

Caspian Soccer 2D Simulation Team Description Paper

Nasim Hajati, Shayan Janpak, Golnoosh Malaki, Bardia Rezapour,

Marlik Institute of Innovation and Technology
keen_wasp@yahoo.com

Abstract. Caspian is a 2d soccer simulation team based on Agent2D. In this paper, we will explain the used codes and functions and also the changes made on the base and previous algorithms after a brief description about the team members. Here, we have focused on mark and block defense skills.

Keywords: Block, Mark, Player, Opponent, Defender

1 Introduction

Caspian is a junior team which its activities on 2D soccer simulation field has begun in 2012 and after tests and practices on the UVA base, it has started working on Agent2D base on July 2012, transferring the algorithms and ideas of previous base to the new one.

There are lots of defects in the defense part of Agent2D base and there is no specific skills in it, other than a simple positioning. Therefore the team is focused on improving the defense part which its main skills are block and mark. In first section, we will explain the block skill and its performance, and in the next part the algorithm of mark and also the ability of making an appropriate decision between these two will be described.

2 Block

There are two ways for the player to reach to the opponent in order to obtain the possession of the ball he have. The first and the simplest way is moving directly toward the opponent; but this method can often make the player to be left by the opponent and can cause an attacking situation for the opposing team. So we should use the second way named "block". Block itself, consists of two parts: determining the blockers and deciding how to block.

2.1 Determining the blockers

According to the view of the player and also factors such as distance from the opponent who owns the ball, position of other teammates and the area in which the attacker is, every agent can understand whether they are blocker or not. Sometimes in dangerous situations, (e.g. when the attacker is in penalty area) more than one blocker is needed. Due to the coefficient of attacker's risk, up to 4 blockers can be used and in this issue, every player can decide if blocking is needed according to the position of him and his other teammates.

2.2 The way of blocking

First a hypothetical dribble route will be created for the opponent. Then the blocker chooses a location for blocking due to the position of ball, opponents and other teammates, and starts moving toward it. After that, he will focus on possessing the ball which consists of two parts itself: standing on the start point and waiting, or directly attacking the opponent.

2.2.1 Waiting on the start point

This method is used whenever attacking for possessing the ball is dangerous. According to the direction and the length of opponent's velocity vector, it will be determined if there is the probability of being left and dribbled. In this situations we will wait until the attacker itself approaches us or to decide for something else.

2.2.2 Direct attack

When moving toward the opponent causes no danger, and it's likely to catch the ball, we'll move toward him with the purpose of tackling.

Fig.1 shows a blocking situation. Agent number 4 wants to block player number 10 of the opposing team. After creating a virtual route for attacker, he goes to the point which is likely to be the opponent's target, instead of moving toward him in order to prevent him dribbling to our goal.



Fig. 1. Block

3 Mark

For achieving an efficient marking system, a good algorithm is needed that should have some features. The first feature is the agent's ability to determine and map the position of the opponent who is going to be marked. The second factor is that every player should know who they are going to mark.

There were several problems in initial methods used for marking system; For example there were times that several players attempted to mark the same opponent simultaneously and because of this, the algorithm could most often cause problems. This problem was solved with a simple and practical algorithm so that players can now be divided properly to do the marking in the time required.

The ability of reaching the opponent and marking him in the shortest time and through the best route, and also knowing that which player is going to mark which opponent according to his position, needs a comprehensive view and information from the surroundings. There are two ways for obtaining these data: interference of the coach, and the other one, receiving the data from server by the agents themselves.

3.1 Getting help from the coach

During the match, the coach can specify each agent's roles in marking, having the data of previous cycles, especially the positions of the opposing team's players due to his ability of receiving the game's information from server without noise and having the view of the whole field, and also the opponents' movements and the areas they have frequently been in. After processing these information, he sends the outcome to his team members as a command in "Freeform Message" format.

3.2 Defenders' individual decision making

In this method (that we used) every player can choose the opponent and mark him based on the data received from the server and also based on the evaluation of its surroundings. This method can cause some mistakes because of the players' limitations like his position in the field, his view, etc, but we've tried to reduce these mistakes, making changes in previous algorithms and repeatedly testing, and we've succeeded a lot in it.

One of the things that can make problems for the players of any team is that sometimes agents aren't able to distinguish between the time they should block and the time they have to mark. As an example, in a time, blocking the opponent is needed instead of marking, but this procedure comes to a failure because of inappropriate explanations of players' roles or using defective algorithms. Therefore, having known all these issues and testing repeatedly, our team is now using a proper algorithm to dramatically reduce the percentage of mistakes.

As it can be seen in figure 2, defender number 5 is marking player number 9 of opposing team so that the attacker number 11 won't be able to pass him the ball.

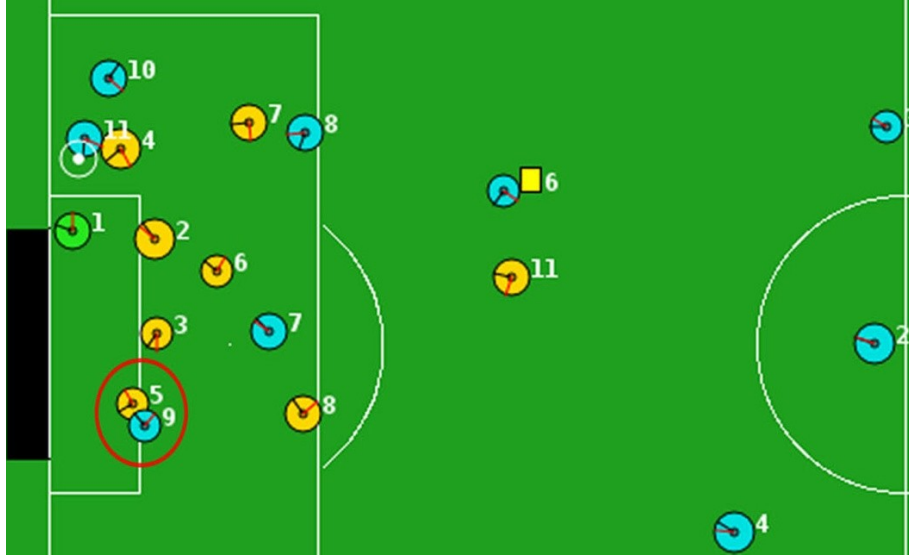


Fig. 2. Mark

4 Conclusion and future work

This competition is a small step for our progression in this science. In this paper we've mentioned the changes and improvements in previous algorithms. Our main goal is raising the scientific literacy, getting more attention of people to computer science and robotics. We are trying to change our mark system into the condition in which the coach is involved in marking for the next stage. We hope to see the progress of everyone in this science.

References

1. R. de Boer and J. Kok. The Incremental Development of a Synthetic Multi-Agent System: The UvA Trilearn 2001 Robotic Soccer Simulation Team. Master's thesis, University of Amsterdam, The Netherlands, Feb. 2002.
2. P. Kaviani, S. Saharkhiz: ESKILAS 2011 Team Description at RoboCup 2011 Istanbul, Turkey.

3. M. Vosoughpour, S. D. Arznaghi, N. Nozari, A. Tavafi, S. Sheikholeslami: LEAKIN'DROPS 2008 Team Description at RoboCup 2008 Sozhou, China.
4. A. Tavafi, N. Nozari, R. Vatani, M. Rad Yousefi, S. Rahmatinia, P. Piredeyr: MarliK 2011 Team Description at RoboCup 2011 Istanbul, Turkey.