

OXSU 2010 Team Description

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Abstract. Oxsy team was founded in July 2002 for a graduation project of one student, Sebastian Marian, in the field of Multi-Agent Systems, at the Department of Computer Science of Lucian Blaga University (Sibiu - Romania). After graduation he continued the work on this project and so was born Oxsy team. As we started from scratch, our ideas, concepts and beliefs, was implemented year by year and today, we are happy to see that we choose the right way, in all what we have improved here, as our team was growing in these years, more that we've been expected at the beginning. If we'll qualify to the competition, this year we'll reach at the 8th consecutive participation in RoboCup Soccer Simulation League.

1 Introduction

In July 2003 at RoboCup competition, held in Padua - Italy, we won the first round group and for us it was a good surprise for first year of participation. Then, next year we participated in Lisbon - Portugal for the second time and again we obtained a good result (the 11th place). In 2005 in Osaka - Japan we participated for the third time and finally we entered in the first 8 teams in the world of soccer simulation league, as we won (the 8th place). In 2006 the competition was held in Bremen – Germany and we won (the 7th place). In 2007 we went to Atlanta – Georgia (U.S.A), where we obtained (the 5th place), the same result which we achieved in 2008 in Suzhou – China. Finally, last year in Graz we entered in the first 3 teams in the soccer simulation league, as we won the 3rd place in this amazing competition.

This year the competition will be held in Singapore, and we want to obtain a better result, because we already have a good experience in this league of “2D Soccer Simulation”. We hope that our ideas and our new improvements for this year will be materializing in the competition, where we'll test many others tactical elements developed.

2 The Offensive Phase

As we announced in our last team description paper, this year we paid more attention to the coach. Beside his classical attributions, as change player types or recognize opponent player types that already are implemented, we felt that we can use it more efficient, in order to give some tactical advices during the game.

As the coach has the privilege to receive full visual information without noise, we can use it to make an opponent modeling. In fact, we believe that is more important to adapt the strategy during the game, instead before it.

So, we can use a neural network that will try to find, a typical pattern for each opponent team, in both of these defensive and offensive phases. Than the coach can decide, if something goes wrong, to send some advices to change things.

We think that importance of the coach is not speculated very well right now, and maybe it will be a good point for research, not only for our team but for all teams involved in soccer simulation.

So, for this year we tried to use the coach in our offensive phase. As we replayed many games from the last competitions we clearly observed that we can group opponent's defensive in three types of pattern. First group of teams are defending using pressing (marking one at one) in certainly zone, specially in theirs own third, the second group are defending in zone without very strictly marking and the last group of teams are defending using pressing (marking one at one) almost all the time on the whole field. As we are interested how to create more spaces in theirs own third, our coach must identify what kind of pattern of these explained above, is used by our opponent and than, to give some advices especially to our midfielders and offenders how to move, in some generally patterns, to create some spaces behind the opponent defense line. We refer here to the players which does not have the ball. We believe that is sufficiently if we got two offensive teammates that supporting the movements. Finally the objective of the offensive phase is to score. So, the necessary phases which lead to scoring are:

- Refraining from losing the ball (avoid risky moves in the defensive area).
- Tacking the ball forward towards the opponents' goal.
- Getting the ball to a teammate who is free from his opponent's marking.
- Shooting effectively.

Statistical analysis has determined that 65% of goals are scored in dynamic play, while 35% are scored in, or following, dead ball situations. Analysis of goals which result from dynamic play shows that the fewer the number of passes, and the shorter the duration of the attack, the more likely the chances of scoring. Therefore, the offensive team should optimize its time on offense, taking advantage of its players' movements, and passing, receiving and shooting skills, to take actions in a quick and decisive way. This was our philosophy of playing soccer, from the very first beginning of our participating in soccer simulation league. On offense, the player with the ball can either kick it (pass it or shoot) or dribble it (also dribbling past an opponent), while his teammates are moving without the ball. The roles of the players without the ball are as follows in figure 1.

