MT2017 Robocup Simulation 2D Team Description

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Abstract. This paper mainly describes the work which MT has made after the 2016 RoboCup World Cup. On the basis of MT2016 we mainly improve the movement point selection and indirect Pass, call in passing, and some code optimization work.

1. Introduction

MT was founded in 2012, by the Hefei University Department of Computer Science and Technology Innovation Laboratory of a group of robot-loving football [RoboCup] students. During the five years, we take an active part in annual competitions of RoboCup. And there are some achievements, in 2012 and 2013 we won the second prize, in 2014 we won the grand prize, and in 2015 we got ninth because of the errors of model parameter. Besides, in 2016, we got the sixth prize in RoboCup China Open, the third prize in the Technical Challenge，the Champion in Portuguese Open, third in Iranian Open, and seventh in the 2016 RoboCup2D World Cup. We hope to take a further step in the 2017 race and to explore deeper levels of progress with the people who are interested in RoboCup.

2.The underlying of the MT2017

We use agent2d-3.1.1 as the underlying code,the download address is : http://en.sourceforge.jp/projects/rctools/. We use librcsc as the underlying database.Based on the basic underlying,we rebuild the classes function doMove() of each role as bhv_center_back_move.cpp and so on.In addition,we reference Net.cpp/h from WE-BASE.We reference bhv_penalty_kick.cpp/h , bhv_MarlikBlock.cpp/h , bhv_goalie_basic_move.cpp/h from marlik2012 open source and we reference bhv_basic_move to invoke marlik_block.

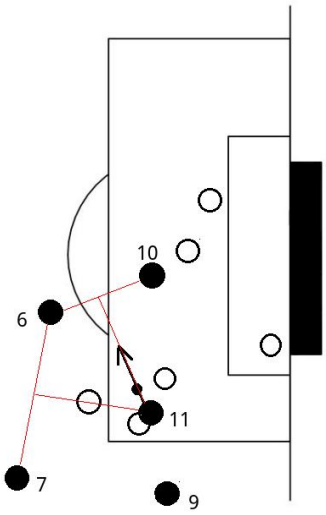
3.The Main Strategies of MT2017

In MT2016, we establish a set of independent attack and defense model, optimizing the tackling ball model, improving the fault tolerance rate, having a precise action assessment and the division of more detailed areas. In MT2017, we make some improvements and use a number of new technologies.

3.1 Choice of Running Points

We use a large amount of data to train different points and different situations on the field so that the CNN can determine the best running position precisely. Then the players in the stadium can distribute more closely and have a significant improvement in the attack and defense.

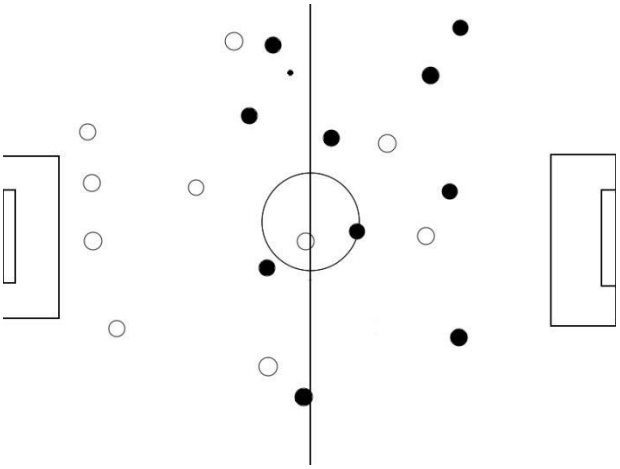
MT2017 is mainly made up of center forward player numbered 11, side forward player numbered 9,10, and defensive half player numbered 7, besides, number 8 is in the BA_ShootChance area to run point and find the exit opportunity. We will modify the running position's coordinates according to the player's position, as well as the distance between the offensive players and the other players. At the same time, it will call the scoring mechanism in the evaluation device for the corresponding shot of the assessment.



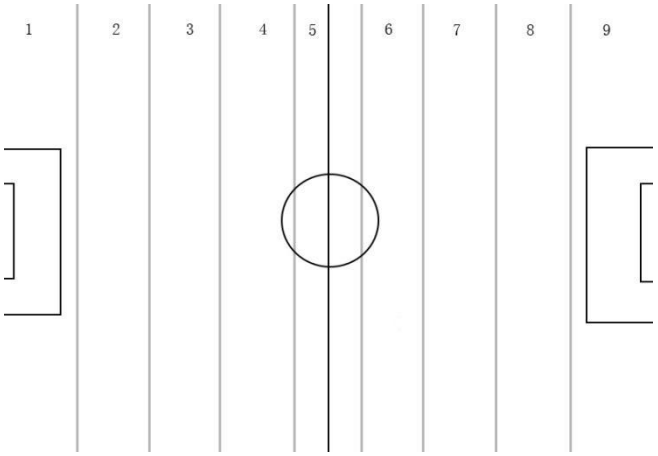
3.2 Indirect Pass

Indirect passing through flexible passing replaces frequent ball which can increase overall flexibility while saving energy. Indirect dribbling must rely on the right formation, in order to get the ball to the ideal position， the formation must be able to ensure that the ball in most of the time can be flexible to choose the direction of passing. Common formations are 244 or 424. As shown in Figure 3, indirect dribbling

