

OXSy 2011 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 goes on the right way, as our team was growing in these years, more than we've been expected at the beginning. If we'll qualify to the competition, this year we'll reach at the 9th 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, in 2009 in Graz we entered in the first 3 teams in the soccer simulation league, as we won (the 3rd place), the same result which we achieved last year in Singapore, in this amazing competition.

This year the competition will be held in Istanbul – Turkey. As we already have a good experience in 2D Soccer Simulation league, we hope that our ideas and our new improvements for this year, will be materializing in the competition, where we will also test others tactical elements developed.

2 The Coach Involving

2010 was the first year when we involved the coach beside of his classical attributions, as change player types or recognize opponent player types that already were implemented, in some zones where 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. 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, in one hand based on the typical neural network that we developed to be used by the coach in some specific way and in the other hand based on the power of the coach, who has a full view of the whole field without any kind of noise, this year we extend the coach attribution with the following:

- Obtaining a good world model for the opponent's players positioning in both phases of the game, depending of the game phase and the position of the ball, which will be useful in offensive phase for the pass decision when the world model of the opponent's players generated by sensor information is incomplete, and in defensive phase for the defending strategy in the same situation of incomplete world model information of our opponent.
- Choosing the best position of our offenders in spaces created between or behind the opponent's defenders when the ball is controlled by a player from our team, depending of the position of the ball.
- Deciding if we should use offside trap with current opponent.

2.1 Obtaining a good world model

We believe that obtaining a good world model of your opponent is most important then any other "mill metrical" calculation that we are hag-ridden to do for every action in every cycle of the simulation. Our belief is that if you have a better world model, you have more powerful in any kind of decision that you have to take indifferently of the current phase of the game, defensive or offensive. So, for this scope we developed a neural network which tries to find, a typical pattern for each opponent team, in both of these defensive and offensive phases. The input of our neural network is the type of the current phase (defensive or offensive) and the position of the ball. The result should be the positions of the opponent team players regarding to the current input. The achievement of data will be taken and also used only in normal conditions of play (play on mode), when type of play is positional and not a counter-attacking and most important only when the ball is in kickable area of the player who is handled it. Of course that the position of the opponent's players can be different depending of the position of ours players, but if we assume that both teams are moving after a clearly good defined characteristic, we decide to use the result of this neural network.

2.2 Choosing the best position

Last year we made an analysis about teams defending strategy in our simulation league. After this analysis, 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 first, which kind of pattern of these explained above, is used by our opponent. Then we predefined some types of movements for each of this style of defending. First time, the coach will try to recognize it and then he will communicate to his players, which type of defending is used by the opponent that we are facing. Our players involved in these kinds of actions (especially midfielders and offenders), will start to apply these movements depending of the role of the player and also of the position of the ball. If the player (midfielder or offender) which is ready to receive a ball, will recognize that the positions of the players (teammates and opponents) regarding to his own position, is adequate for applying one of the predefined type of movement, he will announce this by saying command and all the players involved in this schema (generally no more than two), will react with the movements of theirs new role, exactly as we predefined them from the beginning. The most important role in this equation will be on the coach shoulders, because he must analyze the result of this action, as he clearly knows the moment where the action was starting, because he also received the say command from his player which announced this, and finally he must evaluate the spaces created by these movements, between or behind the opponent's defense and also to see if there will be some chances to score. He must qualify this type of movement, as he should decide until the time for the next freeform message will come, if this schema will be maintained or will be changed with another. For a clearly understanding we decide to explain one of these types of action made by our team in one currently played game.

