

Iranians 2003 Team Description

Hamed Mousavian, Hossein Aminaiee, Ali Hosseini
mousavian@iust.ac.ir, {aminaiee, hosseini}@mail.iust.ac.ir}

Computer Engineering Department, Iran University of Science and Technology

Robocup has provided a useful, objective example of a case where learning can produce a better outcome than labor intensive programming [1]. *Simulated soccer teams* used learning methods in implementing strategic behavior of player agents, as well as their individual skills in recent years.

We used *genetic programming* [2] in developing some basic skills of a player and we are trying to use this technique for implementing some high level skills or even tactics. Individual skills have important role in achievement of a simulated soccer team, but the major problem for a simulated soccer player is the *decision making*.

For players not having the ball, decision making problem conduces to the problem of *positioning*. Now we are investigating the idea of applying *potential fields* [3, 4] for leading the players to the most proper positions in the field.

The player that has the ball, should also make a decision for choosing the best skill to execute or the best teammate to pass. Now, for this player, suppose a *graph* that the teammates are its vertices and the paths between them make the edges. The vertices have some parameters including *confidence*, *utility* and *stability*. The confidence is the result of uncertainty, utility indicates how much is good that a teammate has the ball, and the stability depends on the probability of the changes in the environment until that player receives the ball. Also we can consider an *expectation* parameter for each of the edges, that corresponds to the probability of a successful pass between two teammates. According to this graph, the player that has the ball could find the most proper teammate for receiving the ball and the best path for passing it. We are currently inquiring different approaches to solve this problem.

References

1. Stone, P., Balch, T., Kraetzschmar, G., editors, RoboCup-2000: Robot Soccer World Cup IV. Springer-Verlog, 2001.
2. HamedAzimi, N., Sharifi, M.: Using Genetic Programming for Developing Basic Skills of a Simulated Soccer Player. Submitted to RoboCup-2003: Robot Soccer World Cup VII. Springer-Verlog.
- 3 Meyer, J., Adolph, R., Stephan, D., Daniel, A., Seekamp, M., Weinert, V., Visser, U.: Decision-Making and Tactical Behavior With Potential Fields. In Kaminka, G., Lima, P., Rojas, R., editors, RoboCup-2002: Robot Soccer World Cup VI. Springer-Verlog.
4. Damas, B., Lima, P., Custodio, L.: A Modified Potential Field Method for Robot Navigation Applied to Dribbling in Robotic Soccer. In Kaminka, G., Lima, P., Rojas, R., editors, RoboCup-2002: Robot Soccer World Cup VI. Springer-Verlog.