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Research Article

AIN-Based Action Selection Mechanism for Soccer Robot Systems

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Abstract

Role and action selections are two major procedures of the game strategy for multiple robots playing the soccer game. In role-select procedure, a formation is planned for the soccer team, and a role is assigned to each individual robot. In action-select procedure, each robot executes an action provided by an action selection mechanism to fulfill its role playing. The role-select procedure was often designed efficiently by using the geometry approach. However, the action-select procedure developed based on geometry approach will become a very complex task. In this paper, a novel action-select algorithm for soccer robots is proposed by using the concepts of artificial immune network (AIN). This AIN-based action-select provides an efficient and robust algorithm for robot role selection. Meanwhile, a reinforcement learning mechanism is applied in the proposed algorithm to enhance the response of the adaptive immune system. Simulation and experiment are carried out to verify the proposed AIN-based algorithm, and the results show that the proposed algorithm provides an efficient and applicable algorithm for mobile robots to play soccer game.