Let's Play Soccer

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1 Introduction

In this Assignment, we have implemented an assisted Soccer Goal scoring algorithm with Pygame[1]. Our implementation involves calculation heuristic costs to score a goal with the minimum cost. We have implemented the program taking care of all the conditions provided in the question, namely,

1. Team BLUE is performing an assisted goal shootout but from the Center Circle position.
2. One player from each team will be staying in the Team RED goal box and will not leave it.
3. Apart from the center kicker from team BLUE players, the rest of the players will remain in the upper part as shown (RED Team area).
4. The agent needs to decide the shortest goal path, this will be your heuristic cost(has to be assisted goal).
5. With every run, the position of players will be changed, which has to be randomized and should satisfy the previous condition.

The shooter at the centre performs as assisted goal based on a heuristic for determining the shortest path. We have chosen the the minimum distance between two players from the same team as the heuristic cost. More shall be discussed on this later.

[1]For more details on Pygame library, please visit :https://www.pygame.org/wiki/GettingStarted

2 Idea

We have used the Python game library called Pygame for creating our Soccer playing area along with the Players fulfilling the conditions listed in the previous section.

Our approach to the problem is to help our striker(the BLUE player at the center of the field)to score a goal with the minimum cost. Our cost function is the distance between the players calculated by the distance between their co-ordinate position.

$$distance = \sqrt{(x_1 - x_2)^2 + (y_1 - y_1)^2}$$

We try to minimize this distance as our agent tries to perform an assisted goal. For this assisted goal to happen, we need to move the ball- the BLACK circle between different players from the same as well as different teams. As there are four players - two from each team in the RED Team area, we will be transferring the the ball to whichever player is nearest to the ball.

We now have two players - one from each team inside the RED team goal box. Now we, will be transferring our goal to only a BLUE team member since a BLUE player can score goal inside the RED Team goal box. By following this approach, we have found the goal is scored with minimum cost. However, since there is no learning involved, we haven't been able to make our agent perform perfectly. Our assumptions are stated below -

1. The striker from BLUE team, also our agent passes the ball to the nearest player - can be from both teams.

2. Once the ball is in the RED team area, it should only be passed to the BLUE team member inside the RED goal box.

3 Implementation

We have implemented the code and it's available the the GitHub repository: https://github.com/saptarshidatta96/SoccerPyGame

A video file has been provided to demonstrate the assisted goal by our Agent. The top three lowest cost to score the goal per each iteration is also included. Here, each iteration starts by clicking the left button of the mouse.