

RoboSampad Simulation 2D

Team Description Paper

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Abstract: In RoboSampad, we continue to research based on Knights simulation team. RoboSampad has participated in Iranopen2008, 2d league student's competition, Khwarizmi 2d league. In this paper, we present the agents' skills and all future work. RoboSampad methodology that is the fuzzy logic and all action of an agent in soccer simulation 2D environment are used with this logic and in continue, we presented it.

Key words: fuzzy logic, Robocup soccer simulation , Artifitual intelligence, DATA_RUMMAGE_MODE , neural system

1 Introduction

The RoboSampad team was established in 2008, starting with only the simulation team. In 2d students competition, we got 5th place and 10th place in iranopen2008 competition. Agents send/receive the message that got the harmonizing team aims. So, teams' coach try to analyze the opponent team behavior that considering team between weak or strange. Finally, appoints the team strategy in filed and by knowing the agents, send the suitable message to them. After sending message by coach, agents try to do them well. Since now, a large part of this structure has dismount successfully and remains complete in future.

2 Team Systems

Team methodology is based on fuzzy logic. Below graph show that all actions are sending to server after fuzzy deciding. In team, filed has divided to 12 parts and set weights for all of part. After pointing the actions (below will present), weights are effected to points after considering the position or strategy.

This graph show team coordinates structure:

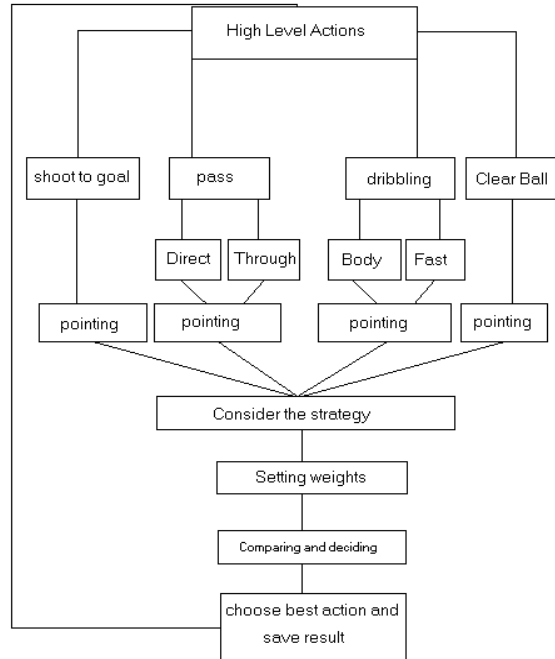


Fig. 1. Team structure

After doing action by agent, consider that how the action successfully and save the result.
After some run the action, best action for the any part of filed will choose or add its points.

2.1 Actions with ball

Any agents that owner the ball to achieve the end should has best skills. RoboSampad team skills divide to 4 parts:

2.1.1 Shoot to goal

In this part, any agent tries to get a goal for team by using this skill. RoboSampad agent divides the goal line to 6 parts and creates a point and risk for any part. Finally, select the best part with terms and shoot ball to it.

2.1.1.1 Shoot to goal terms:

1. Distance to goal, 2. Distance to goalie and 6part of the goal line, 3. Goalie catchable area,
4. Opponent strategic and agent's position

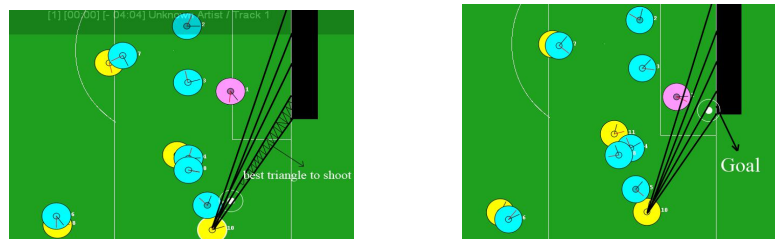


Fig.2. shoot to goal action

2.1.2 Pass

This skill is important to relate the agents together. In this part, agent chooses the points for all of the teammates and calculates the point by using the pass terms and finally chooses the best teammate for pass to it.

