FC Portugal 2005 Team Description Paper

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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.
The FC Portugal 2005 2D team builds upon previous research that has made the FC Portugal team one of the most successful ones that ever participated in RoboCup competitions.

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] that can be instantiated in other multi-agent domains. Cooperation mechanisms include developments of the previously proposed Situation Based Strategic Positioning [1, 4] and Dynamic Positioning and Role Exchange Mechanisms [1, 4]. The intensive exploitation of the low bandwidth communication among players is one of the aspects in which the FC Portugal team excels. Nevertheless, new communication languages and protocols are being developed. Also, research is focused on intelligent control of players' sensors to achieve maximum coordination and world state accuracy. New ways to gather opponent models and use these models in the individual decision are also one of the current research topics.

3. Intelligent Perception and Communication

Intelligent Perception [1, 3] has always been one of our research topics. New ideas on how to use the available sensors and communication are currently under way of being tested. Tools have been developed to evaluate world state accuracy achieved using different strategies.

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]. The development of translators from Coach Unilang to Clang has provided us with a very useful tool to test team behaviors and to participate in the Coach Competition.

5. Agent Analysis and Debugging Tools

FC Portugal is also concerned with the development of agent evaluation tools like:
- Offline client methodology;
- WstateMetrics that evaluates the accuracy of world states;
- Team Designer that enables the graphical definition of soccer strategies;
- 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 Osaka 2005 tournament.

6. Conclusions

FC Portugal 2005, 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.

Acknowledgements

References

1. Luis Paulo Reis and Nuno Lau, *FC Portugal Team Description: RoboCup 2000 Simulation League Champion*, In Peter Stone, Tucker Balch and Gerhard Kraetzschmar editors, RoboCup-2000: Robot Soccer World Cup IV, LNAI 2019, pp 29-40, Springer Verlag, Berlin, 2001
2. Luis Paulo Reis and Nuno Lau, *COACH UNILANG - A Standard Language for Coaching a (Robo)Soccer Team*, In Andreas Birk, Silvia Coradeshi, Satoshi Tadokoro editors, RoboCup-2001: Robot Soccer World Cup V, LNAI 2377, pp 183-192, Springer Verlag, Berlin, 2002
3. Nuno Lau and Luis Paulo Reis, *FC Portugal Homepage*, Http://www.ieeta.pt/robocup
4. Luis Paulo Reis, Nuno Lau and Eugénio Oliveira. *Situation Based Strategic Positioning for Coordinating a Simulated RoboSoccer Team,* in M. Hannebauer, J. Wendler and E. Pagello eds, Balancing React. and Social Deliberation in MAS, Springer, LNAI, Vol. 2103, pp.175-197, Berlin, 2001