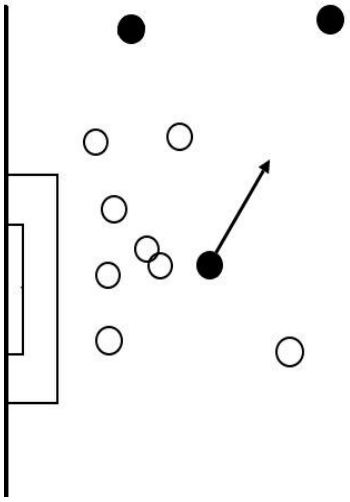
depends on the 424 formation.



Indirect dribbling strategies in different areas of the stadium are to start a different strategy. As shown in Fig. 4, the course is divided into several zones. When the ball is in the area 2 to 8, it will tend to use indirect dribbling. When the ball is in zone 1 or 9, direct dribbling or other means is used.



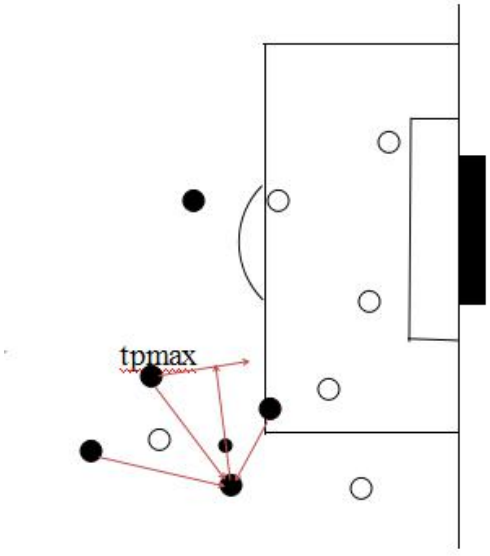
When our players enter into the other half and ready to shoot, we will face the situation which many opposing players will come back near the goal of intercepting our shot, this time, it is difficult for us to score in this adverse circumstances. Thus we can dribble through the indirect choice of the right position, passing the ball to the area where there are few other players and it is easier for us to coordinate. And then we can find a more appropriate time to shoot. In figure 3, when the shot was intended to be blocked, in order to avoid losing the ball, it will return the ball to the nearby players.



3.3 Passing Improvement

Before the game, we used the field evaluator to divide the area of the golf course. Combining the data collected by the training method using CNN, we evaluated the different tactics corresponding to each field and got the corresponding evaluation value. (tp value). But the true value of tp is influenced by many factors.

In the process of the above coordination, CNN will analyse the player's delivering data, and assess each player's tp value score on the pitch. The ball handler will lead teammates who receive the maximum tp value of the signal to the tactical position and guide them to reach the corresponding position in the training. At this time, CNN's analysis of the tp value reaches to the highest point， ball handler will execute the command passing.



3.4 Basic Motion Optimization

For the problems of MT2016, we have done some optimization and repair on the basis.

(1) Hold the Ball

When the player holds the ball in the court, and is surrounded by some players, the player will obtain a set of points that satisfy the condition according to the algorithm and get the optimal value of the next passing point. When the point focuses on one point and the player's own position, the player will make the point as the best point and keep in place. If the two players do not take the initiative to break this situation, the players will always own position as the best point, so that the player will always hold the ball standing still. This problem is not common, but it has been avoided through our continuous optimization.

(2) Shot Improvement

In the MT2016, when the ball handler is in the attacking area at a certain point, the evaluation of the shot points is higher. While the ball does not shoot, continuing to pass. The tree search depth in the action chain is multi-layered, but the player will search for a new optimal tree and execute it every cycle, and forget the entire set of actions, resulting in the entirety can not be converged. We find this problem and change the evaluation chain to local optimization so that there is no case where the player could score without scoring.

4. Summary and Outlook

MT team has been stronger in the construction team within 5 years. However, there are still many flaws need to make up for it, and many advanced technologies that we should learn and use. We will continue to build a strong team, focusing on it and actively participate in RoboCup-related competitions, we will continue to strengthen exchanges and learning with other teams and cooperation.

Reference Material：

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