Team YAMAKASA

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1 Introduction

The aim of our team YAMAKASA is to implement highly coordinated cooperation among agents in terms of formation. Especially, we focus on zonal formation in both cases of offense and defense. Recently zonal cooperation among agents in terms of formation. Especially, we focus on zonal formation in both cases of offense and defense. Recently zonal formation is said to be effective in real-world soccer, because of superiority in numbers of players if the ball stays inside the overall formation. One of the week points of zonal formation is that once the ball gets out of the arena of the formation, it costs expensively in terms of time and players' stamina. This situation always happens in real-world soccer just by one long kick over players. However, in the robocup simulation, since the ball has to crawl on the ground, that kind of long kick is hard to achieve. That's why we think zonal formation is strongly effective in the simulation model.

To achieve our goal, we adopt three zonal formations for offensive use defensive use, and set play. Since we have to dynamically switch formation as soon as possible while situation changes continuously, our main idea is sharing information about power struggle around the ball, by reasonable use of the "say" command. Our team is made by adding several functions to 11MonkeysZ[1], because

- (Ease of improvement) The source is opened in public,
- (Ease of development) It provides throughly mature libraries.
- (High ability) It has reputation that ability of each agent, say, kicking and running, and
- (Use of say command) It already implements fundamental messages for transmitting by the say command

2 Dynamic Change of Zonal Formation

In zonal coordinated cooperation, the distance from defensive line to offensive line is kept compactly about 30m and some agents put pressure agent of another team with a ball to take a ball away. After taking a ball, turn to offence immediately. In order to achieve this move, we prepare three zonal formation for offensive use defensive use and other case and we switch formation while situation changes.

The formation of set play is 4-4-2 system shown figure1. This formation is instantly changed to defensive formation or offensive formation to finish set play. The defensive formation is shown left of figure2. The role of this formation is to make a situation that few our agents can easily put pressure to their agent holding a ball. Two midfielders shift their position to defender and other midfielders and fowards move backward compared with the formation of set play. The offensive formation is shown right of figure2. The role of this formation is to turn to offense by fowards extending right and left after taking a ball. Two midfielders shift their position to foward and other midfielders and defenders move forward compared with the formation of set play.

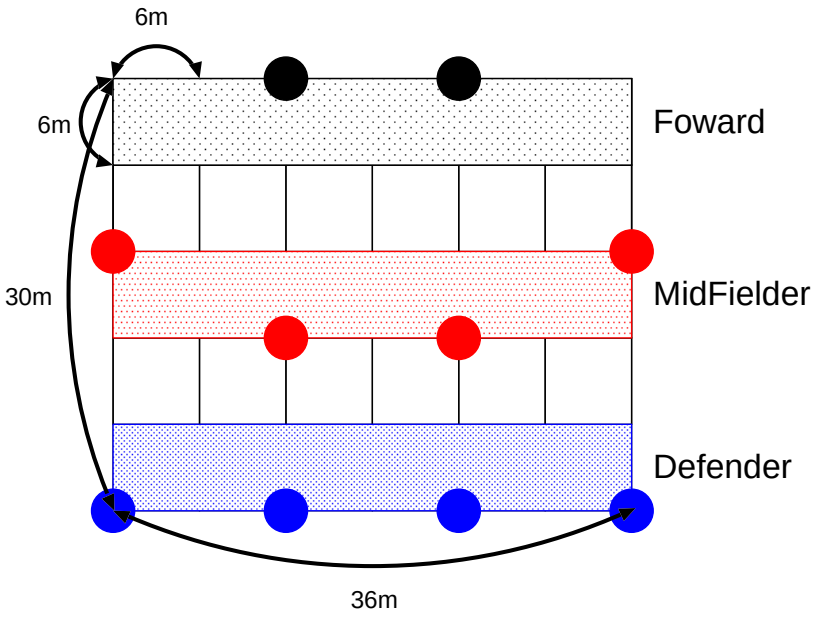

Figure 1: formation in set play

Each zonal formation is moved so that position of a ball comes to center of itself. Furthermore, formation moves forward or backward dynamically according to the following situation. Move Foward:

- 1. A teammate holds a ball and isn't opponent within 3m.

