CONDUCTANCE BASED NEURAL SIMULATOR: NEURAL EXCITABILITY, SPIKING, AND BURSTING

IREN VALOVA
Computer and Information Science,
University of Massachusetts
N. Dartmouth, MA 02747

GEORGE GEORGIEV
Computer Science, University of
Wisconsin, Oshkosh, WI 54901

NATACHA GUEORGUIEVA
Computer Science, City University
of New York
Staten Island, NY 10314

ABSTRACT
Neural networks can learn how to solve tasks based on the data given from training or initial experience, in real time and then reconfigure and carry out the computations in parallel with the received and processed new data. We present an extension of Integrate & Fire McGregor Spiking Neural Simulator (SNS) based on Hodgkin–Huxley model. The goal of this research is to study how the neuronal behavior depends on measurable physiological parameters, such as the maximal conductance, steady-state activation functions and time constants by altering the weight and delay factors of the synapses as well as changing the structure of the connections between the layers and the parameters of the NN. The simulation parameters are chosen to be close to those used by medical researchers in order to compare the results of our simulations with those reported in medical literature.