Team pass is dividing to 2 part: 1- direct 2- through

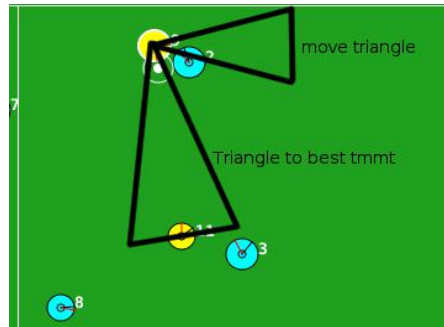


Fig.3. passing mode (direct)

2.1.2.1. Direct pass

If agent can pass ball to teammate directly, try to direct pass when the opponent isn't in pass route, direct pass is suitable or distance to teammate are low, using direct pass is good and useful.

2.1.2.2. Through pass

If agent can't to pass directly, use through pass. In this part, pass to secure position is important. Team is using the pointing-mode to select position. position usually front of the agent to be selected for pass.

2.1.2.3. Passing terms

1. Distance to agents, 2. Strategic position and type of the players, 3. Agent position and teammate, 4. Number of opponents and teammates on pass route, 5. Visible and confidence, 6. Offside line and agent situation from it

2.1.3. Dribble

Dribble of team is dividing to 2 parts: 1- Body, 2- Fast

2.1.3.1. Body dribble:

This dribble is action when around of the agent isn't secure, and this dribble with low speed and dash to save the ball.

2.1.3.2. Fast dribble :

This dribble is action when the around of the agent is secure and in this dribble agent use long dribble, and kick the ball frontier than body dribble.

2.1.3.3 Dribble terms:

1. Agent position, 2. Agent type, 3. Strategic part, 4. Goal difference, 5. Opponent position

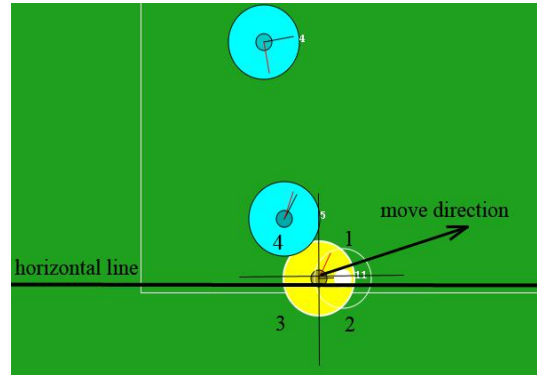


Fig.4. dribble mode (penalty area side)

2.1.4. Clear ball

Clearing ball in all teams is important for goalie and agents. In our team, 3 triangles have created in front of the agent and calculated the points for any one and select best and secure to kick ball to it.

2.1.4.1. Clearing ball terms:

1. Agent type, 2. Agent position and strategic area, 3. Teammates and Opponents positions, 4. Kick route and number of player in it.

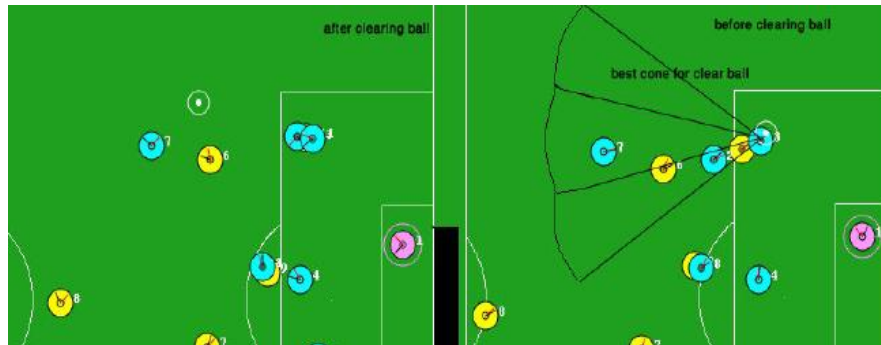


Fig.5. clearing ball in dangerous situation

2.2. Actions without ball

These skills make agents to be arranged in positions so that they would have the most chance to create opportunities for team or to get the opponents opportunities.

2.2.1. Mark:

Mark skill approaches two purposes:

1. Not to let the ball reaches the opponents (mark player).
 2. Not to let the opponents shoot to their desired position (mark ball).
- According to the purpose the player gets near to the opponent up to the MarkSecureDistance and marks him.

2.2.2. Object-finding skill:

The agent uses this skill to find an object and/or to update his world model.

3 Goalie

RoboSampad try to improve the goalie action by using the best conditions. In this part, first check the catching ball action, if goalie fastest to ball then tries to catch ball or kick it out of filed. Goalie standing position calculate with creating parallel line with goalie line and intersect it with ball line(Fig. 6) and got the position that move it.