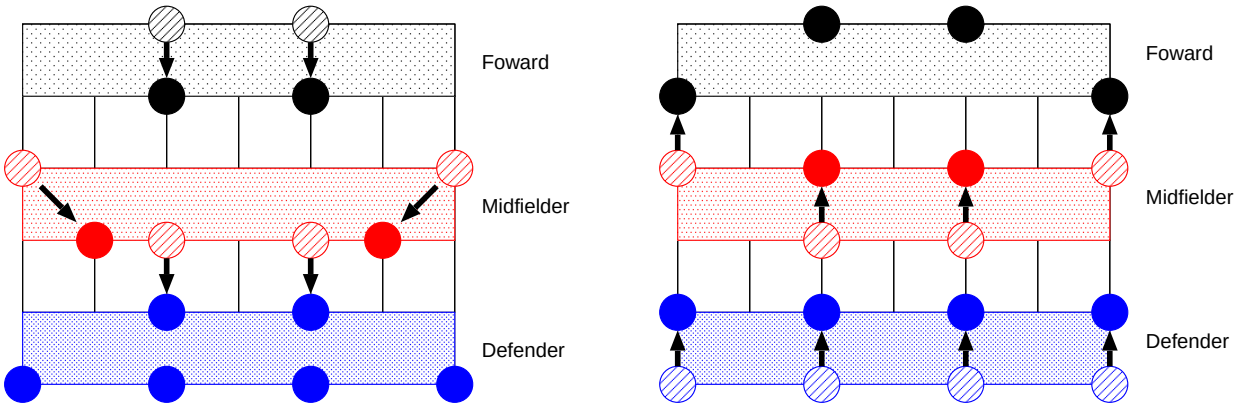

Figure 2: Left : defensive formation, Right : offensive formation

- 2. A teammate holds a ball but a opponent is opponent within 3m.
- 3. An agent nearest ball is a teammate and he is far from all opponents over 3m.

Move Backward:

- 1. A opponent holds a ball and isn't teammate within 3m.
- 2. A opponent holds a ball but a teammate is teammate within 3m.
- 3. An agent nearest ball is an opponent and he is far from all teammates over 3m.

The distance of movement is maximum at 1 and is minimum at 3.

3 Sharing Information of Offense and Defense

In our team, offense is the state that teammate holds a ball and defense is the state that opponent holds a ball, on the contrary. When there is not the agent holding a ball, if the agent nearest a ball is teammate, the state is offense or he is opponent, the state is defense.

As stated previous section, our team changes formation dynamically according to state of offense, defense and set play. If an agent perceives different state, formation is confused and unnecesary space is made. So, it is important for each agent to share the same information and our team realizes it to use "say" command. An agent holding a ball executes "say" command. When he does't exist, an agent nearest a ball does it. If the perceiving information is defferent from the present information, the "say" command is executed. Transmitting contens to soccer server are as following:

- Msg_state

- DEFENSE or OFFENSE
- Own world model

Msg_state :
A character string which represent that transmitting message is information of offense and defense.
DEFENSE or OFFENSE :
Information of offense and defense, OFFENSE is offensive and DEFENSE is defensive.

4 Conclusion

This paper has presented ways achiving zonal coordinated cooperation among agents in terms of formation, dynamic change of formation and sharing information of offense and defense. Main week points of our approach are as following:

- difference of sharing information.
- sharply consumption of stamina

difference of sharing information :
Because each agent shares the information of offense and defense using "say" command, information an agent has which can't hear the message may differ from it other agents having. This causes formation confused.
sharply consumption of stamina :
Because each agent moves fast and long distance, he often consumes many staminas. As the future work,

- more dynamic change of zonal formarion
- the control of stamina
- completely sharing infomation of offence and defence

acknowledgement

We are thank Mr. Kinoshita for 11MonkeysZ.

References

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   http://homepage2.nifty.com/kinoshita/robocupj.html