عنوان مقاله:

Design of a Cellular Sugarscape Environment to Increase the Learning Speed in a Stochastic Multi-agent Network

محل انتشار:

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خلاصه مقاله:

Sugarscape model is a multi-agent environment used for modeling and organizing processes such as social, political and economic processes .The purpose of this study is to assess the learning ability of a learner system in sugarscape and for that reason the Boltzmann machine learning algorithm is evaluated .During the first experience, model number ۱ which is a learned multi-agent model and is based on Boltzmann machine algorithm was considered .In this model each agent, was assigned with a parameter which indicates the agent's knowledge .Once the knowledge of agents reached the maximum, the model is converged .The criterion was time of convergence .After that, the second model which is a multi-agent, cellular, and learner based on Boltzmann machine learning algorithm was considered, in which the Boltzmann machine's learning algorithm is implemented in a multi-agent cellular environment . And finally the third model which is a multi-agent, cellular, Boltzmann machine learner model was assessed in sugarscape. And measure the time needed to reach convergence over specific number of agents for each model. After investigating the resulting diagrams it was concluded that the convergence speed of third model is more than the convergence speed of second model .Also, the convergence speed of second model is more than convergence speed of first model .Utilization of cellular automata results in a more speedy convergence for the model and this is due to rules and local interactions and transformation of generalized convergence to localized convergences .Application of sugarscape accelerates convergence speed relative to the case when it is not used. Additionally the maximum number of executable agents in third model is more than second model and also the maximum number of executable agents in second model is much greater than the first model .At last, it was deduced that the learning process of a learned multi-agent system and in sugarscape speeds up this process and does not have the limitations in the number of agents during execution.

کلمات کلیدی:

multi-agent system, learning, Boltzmann Machine learning algorithm, cellular automata, sugarscape, convergence