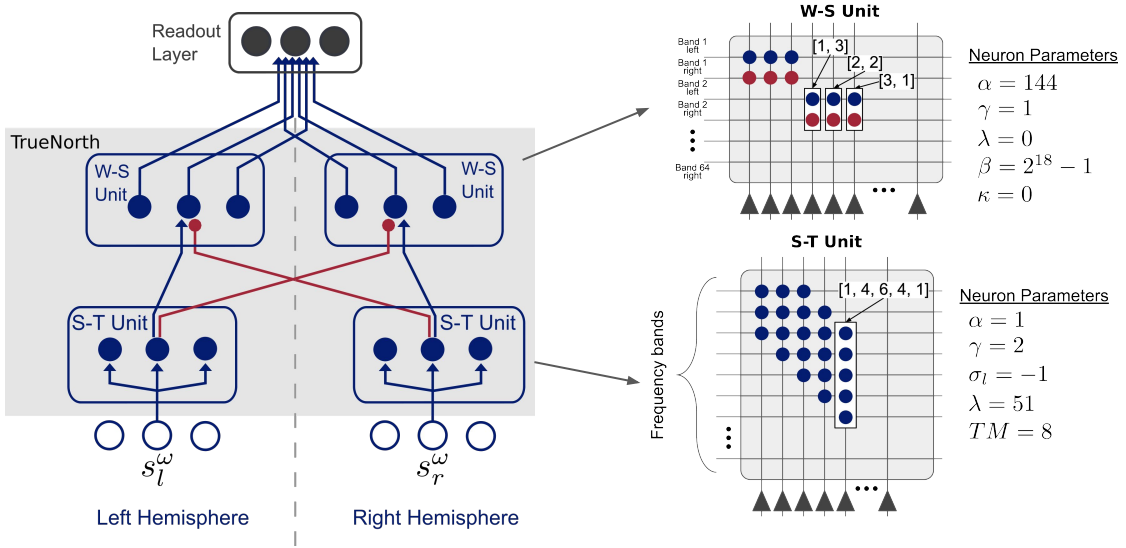
Interaural level difference encoding for localization in lateral superior olive (LSO)

- **Excitatory inputs** from ipsilateral side
- **Inhibitory inputs** from contralateral side



Neuromorphic LSO Model on TrueNorth Neurosynaptic Chip[1]

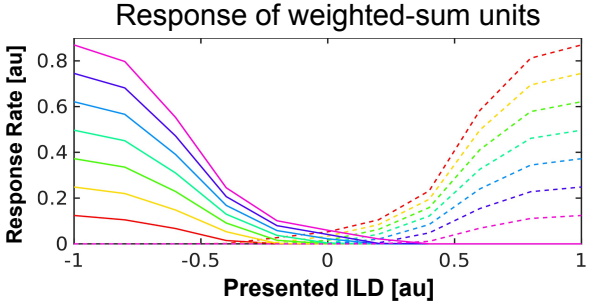
- Spectro-Temporal smoothing units for stabilization.
- Weighting-Sum units for integration.

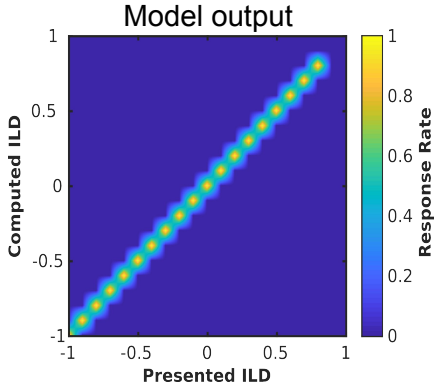


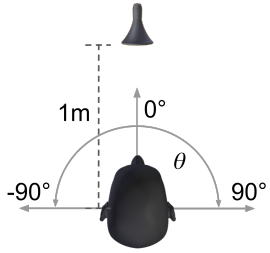
[1] Cassidy et al. 2014, Proceedings of the international conference for high performance computing, networking, storage and analysis.

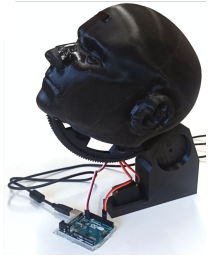
Results

- Stimuli: Synthetically generated input data
- ILD values in normalized range [-1,1]









- Stimuli: white noise + 8 different natural sounds.
- Sound directions from -90° to 90° in 10° steps
- 75.4% mean accuracy over azimuths.