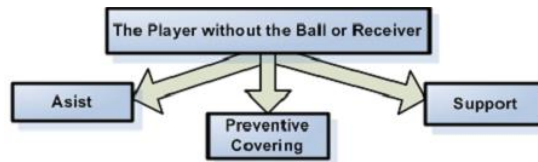


Fig. 1. The role of the players involved in the offensive phase.

When the player does not have the ball:

- **Analysis of the player's functions when the player does not have the ball.**
- How to receive the ball.
- Movements of the player without the ball.
- **Supporting movements by two teammates.**

As we said we will try to involve the coach in more and more of these kinds of tactical actions during the game. For this year's competition the coach will try to help our offense with some advices, to create more spaces behind the opponent defense line, by recognizing the pattern of opponent's defending style and also by finding their weak points, in this way our offense clearly advised by the coach, should create more chances to score goals.

2.1 Analysis of the player's functions when not in possession

- **Preventive Covering.**

The offensive players who remain positioned between the opponent's offensive section and the offense's own goal, so as to become an obstacle to the opponent's action if they gain possession of the ball and start an attack, are said to be in preventive covering. All the players on offense, who remain positioned behind the line of the ball, are considered to be in "preventive covering".

- **Support.**

An offensive player who makes himself available for a back pass or a horizontal pass is referred to as a "supporting player". The supporting player can be termed as "back support" when he is behind the teammate with the ball. When the supporting player is along the same line as the teammate who has the ball, his support is referred as "encompassing" because he can receive the ball either some steps forward or some steps backward, depending on the game situation.

- **Assist.**

An offensive player, who helps to take the ball towards the opposing goal by making himself available for a pass forward, is referred to as an "assisting player". He can receive the ball in two ways: either with the opponent at his back or by unmarking himself. He has the opponent at his back when he comes towards the ball or when he cuts towards the corner flag. He tries to receive the ball unmarked when he cuts towards the opposing goal or when he penetrates to receive the pass from his teammate.

2.2 Movements of the player without the ball

We will now consider how to organize the movement of two offensive teammates, one belonging to the “attack” line and the other a neighboring “attack” player or belonging to the “midfield” line. These types of movements will be of course decided by the coach, after he’ll analyze the defensive pattern of our opponent.

Possible combinations of movements of two forwards:

- Both forwards go towards the teammate with the ball.
- Both forwards move forward in depth.
- One forward goes towards the ball while the other attacks in depth.

Figure 2A shows the situation when both forwards go towards the ball. The player with the ball can either pass it to the near assisting player and make himself available for a combination (one-two) or, as shown in the figure, pass it to the far forward that can then make a deep pass to the other forward or a back pass.

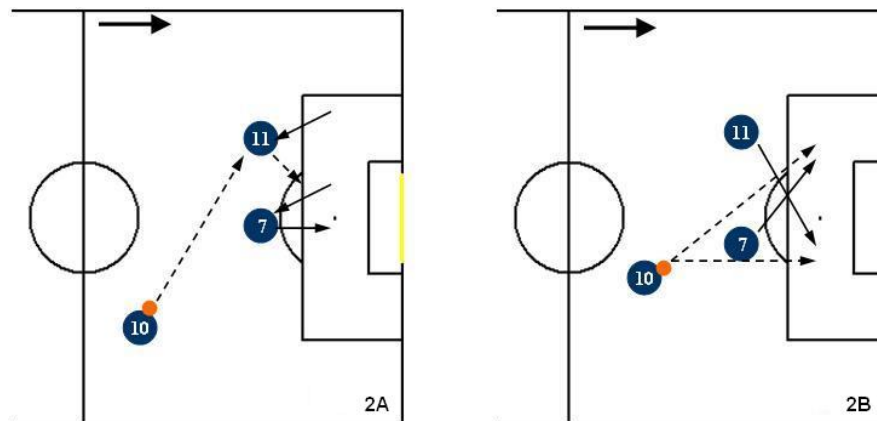


Fig. 2. Both forwards towards the ball or both forwards in depth

In figure 2B, both attackers go forward in depth. The near attacker carries out a crescent-shaped movement in order to receive the ball. The assisting attacker, who is further away, cuts diagonally into the space vacated by his teammate’s movement. In figure 3A, the two attackers go forward in depth, without crisscrossing and then cut in the same direction. In figure 3B the near forward goes towards the ball, while the far forward attacks in depth. The player with the ball can either make a “one-two” pass to the near forward coming towards him, or he can make a deep pass to the far forward who is cutting into the space created by the movement of the near forward.

