Special Seminar

How do networks of spiking neurons compute and learn?

November 12th, 2018, 15:00 - 16:30

Convention Hall, An Building
Institute of Industrial Science
The University of Tokyo
http://www.iis.u-tokyo.ac.jp/en/access

Registration Form
https://goo.gl/forms/8i2p7YzYmFIAiNjf1

Abstract:

Networks of neurons in the brain consist primarily of spiking neurons. These are neurons whose output consists of stereotypical voltage pulses (spikes), which they emit at irregular points in time. These spikes are then transmitted via synapses to other neurons, where they may increase or decrease the likelihood of a spike. This event-based processing scheme is conjectured to be essential for the astounding energy efficiency of brain computations. New spike-based computing hardware, such as IBM' s TrueNorth and Intel' s Loihi, explore options for building substantially more energy efficient computing devices on this basis. I will describe in my talk some of the new computing and learning principles for networks of spiking neurons that have been discovered in recent years. In particular I will sketch how Deep Learning can be employed to design networks of spiking neurons with powerful computing and learning capabilities. My talk will end with a discussion of open problems and challenges for futher research.

Several details can be found in:

G. Bellec, D. Salaj, A. Subramoney, R. Legenstein, and W. Maass. Long short-term memory and learning-to-learn in networks of spiking neurons. NIPS 2018, preprint in arxiv (see https://igi-web.tugraz.at/people/maass/publications.html)

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