Katedra aplikovanej informatiky FMFI UK
Ústav aplikovanej informatiky FIIT STU
Spoločný seminár Umelej inteligencie

Pozvánka
Vo pondelok dňa 15. 3. 2010 o 14.00 hod. v zasadačke I9, blok
Informatika, FMFI UK, Mlynská dolina

bude prednášať

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Binary Cellular Automata Approach to Anonymous, Self-Stabilizing Leader Election on Rings

Abstract
This lecture presents a novel approach to the problem of leader election that is fundamental in the theory of distributed algorithms, multi-agent systems as well as sociobiology. We investigate one-dimensional binary state cellular automata with an intention to track self-organizational mechanisms that enable an election of global leader, despite limited capabilities of individual cells. Since our model is anonymous, uniform and deterministic we also have to deal with a problem of symmetry that in great majority of cases is broken by inhomogeneity of arbitrary initial configurations. Our methodology is based on the evolution of cellular automata by genetic algorithms and dynamics analysis by the computational mechanics. The presented new solution of the leader election reaches remarkably high performance up to 99%. Sophisticated collective computation found in the best performing cellular automata is demonstrated by so called particles and their interactions. Furthermore, we analyze and prove an upper bound performance of the anonymous, synchronous instance of the leader election problem for the architecture of cellular automaton in a bidirectional ring. Fundamental limitations demonstrated here are the results of symmetry breaking issue in conjunction with loose-coupling (low density) of active cells. Due to the simplicity of our model, presented results are general and universal enough to be applicable even at the level of primitive biological or artificial systems.

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web stránka seminára:
http://www2.fiit.stuba.sk/~kvasnicka/Seminar_of_AI/index.html