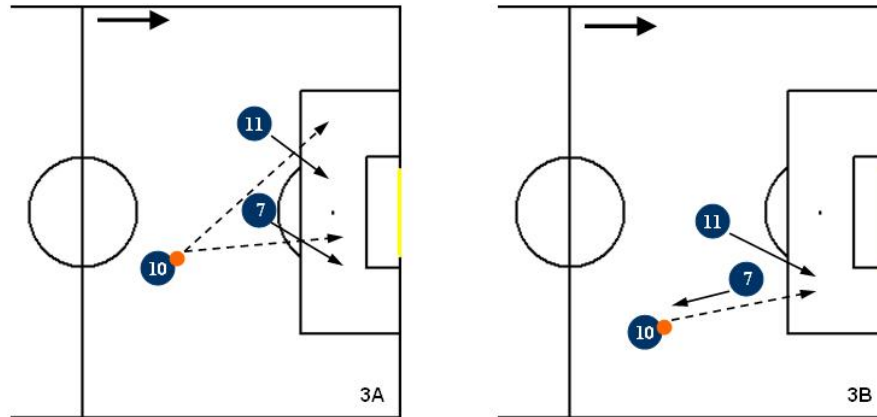


Fig. 3. Both forwards in depth or forwards in opposite movements

Possible combinations of movements of a forward and a midfielder:

- Both players attack in depth.
- The forward goes towards the ball while the midfielder goes forward in depth.

In figure 4A both assisting players attack in depth, enabling their teammate with the ball to have two passing options.

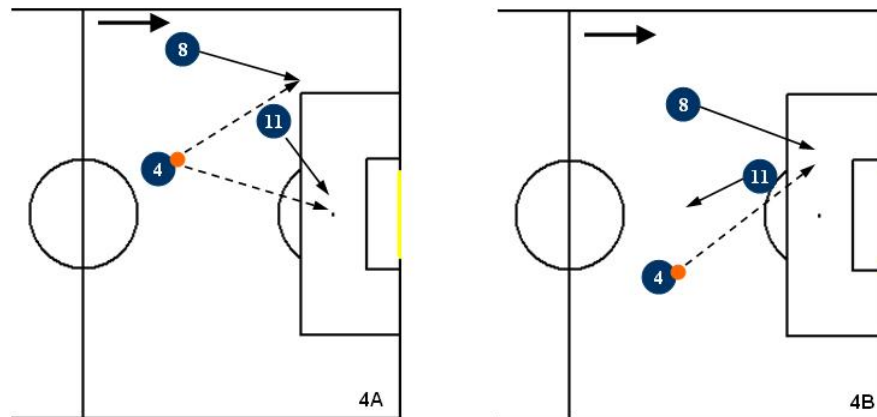


Fig. 4. Both players in depth or players in opposite movements

In figure 4B the forward comes towards the ball, thus creating space for the midfielder's deep cut-in. The teammate with the ball can either make a pass to the penetrating midfielder or carry out a combination with the forward coming towards him.

3 Future work

For the next future we'll involve our coach in many others issues where the team really needs his help. Even if the free form messages are limited by count and periods of sending, the power of the coach remain very important, as now he can receive free noises information. In this way he can analyze many important aspects of the games and if he'll deliberates based on these information he'll can give valuable advices to his own team.

We must accept that right now, many teams involved in this competition, adapt theirs strategy before the game is started instead of while it running. A team will be more powerful when it can adapt correctly his strategy, depending by the opponent behaviors and not by the opponent's name, during the game and not only before it. In the real soccer the coach has a real importance during the game, and this is not only because of the players that he's changing, but because of many good advices that he gives to his team. In the same way we must think more and more to the power of the coach and how we can use it in our simulator. As many things that we've been implemented in our teams were taken from real behaviors of the humans, in the same way we must try also with the coach. We really must take advantage of the 12th agent which exists in our simulator.

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