AbouAliSina
Soccer 2D Simulation Team
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Abstract. This paper describes AbouAliSina team's features for example Pass, PhysicalMark, Block, etc. Our main goal is generating suitable methods to solving the problems in defense and offense of a 2D team.

1 Introdution

AbouAliSina team has started since 2009, with the aim of computer programing improvement of its members . We worked on UVA-Trilrean base and Agent2D base then we changed base to Mersad base because of its perfect structure.[1]

2 Defense system

The team's defense system is a linear positioning of two lines. A line of 5 main defenders and a line of two midfielders that also try to help the team's offense. There are two main duties for a defender. The first one is blocking the dribbling opponent players. And the other one is marking the dangerous opponent players.

2.1 Block

Through Block skill, we are focusing on gaining posessoion of the ball. For accomplishing this end, our players should first decide who is the fastest teammate, so that the fastest teammate goes for a block, and the rest should hold the line. The fastest player should then find the fastest opponent in order to execute the block on (needless to mention that if the ball is completely in posession of a player, he is the fastest). Going to a suitable point is rely on the average point of ball position and the fastest opponent position. It devides in two phases.In first phase we try to find the best root point by knowing that where the mentioned average point is then draw a line between root point and average point.If the fastest teammate player's distance to line is less than 1 meter second phase actives else the teammte player goes slower to the suitable point and it stops the opponent by movement.

1. Phase 1:
   The teammate player which want to block find its distance to the mentioned average point then seprates a distance as length as it on the root-average point line. Then it calculates the suitable positioning point by seprating the distance from the average point and goes there.
2. Phase 2:
   The distance is short and it is dangrous to dash slow so the teammate player starts to go faster than before, in this function the player should know the opponent's position (which) is dribbling.
   Note: It should been said that,in these two function the speed of going to the suitable point is the most speed that the teammate player can go with it.[2]

2.2 Mark

1. Marking:
   For executing this action it is enough for an opponent to be in the distinguished area which we define for each player. As soon as the opponent(locally called "O") enters the area where our player(locally called player "A") is in charges of, "A" begins to chase the "O" down, positioning around him in a such a way that eliminates the posibility of good passes for "O". In order to reach such an end, "A" will position on an imaginary line which connects "O" with the ball. The position should lean toward "O".
2. PhysicalMarking:
   This part is activated when the ball is inside our danger area. Each of defense players has a small rectangle to himself, where he is in charge of keeping opponents inside under pressure, not to let them receieve a pass which causes danger on the goal. The main player who should go under pressure in each area is determined on two factors, Distance of the opponent from the defender, and distance of the opponent from the wicket.

3 Offense system

The agents are capable of executing different offensive actions such as Shoot, Pass, Dribble and Positioning for receiving passes. A valuation system(which will be described later in this paper) will determine which of these actions will take place. But first we shall describe a bit about the skills mentioned above.

3.1 Shoot

The main goal of each team in soccer is scoring, some thing that is (under normal circumstances) only reachable by shooting. All of the passing, dribbling, and penetrating through opponent defense line is to shoot, in order to score a goal. To make a good and safe shot, we should make use of our intercept calculate system. There will be different points on the goal line, some of which are safe to

take a shot. Amongst them we should choose based on two main factors. Distance which the ball should travel, and the distance with the bars. The least the ball should travel, the better the shot is. The distance from the bar determines the safety, where as the ball should not be near the bars, but should be to the sides.

3.2 Pass

There are various types of passes which are used by agents. Namely Direct, Course and Leading. Each of which is used under certain circumstances.

1. Direct Pass
   Certainity is the main factor in this type of pass. As a result, the pass is always aimed toward teammates face. Since this doesn't envolve "running receiver", this can not be the main pass which is used while penetrating through opponents defense. But for moving the ball for short distances (e.g. when the offense is stuck in front of the opponent defense line, looking for a crack in defense). In order to select among the possible passes, we are using a weighting valuation system.
   (a) Getting nearer to the goal should be one of the factors affecting the pass. Players should try to pass the ball in such a way so that they can get near to opponent's goal.

   (b) As for every area in the field, team strategy might prefer a typical speed. For instance, when playing with the ball behind opponents defense line, passes should be quick. So, the speed should get near to a recommended rate in every area.

2. Course
   To advance through the opponent defense line, it is needed to have some long shots that pass through the defense line. For this goal the player simulates some kicks to points in front of each offense player. The best pass is which the ball passes the defense line, and also it gets nearer to goal. This part is now implementing in team and will be available for upcoming competitions.

3. Leading
   When the player tries to directly pass the ball to a teammate player, according to the situation of the match it would be better to have a pass that also makes the ball approaching the opponent's goal. So the player simulates passes with different velocities in all directions around him. The best pass is which the ball gets nearer to opponent's goal and also be far enough from nearest opponent players.

3.3 SRP Dribble

As need of faster dribble arises, the attention of our team came down to our "Intercept Calculate" module. If we can put all the players in such a module,

and simulate some shots which shall lead us towards the target, and find one of the shots, which can hold the ball still in the agent's posession (but outside his kickable area). Through such a dribble, our players can dribble faster, and thus, more efficient. For deciding which shot to take, our agents should compare between their possible shots based on the distance the ball goes.

3.4 Clear

This skill will be used when none of the mentioned actions has value.It is usually used in defensive actions especially when the opponents are attacking and we are in dangerous situation but sometimes it is useful in offense too.We also use the calculated angle in tackling skill.

4 Future Strategies

Offense should advance toward opponent's goal in order to make possibilities for shoots. Advancing is possible through passing and dribbling. Having discussed "Pass", we should now turn our attention towards "Dribble". Dribble , aside from being a means of advancing, can be used as a "Keeper" strategy, waiting for an opportunity for a "Course" pass. So, our agents should have a dribble skill such that they can use it in a fast pace, for advancing, or in a slow pace, as a way to wait for better opportunities. A good dribble should consist of two main parts. Determining the target, and going to the target. The earlier, might be as critical as the later. As a result, our team should have an algorithm on how to determine the dribble target. Also, an algorithm on how to take the ball around the field along with the player himself.

References

1. Mersad base http://mersad.allamehelli.ir.
2. Amini Zanjani M. Saharkhiz S. Bakhtiari M. Montazeri M. Vosoughpour M. Kaviani P. Eskilas soccer 2d simulation team description paper. RoboCup 2010 Singapore.