A Spiking Neuron Model of Olfactory Bulb Dynamics

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This work presents a spiking neuron model of the olfactory bulb. The main purpose is to simulate certain dynamics within the olfactory bulb. It is shown how certain parameters of the spiking neuron model can be used to model these dynamics. The model is based on the two main cell types in the olfactory bulb, the mitral and granule cells. The dynamics that have been simulated include the reciprocal and lateral inhibition of mitral cells by granule cells, as well as the saturation of mitral cells. Simulations show how certain spike train inputs to mitral cells are affected by those dynamics in the olfactory bulb. This work also provides a detailed introduction into neuronal systems, which are the basis for the spiking neuron model. In addition an anatomical overview of the olfactory bulb and its biological dynamics are explored and defined.