

TJNU2011 2D Soccer Simulation

Team Description Paper

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Abstract: In TJNU 2011, we develop our simulator team based on TJNU 2010. In this paper, we introduce several improvements, such as the changes on role goalies and other strategies.

1 Introduction

The TJNU team, attaches to the Tianjin Normal University, was set up in 2008. It is established by the lab center of the College of Computer and Information Engineering in Tianjin Normal University, which is based on the years of research of “Affective Computing and Intelligent Interaction Lab” on Robotics-related fields, which is formed for robot soccer competition.

The TJNU team is mainly made up by the simulation 2D group, medium-sized group and @Home group. We have been participating in annual competition of RoboCup since 2008, and have scored excellent achievements in the past two years. We have made our efforts to optimize the strategy of multi-agent collaboration and the agent2d basic actions. Meanwhile we give consideration to the offensive and defensive parts, pay attention to the teamwork to win the game. The main improvement includes:

- (1) The goalies view mode and move mode ;
- (2) The role decision based on the refinement of field;
- (3) The strategy of side attack based on the special game model.
- (4) The defense system of kick_in, corner_kick game mode

In addition, we optimize the team as a whole and train the formation by optimization algorithm. In the second part of this article, it depicts the team's global construct, the third part is the team's main improvement, and the fourth part gives a summary and brings forward the improved direction in the future.

2 Team structure

Our team is built on the base of agent2d and librcsc

agent2d-3.1.0, <http://sourceforge.jp/projects/rctools/releases/51943>

librcsc-4.1.0, <http://sourceforge.jp/projects/rctools/releases/51941>

The whole structure of our team is as Figure 1:

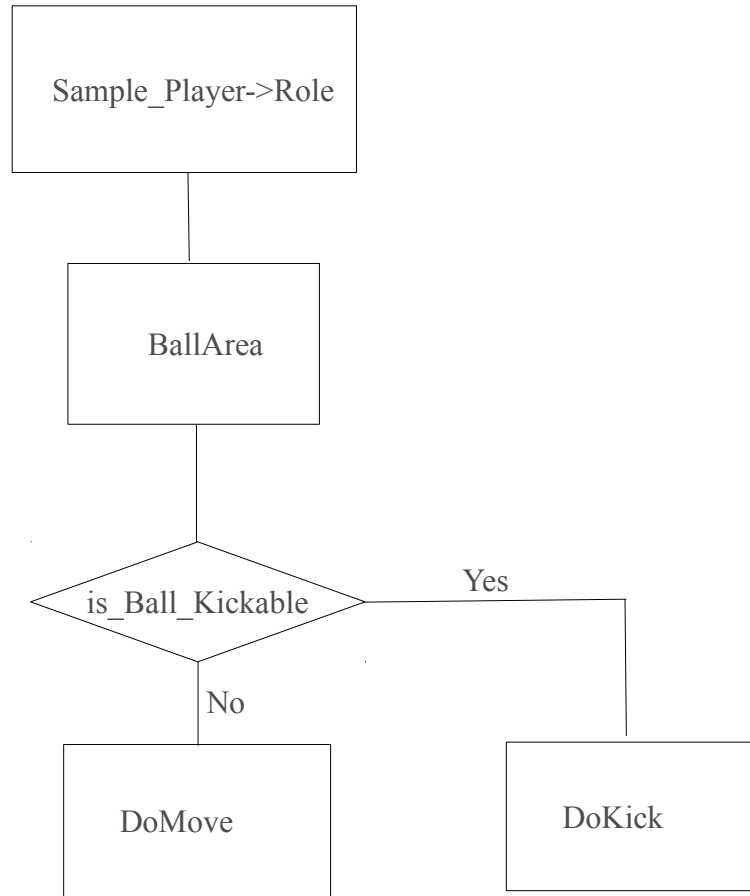


Fig.1 Team Structure

At the different regions of the field, different role uses different strategy, in this way, it is possible to make full use of formation and make team work well. Players are divided into several roles, and roles get two basic strategy: DoKick and DoMove. This works well and strengthens team in the region of offense and defense. When a player is not ball_kickable—it's vital for player to go to a reasonable position and scan the fields to get informations about the game. When a player is ball_kickable, player needs to action with ball—dribble, pass, dash. In all, players make decisions according to ball's position. We refined the fields to achieve team's high level strategy especially for side_attack.

Strategies are added along with the different game modes in the behavior layer, which makes it easy to have a thunder attack. On the base of actions, we just keep fix the action of dribble, shoot and pass to provide what high level decision needs.

