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Authors:

Subha Fernando

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Abstract

Behaviors of the colonies of small unsophisticated agents have been analyzed in the literature with the purpose of developing efficient algorithms to solve complex, dynamic and burden problems in other societies. Among them, only a few research have been conducted in the area of swarm cognition which tries to understand the cognitive behaviors exhibited by human brain by using the cognitive behaviors demonstrated by a colony as a self-organized entity. In this aspect, the role of a neuron and a role of an insect have been equally considered as an unsophisticated agent which adjusts its actions according to the fluctuations of local environment without knowing any global information. The cognitive behavior, such as effective labor division of honeybees at food foraging process, was analyzed in this paper and has been exploited under operant conditioning. The paper has proposed a simple but effective computational model which demonstrates that, the positive reinforcement and the negative reinforcement in operant conditioning are the real factors that affect to the emergent of cognitive behaviors at swarm level when swarm is observed as a self-organized entity.

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