

Nemesis 2D – Team Description 2007

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Abstract. Considering the advantages of linear defense, most of the teams have started to make use of this defense system since many years ago. Therefore, in Nemesis team, besides devising a method for penetrating within such a defense model, they make use of linear defense in a more stable fashion. Almost all of the skills of the fielders are designed in this regard. In this paper, we have provided some summarized explanations in case of the structure of Nemesis and the aforesaid methods and skills.

1 Introduction

Nemesis Team has commenced its activities since 2004. This team is implemented, designed, and developed by Mr. Mehrab Norouzitallab, a student of Hannan High School.

At the present time, this team makes of the codes of Mersad Team as the base code which are completed by making use of other codes of the Tsinghuaeolus and UVA_trilearn teams.

In Figure 1, the high-level structure of the team is presented that is described in following paragraphs.

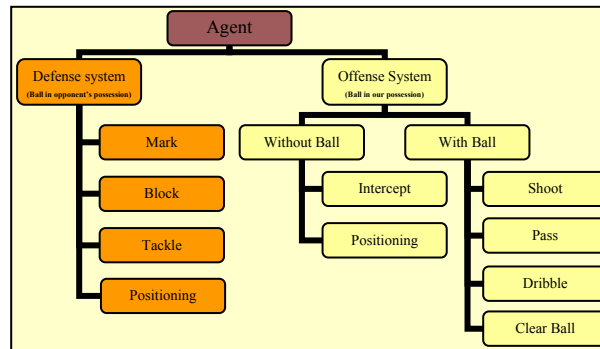


Figure 1. High Level layer of nemesis team

2 Pass

Pass is one of the most crucial skills applied in this team that holds the duty of guiding the strikes, exiting the ball from the defense domains and reaching it to the penalty area of the rivals land and keeping the ball.

For giving a pass to the teammate player, three methods of passing the ball: Direct Pass, Leading Pass, and Through Pass have been considered.

Direct Pass is a kind of passing the ball in such way that the teammate player receives the ball with the lowest dash.

Leading Pass: is a kind of passing in which the teammate player can receive the ball with a little forward move.

Through Pass is a kind of passing in which the ball passes through the opponent players and reaches to the teammate player.

This kind of pass method is for passing through the linear defense. After analyzing the defense method of the opponent team, and achieving the space occupied by such a defense and after calculating the most open angle between the opponent defenders in each one of the sections, the parameters needed for kicking the ball in such a way that it passes through the opponent players and reaches to the teammate player are determined.

When the player thinks that the ball will be caught by the teammate player before the player of the opponent team, it is the most suitable time for passing the ball. From among all the passes of balls to the teammate players, the pass will be selected that has the most proper situation in comparison to other passes.

Only when a pass is worthy to do that catching the ball by teammate player is guaranteed more than other players.

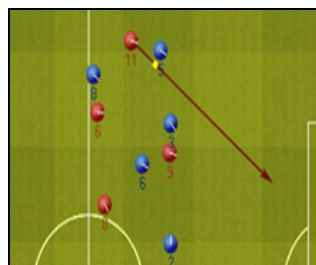
From all the possible passes to teammates by this skill, the pass which has the highest advantage than others will be chosen. This advantage is elected by factors like being secure during the way, having opportunity for shooting near the opponent's gate, vacuumed space during receiving the ball, or possible receiving of the ball in the opponent's defenders' back, and being in the course of the attack and so on. If the position of the passer is better than the point in which the best pass receiver intercepts the pass, the pass outlay will be decreased, otherwise the outlay of pass will be equal to the bonus of the best pass.



Direct Pass



Leading Pass



Through Pass

3 Dribble

Dribble is used for making use of the empty spaces between the opponent players and passing through it, keeping the ball, and moving towards the goal of the opponent team and so on.

There are two types of dribbles in a team: “Fast dribble” and “Dribble with ball” that are complements of each other.

3.1 Fast Dribble

The dribbler striking the ball in such a way that in the next cycle it exits from the Kickable Margin of the dribbler and the dribbler reaches to it after passing behind some cycles and by having some moves before the other players. This kind of dribble is quicker than dribble with ball.

3.2 Dribble With Ball:

Move along with the ball in such a way that not only the ball does not come out of the Kickable Margin of the dribbler but also holds a suitable speed.

