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A Cooperation Strategy for Shooting in Robot Soccer Competition Based on the Multi-Suppose Tree

FU Bing^a, ZHANG Pi-xu^{a*}, WANG Cheng-fei^b

^a*Electronic Engineering College, Naval University of Engineering, Wuhan 430033, China*

^b*Common Automation Institute, Naval Academy of Armament, Beijing 100036, China*

Abstract

In the robot soccer competition, robots are intellective and traditional shooting strategy is simple for merely controlling one robot dribbling ball lack of cooperation. According to the behavior process for multi-agent system, sense-decision-action, the cooperation strategy for shooting based on multi-suppose tree is presented, which obtains some suppose sequences and finds out an effectual shooting path with less account when the robot dribbling ball is interrupted by opponents or can't kick a goal. The method to implement cooperation strategy for shooting in the robot soccer competition is also an important reference to cooperation strategy of multi-agent system.

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Keywords: multi-agent system; robot soccer competition; cooperation strategy; multi-suppose tree

1. Introduction

The robot soccer competition is another milestone for artificial intelligence following the computer chess, which combines some new technology in different areas, such as the real-time vision system, robot control, wireless communication, and multi-robot control. One Agent behaves simply, while some intellective robots in reciprocal influence may accomplish more complicated missions with cooperation strategy, which is a standard test-bed for studying multi-agent system^[1-3].

The traditional shooting strategy is simple for merely controlling one robot dribbling ball lack of cooperation^[4-6]. According to the behavior process for multi-agent system, sense-decision-action, when

* Corresponding author. Tel.: +86-01397126827; fax: +86-027-83443974.

E-mail address: pxzhang_531@126.com.

the robot dribbling ball is interrupted by opponents or can't kick a goal, cooperation strategy for some teammates is necessary by establishing the robots interspersing model^[7]. In the 5V5 mode of robot soccer competition, the multi-suppose tree is an effectual method to implement cooperation strategy for shooting, which find out the shoot straight path with less account.

2. Establish and manage the multi-suppose tree for cooperation strategy

The multi-suppose tree is a combination and optimization problem, which describes kinds of uncertain information by a tree with branches and leaves. The method to implement cooperation strategy for shooting in the robot soccer competition by establishing and managing the multi-suppose tree is to obtain and optimize some suppose sequences, based on the robots interspersing model.

The multi-suppose tree is the whole data aggregate, every leaf of which represents an effective associated suppose between two robots, showed as figure 1. The depth of suppose tree which varies dynamically represents the count of pass, and the depth of optimum associated sequence is minimum. The root node is robot dribbling ball, and nodes in next floor are robots effectively associating with the root node. In 5V5 mode of the robot soccer competition, the robot dribbling ball may associate with each teammate, so the default count of a node associating with next floor is 4. Then manage the associated defaults in new floor and wipe out noneffective nodes considering pass and shooting restrictions. Finally, every associated sequence from root to leaf in the tree is an effective suppose and the expectation's depth is minimum.

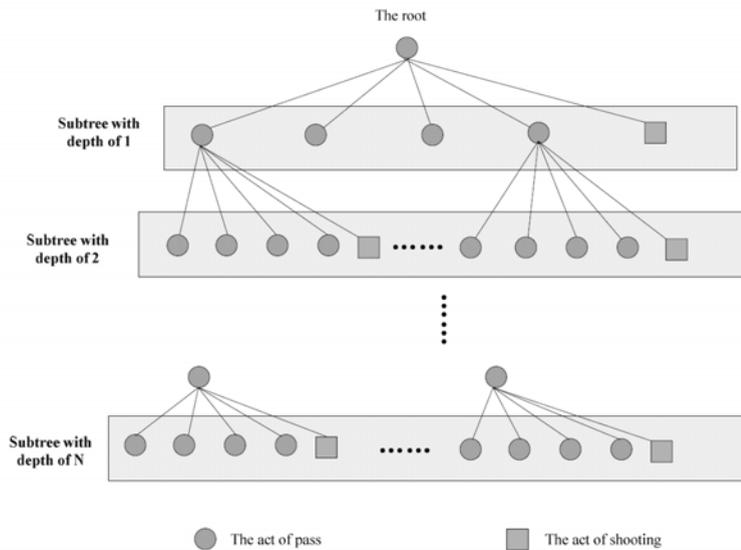


Fig. 1. the structure model of multi-suppose tree

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