

Description of Sahand Soccer Simulation Team

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Abstract. Sahand soccer simulation team consists of four layers, basic layer, decision layer, control layer and skill layer. Most of our effort had gone into control layer where we could take advantage from our probability-based decision algorithm. Our coach is also uses the same idea to change the strategic zones and roles of each player.

1 Introduction

In this paper we aim to give a short description of the architecture and development of Sahand soccer simulation team. Sahand was formed in 2001 at AI lab, Isfahan University of Technology, and is modeled closely after its predecessor Kemps@iut. Sahand has a four-layer architecture and uses the coach's abilities to select the best strategy against opponents.

2 Architecture

Sahand soccer simulation team consists of four layers as described below.

2.1 Basic Layer

Sahand's basic layer is mostly built on CMUnited99's basic layer. This layer consists of two main sub layers: the connection layer and the world model layer. The connection layer tries to completely hide all the communication between the agent and the soccer server. The world model is constructed using the information received from the server each cycle. A few changes have been made for better using of the new soccer server features.

2.2 Decision Layer

In this layer all the possible actions in a certain state are determined and sent to the control layer. This layer also uses a history of what have been done by the agent in the previous cycles. This enables the agent to perform a continuous task better.

2.3 Control Layer

The task of this layer consists of two main sub layers: First layer is to select the optimal action sent from the decision layer. The optimal action is determined by three factors: what is the probability of this action to be successful, and how is the profit of this action for the agent, and also how the action is prioritized regarding the agent's role in the match.

2.4 Skill Layer

This is mostly built on CMUnited skill layer the optimal action is performed. The control layer has a number of parameters, some are set regarding the current state and some are hard-tuned. We are going to design a neural network to be used with the offline trainer to set the parameters of this layer.

3 Coach

The coach observes the match and tries to model the opponent's playing style, and then finds the best strategy to be used against the opponents. Sahand has a few defined strategies but the coach can easily modify these by changing the strategic zones (home position, pass areas...) or define a new role for the agent by changing the priorities of different actions.

References

1. P. Riley, P. Stone, and M. Veloso. Layered Disclosure: Revealing Agents' Internals. In Proceedings of the Seventh International Workshop on Agent Theories, Architectures and Languages (ATAL-2000), 2000.
2. J. R. Kok, R. de Boer, N. Vlassis, and F. Groen. UvA Trilearn 2002 team description. In G. Kaminka, P. Lima, and R. Rojas, editors, RoboCup 2002: Robot Soccer World Cup VI, page 549, Fukuoka, Japan, 2002. Springer-Verlag.
3. C. Guestrin, S. Venkataraman, and D. Koller. Context specific multiagent coordination and planning with factored MDPs. In Proceedings of the Eighteenth National Conference on Artificial Intelligence, Edmonton, Canada, July 2002.