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The effect of tactics to action planning in Soccer Agents

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Abstract

Multi-agent system(MAS) has been developed as intellectual software such as robotics, the aviation and space science, information science, and E-Commerce. The robotic soccer is one of the researches, where soccer players are simulated, and many researchers have wrestled with the problem. The project named RoboCup hosts a competition held annually and aims to realize the goal that "The robot soccer team will win FIFA World Cup champion team under their rule, in 2050."

In this thesis, we approach the problem with intention to make the soccer agent play soccer like human being. We research on the role and effectiveness of tactics in robotic soccer, so that we based on "data of soccer by human being, and deciding action process of player by beforehand inputted indication", and we applied players made thereby in the tactics used in soccer by human being.

We aim at deciding action from not individual conclusion of agents but a pre-installed rule as team rule, and constructing good teamplay(i.e. good cooperation reaction in the system) as a system. Our suggestion based on the reason that real soccer is repeat of

training and games, the tactics of team have already decided in training, the team go on games with knowledge based on there, the players depend on own conclusion to settle problem in regional situation as 1 on 1.

We used the method that to solve by applying conditional diverge with fix occurred situations individually in many step so that agents act under beforehand inputted indication. We determined on it by using information as judging situation because players (agents) repeat judging situations (get positioning info and recognize objects around) and "action" (run, kick, and so on). We will then apply tactics in soccer by human being and make players act like human being closely about action decision basis. For example, when a player holds ball, we made the method such that "whether a goal is closely (Yes/No)", "(Yes) shoot to goal direction", "(No) run ahead or pass to teammate".

We modified and used agents based on CMUnited (Carnegie Mellon University, United States of America) and we made an execution (experiment) on SoccerServer that was official server of competitions and common experiment environment in research of this field. We investigated that tactical effectiveness in three cases, "center attack" "side attack (right and left)", and counted the number of "success or failed". We observed that agents behavior as we expected, and investigated processes to goal and the number of "success or failed" in "2 on 2 game".

As a result, in action planning process by conditional diverge, we could construct tactical action of players, show the effectiveness of "side attack" similar to real soccer and possibility that we can apply players to tactics certainly. In other words we could show that we will be able to construct methods that started fixedly "versus human being" by method and experiment of this study.

A result of this study is an indicator to know what kind of tactics is effective and we could show this study is effective for team play ability improvement of a soccer agent.