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Evening Lecture: Nature Inspired Computing

Tuesday, August 27, 2013 7:00 PM (1h 30m)

Computers - the high point of technology. Our omnipresent slaves and sometimes masters. But thousands of years before the first vacuum tube lit up biological computing machines existed that would outmatch our contemporary silicon companions in nearly every aspect. If in doubt just try to build a machine doing what a simple ordinary house fly does. Soon you will realize, that this simple creature processes and integrates large amounts of various sensory data, infers decisions to sustain its life and adapts to the environment. How?

In the talk we will go through some theory and practice of computing methods inspired by the nature. Despite we are slowly becoming capable to build the computing hardware of the desired complexity we often fail to program that hardware to our liking. Partially, that's why we want the hardware to learn by itself. We will see how artificial neural networks are build and used. We will also see how it is possible to find solutions to complex problems by means of simulated evolutionary optimization. And finally, the memory-prediction framework a progressive new theory trying to explain how the mammalian brain works will be presented. The practical examples to be shown include land use categorization using artificial neural networks, evolutionary optimization of a mechanical structure, object identification in sequences of images using a method based on memory-prediction framework and some more.

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