RoboSoccer Defense Strategy - Viking

Tarang Patel
201101110@daiict.ac.in

Shantanu Jain
201101073@daiict.ac.in

ABSTRACT

In this paper, we consider the defensive strategy in RoboSoccer is of crucial importance. We have used two different types of strategy on the basis of the current performance of our team. If our team is losing against the opponent team, we will use rigorous defense strategy called Triangle net strategy. If our team is playing better than the opponent team, we will use line fallback movement strategy.

INTRODUCTION

Defensive playing strategies comprise two core sub-tasks: On the one hand, there is the task of positioning players in free space so as to intercept opponent passes or to cover or mark opponent players. Also, there must be a player that attacks the opponent ball leading player, interferes him, hassles him, and aims at bringing the ball at his control. We have developed our defensive strategy based on the performance of our team against the opponent team. If the goal difference between our team and the opponent team is less than 1 (i.e our team is not losing), we will use line-Fallback movement strategy.

In Line-Fallback movement strategy, if the ball is with opponent's player, depending on the ball's position and the opponent's players position, some 'n' numbers of our team players will form a wall in front of the relevant opponent's team players and will try to block them. We have discussed this strategy in detail in other section of the paper

In Triangle net strategy, our team players will form triangle near the goal post area and will try to block the opponents players. The player who is closest to the opponent's team player (who has the ball) will try to mark and intercept that opponent's team player. The remaining players of our team will man-mark the opponent's team player on the basis of position of ball and players. This is the brief idea about the Triangle net strategy. We have discussed it in detail in the further sections.

LINE FALLBACK MOVEMENT STRATEGY

Our team players will follow this strategy when our team is winning (or rather performing satisfactory). This strategy will only be invoked when the ball is with opponent's team agent. Here, our team agents will form a line in front of the opponet's team players and will try to block and clear the ball from the opponent's team players.

The formation of line is based on the positon of the ball and the position of the opponent's team players as well as our team players.

Case 1: Here, the ball is with opponent team player and its X-coordinate is in between 20 <= X <= 50. In this case, the player (of our team) who is closest to the ball will run towards to the opponent's team player with the ball and will try to clear the ball. During this time, other 2 closest players will form a line with their x-position as the position of ball - 2 (i.e X - 2 where X is the position of the ball.) and the distance betweenm their y-coordinates will be 15. Hence, they will form a line of 15 distance in front of the ball and will try to intercept the ball and clear the ball.

Case 2: In this case, ball is with opponent's team player and the X-coordinate of the ball is in the range 0 <= X <= 29.

As similar to Case-1, the closest player to the ball (of our team) will man-mark the opponent's team player with the ball. Also, 2 opponent's team players who are closest to the ball will be man-marked by our 2 team players who are closest to the respected opponent's team players. By selecting the closest team players to man-mark the opponent team players, we have a good chance to intercept and clear the ball during the passes made my the opponent team.

During this time, 3 other closest players to the ball (of our team) will form a line in front of the ball with the X - coordinate as 'X-coordinate of ball - 2'. (i.e X - 2 where X is the X-coordinate of ball). The distance between the y-coordinates of these 3-players will be 10 each. Hence, in a span of 30 distance, these 3 players will form a line and will try to intercept the ball and clear the ball.

Case 3: Here, the ball is in our team's half area. The X-coordinate of the ball is in the range of (-20 <= X <= -1).

Here, as the opponent team is in attacking mode, we should rigorously defense them. Hence, in this case our team players will form a line of 6 closest players with equal distance between adjacent players. Other 3 players will man-mark the 3 closest opponent's team players with the ball. Hence, in this case almost all the players will play defensively and will try to clear the ball.

Case 4: Here, the ball is in our team's half area. The X-coordinate of the ball is in the range of (-40 <= X <= -19).

Here, the situation is almost similar to the above case. Here, 7 players will do fall-back (if needed) and will form a wall against the opponents team players while the remaining team players of our team will man-mark the concerned team players.

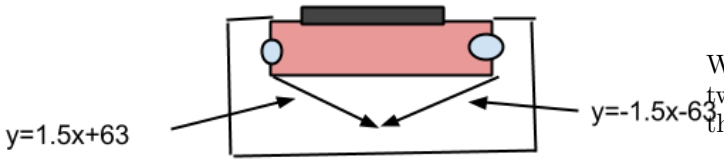
Case 5: The ball is in the goal post area (i.e -52 <= X <= -41). Hence, all the team players will be inside the goal post area and will form a line in front of the goal post. They will be arranged according to their minimum distance with suitable position near the goal post. As soon as the ball is near the intercept area of our team players, the agent will clear the ball by shooting towards the opposite direction.

TRIANGLE NET STRATEGY

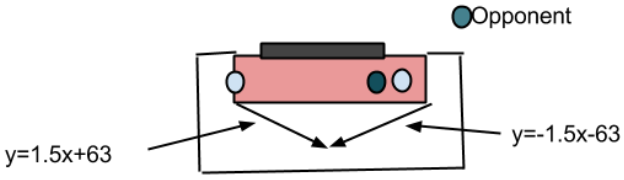
We will use this strategy when our team is losing or the goal difference between our team and opponent team is <= -1.

This strategy is based on blocking opponents movement away from the goal, so in case the opponent takes a shot at the goal the goalie will have enough time to save the ball from going to goal.

In this strategy when the team fall back they form a triangle with 6 players. 3 players on each side of the triangle at x=-46,-44,-42. 2 Players at the below part of the left and right side (blue colored part) and 1 player will be man marking the opponent in the part below the triangle and the last man will be chasing the ball.



Create 2 arrays one on the left side and the other on the right side of size 3. Position of index in array will decide the position on the side of the triangle. So when the team does fallback the would be filling themselves in the array such as if the player comes first is goes at the base of the array and so on. if the left array is full then player goes in the second array. Players will fill the array simultaneous depending whether left position is closer or right. Out of the remaining players, two players each of them will stand in the circle as denoted in the above image. When opponent player enters the red area as marked in the image the players in the circle will try to mark the player and intercept the pass he is going to receive.Like if the ball is on the right side then the right player will stand on the right side of the opponent.



When the threshold goes more down then the remaining two players will come into defense and will stand along the two side players and block opponents movement.

ALGORITHM OF TRIANGLE NET STRATEGY

```
if opponentHasBall == TRUE and Kickable ==
FALSE then
    if TacklePlayerWithBall() == TRUE then
        return
    end
    if Intercept() == TRUE then
        return
    end
    if better than threshold then
        Two strikers chase ball;
        Remaining Fall to Penalty Box;
        Fill 2 arrays and cover the penalty box in Form
        of Triangle;
        And Those Left placed on the left and right side
        of the goalkeeper;
    end
end
if BallWithUs OR BallOutsideTheField then
    Empty the 2 Arrays;
end
```