RoboToos2 2009 2D Soccer Simulation Team Description

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Abstract. This paper explains the Robotoos2 system of soccer simulation team. Our main concentration was on the algorithms of Pass selection and Goalie used in our team. The environment that agents are loaded in (soccer simulation server), is a complex, dynamic platform which gives intelligent agents the ability to communicate with server and get information from. [1][2]

1 Introduction

Robotoos2 soccer simulation team began its activities by researching about server and intelligent agents using UVA trilearn team description. Our team is based on UVA trilearn base 2003 release and we tried to optimize modules and add some useful functions to the base. [2]

2 pass selection

One of the necessary actions of an agent is the ability to find a best pass to a teammate agent. We have two kinds of passes, direct pass and through pass. In order to find the best agent to pass the ball to, we decided to use ranking priority algorithm. Each pass has different elements that help us rank each pass. The elements we chose are distance to goal, opponent can intercept, distance to target agent, information novelty and number of opponents around target agent. To select the best pass, we set a list of passes (with a length twice as much as the number of teammates) that includes direct and through passes for each player. With the formula below we computed the rank for each pass:

$$\text{Pass rank} = \frac{\text{information novelty}}{\text{Distance to goal} \cdot \text{Density} \cdot \text{Dist 2me}}$$

The pass rank for interceptable passes will be considered zero.

Notice: For through passes we get the position of target from a function which calculates the point.

Now the best pass is the highest rank in our list. If all of passes ranked zero the pass action is not appropriate for the agent.

3 Goalie

The main points in a football match are attacking and defending. A big amount of responsibility of defending is on Goalie. So we tried to concentrate on this part of our team. The position that goalie stands is related to opponents' and ball's position. Defend goal line function computes this position and make command of moving to that point. But in some situations such as one on one goalie is forced to leave the goal and move towards the ball to shorten the shooting angle.

Another point is the goalie's neck and view which is important for getting refresh information. In soccer simulation server the catchable area is 2.0 meters and goalie should choose the best way to catch the ball. After catching the ball, goalie is able to do at most 2 teleports. This teleports helps us to let opponents away and give us the advantage to attack rapidly. Choosing the first pass need a great exactitude not to be intercepted by opponents. In the situation that all of our teammates are being marked, we choose to shoot the ball outside the field. Because experimental results show that loosing ball near by the penalty area, could make a magnificent situation for opponent.

4 Conclusions and Future works

This was a brief explanation of the strategy of our team analyzed with many games. But we are looking forward to increase our knowledge and improve our system of playing. As a future plan, we are going to initialize communication between agents in order to increase the novelty of our information and make intelligent cooperation between them. Furthermore we need an algorithm to analyze the opponent system of playing but it takes hard working and a wide range of information about learning algorithms. So we decided to put it in our future works. [3]

References

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[3] M. Riedmiller and Artur Merke, " Using machine learning techniques in complex multiagent domains," In I. Stamatescu, W. Menzel, M. Richter and U. Ratsch, editors, Perspectives on Adaptivity and Learning, LNCS, Springer, 2002.