

FC Portugal 2004: New Coordination Methodologies in the Simulation League

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1. Introduction

The main goals of FC Portugal research project are the development of new coordination methodologies and of a formal model for the concept of team strategy for a competition with an opponent team having opposite goals, general enough to be instantiated to various dynamic competitive domains.

2. Decision-Making and Cooperation

The project research focus is mainly concerned with developing general decision-making and cooperation models for soccer playing [1, 2, 3, 4]. Cooperation mechanisms include developments of the previously proposed Situation Based Strategic Positioning [1, 4] and Dynamic Positioning and Role Exchange Mechanisms [1, 4]. New communication languages and protocols, to convey the most relevant information at the right times to players are also being developed. Also, research is focused on intelligent control of players' sensors to achieve maximum coordination and world state accuracy. Online optimization and reinforcement learning are being used in order to develop a complete set of efficient low-level skills for soccer playing agents.

3. Intelligent Perception and Communication

Intelligent Perception [1, 3] is one of the research challenges we are currently addressing. Several new strategies for vision synchronization and strategic looking associated with a more reliable communication paradigm are also under way.

4. Game Analysis and Coaching

Coaching is an important research topic in RoboCup. We have proposed Coach Unilang – a general language to coach a (robo)soccer team [2, 3]. This language is now being extended and fully implemented in our team. Also, a new agent architecture suitable for a simulation league coach and a complete soccer coaching ontology are now under development. This will allow the development of better high-level reasoning methods enabling the coach to decide the best tactic at each moment in the game.

5. Agent Analysis and Debugging Tools

FC Portugal is also concerned with the development of agent evaluation tools like our offline client methodology; WstateMetrics that evaluates the accuracy of world states; Team Designer that enables the graphical definition of soccer strategies; and Visual Debugger used to analyze the reasoning of agents [1, 3]. Evaluation by domain experts using graphical tools is another methodology that will be used to fine tune our team for Lisbon 2004 tournament.

6. Conclusions

FC Portugal 2004, as its predecessors, is a team with a beautiful, fast, “real soccer like” way of playing simulated soccer. The improvements performed during this year make the team even more flexible and adaptable to different types of opponent strategies.

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