The matter of passing through the opponent players is one of the capabilities the accomplishment of which is profitable for the team in some occasions. For enticing the opponent player who has come closer to the ball, the dribbler first carries the ball in the direction of its Kickable Margin toward the opponent player. When the opponent player comes closer to the ball so that it might take the ball in less than four cycles, dribbler changes the location of the ball in the Kickable Margin and by using a fast dribble misleads the opponent player. If in such position the accomplishment of such moves and keep of ball is not possible, the dribble has no exit.



The Levels to mislead the opponent player

4 Offense System

The offense system is a tool for transferring balls to the penalty zone of the opponent team and reaching to a desired advantage, that by adopting the best immediate decision and coordinating between the skills, the team will reach to the considered objective.

Positioning is a kind of skill that composes the principal plan of striking by determining the location of players, because other skills decide according to the place of the players. The positioning skill of a team will have its highest effect while striking by changing the position of the three midfielders and three attackers. For passing through the linear defense of the opponent team for reaching to their penalty zone, all of these players come close to the above line and create the space for passing ball through opponent players. In addition, the possibility of through passes for leaving behind the opponent defenders is provided.

In decision-making section, when the ball is kickable for agent, the Shoot Skill decides in this regard. If the agent is able to reach to the goal of the opponent team, this skill will be performed, otherwise the decision-making will be limited for choosing between pass, dribble, and clear ball choices. If any one of these skills is performed, the ball will be reached by the team player or it will exit the playground. The proper decision will be adopted by giving marks to the above points taking to account the path of the ball up to the ball, the team receiving the ball, or the exit of the ball from the playground and the bonus of the point's position.

The advantage of the point is designed by factors like: to be in the predicted direction of attack, to be in the opponent's back, having a good situation for getting a goal, which each of them have clear effective power. The advantages of these factors are known by the part of the field, where the ball is there. For example, in penalty area of our team, the power of the factor of being forward to be able to make the ball out of this area is increased. The estimated method for striking is chosen in accordance with some factors. For example, in one of these methods the ball is led to the corner of the playground near the penalty zone of the opponent team the mark for which will be determined considering its closeness to the lined part of the playground. When the ball is not kickable for agent and the agent is the fastest teammate player for receiving the ball, the Intercept skill will be performed. Otherwise, the Positioning method will be operated.

5 Defense System

The defense system is used for keeping the ball and avoiding the reception of goals. The positioning skill of a defending team is the most effective skill for the defense system. In such a condition, positioning will act in an intelligent fashion. The core of the defense system is composed of four players that are positioned in one line. These four defenders are supported by three midfielders in the playground. In addition, the position of the strikers for receiving the ball might be limited by the midfielders and defense line. With the step back of the defense line, the distance of these four players in the breadth of the playground, the space between them becomes smaller by and by until when the defense line come to their own penalty zone and avoid from the reception of goals in the penalty with the help of midfielders. Among the matters that cause distance increase is the when that one of the players of the defense line go far from the defense line to perform some other skill such as catching the ball. In a team,

the empty spaces occurred within a defense line is filled by midfielders and with the increase of distance between the two neighbor defenders in the width of the playground, other defenders come together to reduce this distance. Such a defense is designed in such a way that it hardly steps back and members try to catch the ball before the opponent players reach to their penalty zone.

Mark Skill is about to curb the dangerous moves of the opponent players in such a way that the players who are in the empty spaces of the defenders are marked by the midfielders, or they are positioned in the penalty area of the other team and become marked by midfielders or defense line.

Block skill is about to catch the ball that belongs to the opponent player. The tackle skill is known as the complement skill to the above skill in such a way the Agent is come close to the opponent player that holds the ball in agent's kickable margin by Blocking until he grabs the ball of the opponent by tackling. The Block and Tackle skills should be performed very precisely until the opponent player is not able to mislead the Agent. The player who is supposed to perform block action is elected by Neural Network method.

In this system, decision-making is done in an ordinal fashion and the performance Positioning, Mark, and Block-Tackle exits are studied respectively.

6 Future Proceedings

The decision-making system will be completed by adding some factors to it. In addition, the use of neural network for shooting and for testing the other methods such as reinforcement learning and decision tree will be suitable in decision-making process.

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