3 Improvements

3.1 Improved penalty_kick game mode strategy

In the Robocup China 2010, we lost a game because we didn't implement the penalty_kick very well. This year we use a better strategy for penalty_kick player and goalie. For player kicking the ball, player may choose to shoot the ball directly if opp's goalie stays in the penalty, or just kick and dash to field's left or right side to get a better shoot angle, we also experiment this strategy: player dribble back to opposite side to attract opposite side's goalie for running away from penalty, then dribble forwards the goal and shoot. For goalie, we use the opposite strategy, and the basic rule is that goalie

will try to dash to the penalty_kick point as soon as possible,the far away a goalie run,the smaller angle for the opposite kicker to shoot .See figure-2(Goalie is waiting at the penalty)We use offline coach to test the goalie's and kicker's performance.

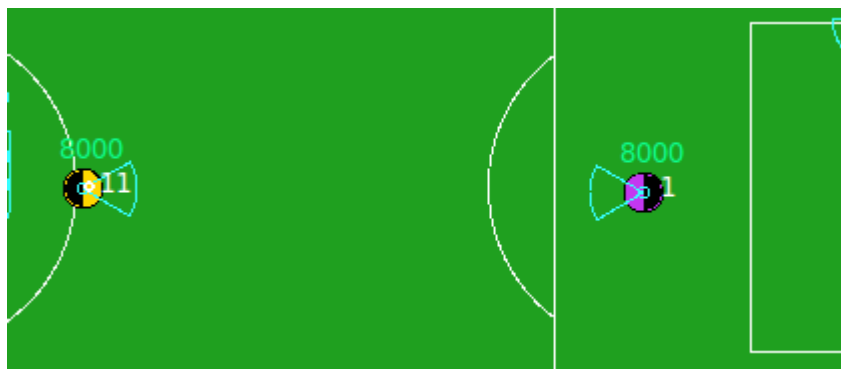


Figure 2 Penalty_kick mode

3.2 Improving side attack ,goalie's view mode and move strategy

In TJNU2010,role side_attack did a great job in scoring, but on the cross_pass ,side_attack met a big problem when playing against teams who got a good defense system,so TJNU2011 just improved the pass action to balance pass and attack action.

Goalie in TJNU2010 had a lot of bugs , for example,at the most of game time,goalie's bodydir just use two angle(-90°,90°) so that goalie couldn't attain full information.so we changed the goalie's default body_angle. Figure-3.Meanwhile,goalie's action area was limited to penalty area ,it's a solid noaggressive and useful strategy .By watching videos and replays,we decide to put goalie more aggressive and give goalie a larger action area.

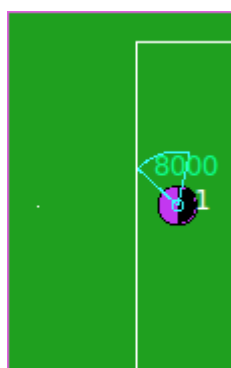
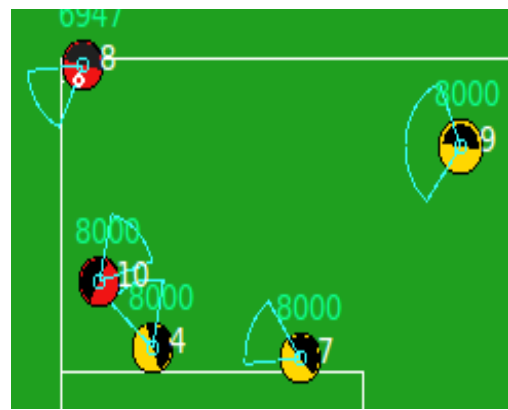


Figure 3 Goalie's body facing the center

3.3 Improving the corner_kick,kick_in game mode

In Agent2d,player number 7 and number 8 take the responsibility to execute corner_kick,this may let player get time to recover stamina,but it takes a lot of time to run to the corner_kick point and pass the ball meanwhile the opposite side has established the defense. Figure-4,Figure-5.To gain flexibility,we make a circle that any player inside the circle can finish the corner_kick,if player's number is 7 or 8,the player is in high priority to finish the corner_kick.



In Kick_in ,Corner_kick game mode ,we want to build our defense system fast using tight marking to give no space for other side to pass the ball.This defened strategy has been tested on several team such as WrightEagle and AmoyNQ.

4 Conclusions

In general, we improved our 2D team based on agent2D and TJNU2010, fixed several bugs in strategy and code. In the future,team's main goal is stay focus on high level decision.optimize team's strategy.

- [1] 中国科大 仿真机器人足球:设计与实现 , 2003
- [2] Ehsan Foroughi and Fredrik Heintz et.al, User Manual - RoboCup Soccer Server for Soccer Server Version 7.06 and later
- [3] 秋山英久 RoboCup2DGuideBook-1.0,2010