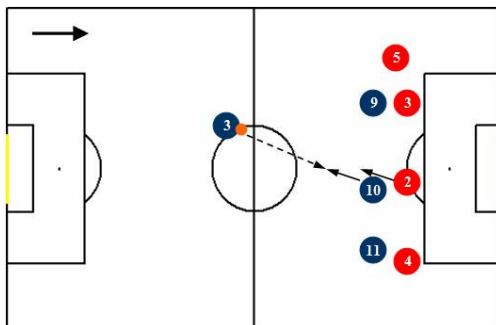


Fig. 1. Defender number 3 passes the ball to the offender number 10

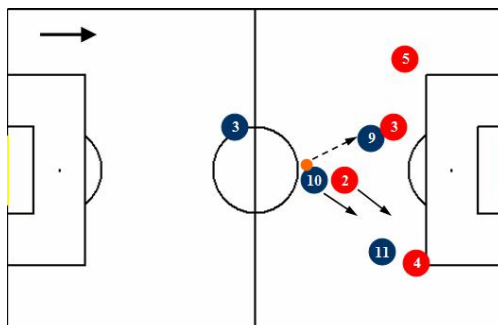


Fig. 2. Offender number 10 passes the ball to his teammate number 10 and then he cut in the right side of the field

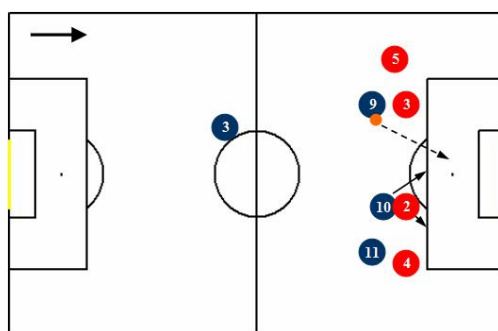


Fig. 3. After he creates space between defenders number 2 and 3 he will quickly cut in this space changing his running direction in such a way to receive the next future pass from his teammate number 9

In figure 1 offender number 10 come back to receive a ball from his teammate number 3, with the opponent number 3 in his back. Then in figure 2 he passes the ball to the player number 9 who also come towards the ball just to take off from his place the opponent number 3. After he passes the ball he cut in to the right side of the field to create some space between opponents number 2 and 3, in fact between the opponent's central backs, as the defender number 2 follows him while he is running. Then, in the last figure number 3, suddenly he cut into this space created between the opponent's central backs to receive the pass from his teammate number 9. This is the simplest way to create spaces while you are tight marked by your opponent.

2.3 Using offside trap

In the general strategy of the team, the offside trap could be defined as all these actions aiming at regaining possession of the ball, which can take place in two specific ways:

- By receiving an indirect free kick;
- Taking the ball away from the opponent thanks to the application of pressure.

In Soccer Simulation League the offside rule is implemented almost from the beginning (with server version 4.00). By years this rule affected strategy of teams playing style in both phases, defensive and offensive. As there are many teams with different type of defending or attacking, it is hard to find a singular strategy to avoid offside trapping of all teams which are using it. The critical point of this rule is when you are trying to execute an offside trap instead of then when you are catching in this trap. If you can't avoid an offside trap the maximum "punishment" for this can be an indirect free kick for your opponent executed in his side, but if you goes wrong with your offside trap, the opponent that you are facing will have a big chance to score against you. So, our analysis was concentrated on this side of offside rule, more exactly when, where and with whom we can use the offside trap. As we observed that already many teams have excellent skills of avoiding classical offside trap, we involved the coach in this problem. Because of noise free information which is received by the coach, he must analyze the movement of the opponent's offenders when our team applying such an action of offside trap. Practically our goalie coordinates the movement of offside trap, as he almost always is facing towards the opponent goal, and if he receives visual information every cycle, he has a good view and also a good position to decide the moment when our defenders can execute this type of action. Of course that his decision will be based on some analysis functions with some predefined risking parameters. If based on these functions, the goalie decides that right now is the moment to execute an offside trap, he will announce this through say command, so the defenders which should received this message, could synchronize in executing it. This is the crucial moment of this action, because of the heterogeneous players type, ours defenders have different speed, different inertia moment and others different parameters, that could have a bad influence in what we call a perfect execution of the offside trap. If only one defender can not keep this line of synchronization, this action could return against us. So, here is the point where the coach must be involved. As we said before, he must analyze the movement of the opponent's offender but also of ours defenders and finally, to decide which of the risking parameters should be modified, for a better execution of the offside trap. He also can decide to definitely stop the execution of the offside trap with this opponent, because is too risky or because of any other reason.

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, and also 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 the real behaviors of 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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