

Caspian 2003 Team Description

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Abstract. The main scientific goal of Caspian team is to develop *goal-based* agents, who cooperate according to the team strategy. To achieve this goal, the *planning* approach has been used. The emphasis of this paper is on *strategy* implementation using *plans* defined for soccer simulation domain.

Introduction. Previous soccer simulation competitions show that, despite of improvements in world model precision and individual skills, there is still a considerable gap between real soccer strategies and strategies used in soccer simulation teams. To overcome this deficiency, Caspian team has focused on developing the agent *decision-making mechanism*.

The scientific goal of Caspian team is to design and implement a decision-making mechanism, which provides the agent with the following capabilities:

1. Agent's behavior is improved to be *goal based*, so that the agents perform their roles in team *strategy*.
2. The team reacts properly against opponent strategies according to the results of previous executed plans and coach advises.

In order to achieve the mentioned goals, *planning* approach has been used. The goal-based structure of this approach makes it suitable for implementing strategies. A plan consists of three components:

1. *Preconditions*: Each plan has a set of predicates as its preconditions. The set of preconditions is divided into two subsets: *simple* and *complex*. The simple preconditions are those, which need simple calculations, such as HaveBall. But the evaluation of complex preconditions is more time consuming.
2. *Priority*: Provides a way in which the likelihood of success can be weighed up due to importance of the goals. The priority is calculated according to the current game state.
3. *Action*: It is the executive part of plan, which is formed by a sequence of player skills.

In each cycle the decision-making procedure is performed in two steps. First, the simpler preconditions are evaluated and it leads to a small subset of plans. Then, in the second step, through a *heuristic search*, a plan will be executed only if its preconditions are satisfied.

To implement plans in which more than one player is involved, the agents take advantage of communication using 'say' and 'point to' commands.

Conclusion. Up to now, the decision making structure and a number of plans have been implemented. The primary results show that the agents now collaborate reasonably to execute plans. The next step is to take advantage of *online learning* methods to improve plan selection mechanism, so the agent can react properly against different opponents.