

APPLICATION OF CONFIDENCE LEVEL BASED ON AGENT'S EXPERIENCE TO IMPROVE INTERNAL MODEL

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ABSTRACT. *In this paper, we focus attention on a Sugarscape model which is one of the multi agent systems. In conventional research, the temperature parameter used in a case where an agent determines action through learning, is assumed to be the same value for all agents. However, this is effective when all agents experience all states equally. Since the environment which surrounds an agent differs for every agent, it is necessary to set up a temperature parameter of an internal model suitable for an agent's experience. So, we propose confidence level of temperature parameter which can gain automatically based on its confidence level. Here, the degree of comprehension of the agent about state transition is called confidence level. Thereby, an improvement of learning speed is expected, because each agent can gain the temperature suitable for his experience automatically. From numerical examples, we show that the learning speed in our proposal method is quicker than the conventional method.*

Keywords: Multi-agent system, Sugarscape model, Confidence level, Temperature parameter of internal model

1. Introduction. In human society, the social structures of macro level are formed by the interaction of social members at micro level. A change in macro level leads to changes in micro level, and generates a new social structure. Such a loop is called a micro-macro loop [1,2]. One of the effective techniques in analysis of this system is a multi agent system. An agent is a subject which acts autonomously, and is realized on a computer. The agent with the internal structure updates it by the environment and action which were experienced until now. Therefore, even when an agent follows the same action rule, it may choose different actions by the difference in an internal structure. The behavior which appears as the whole system by such agent's interaction may generate the phenomenon which cannot be imagined from the action rule of an agent who is a component. The system with such a feature is called the complexity system [3]. Nakano has studied the analysis of the global influence including the random effect using a multi-agent system [4].