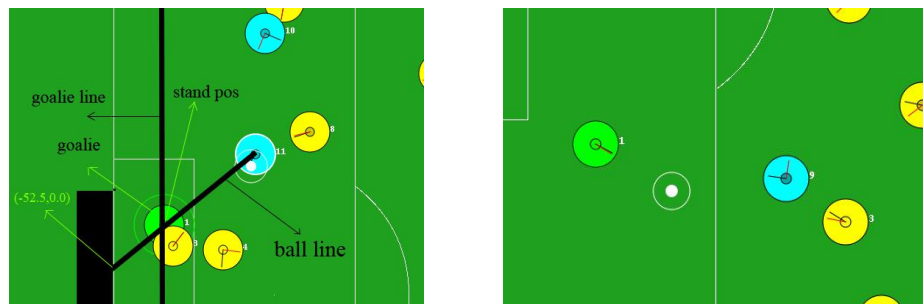


Fig.6. goalie standing position (left) – goalie try to catch ball (right)

4 The Coach

RoboSampad coach level has divided to 2 parts: first analyze the game and second choose the best strategy by using this analyze result.

In analyze part agent's behavior has a pattern that has repeated in game and by using the fuzzy system and artifitital intelligence, the time of run actions would predict that deciding the suitable behavior.

4.1 Analyze system and internal structure

When coach has started the work in first cycle, in any time receive information from server. Moreover, server sends the other information to clear the game mode. In this part try to analyze the game with information of server and other information that coach got them.

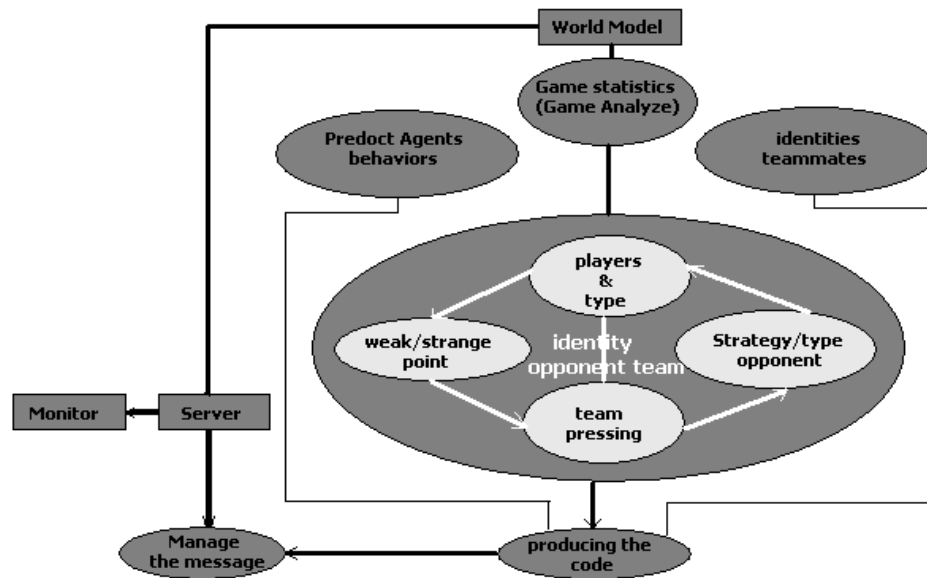


Fig.7. Coach analyzing in online mode

The information that getting in game with coach is number of successfully / unsuccessfully pass, number of shoot, appoint opponent formation and so on.

If we want to have a view of getting data and coach relation, should note that there isn't any ready data before and all of them getting in simulation environment that occur random. To learn the DATA_RUMMAGE_MODE should use the online environment data.

In this research, we has used 4 layers to rummage the data and predict.

1st layer is pattern analyzing that connected to server directly. This part has collected the data and analyzes a part of them and sends these to other parts.

2nd layer is data store that delete the not useful data and convert them to DATA_RUMMAGE format.

3rd layer is appointment the threshold instigation. So connect to neural system that recognize the online server needing and send this to prediction system.

4th layer is pattern time prediction that got the data from 3 above part and using the deciding-tree to predict occurred pattern time and check the predict attention. If time is suitable, send them to neural system, else produce new time.(Figure.8.)

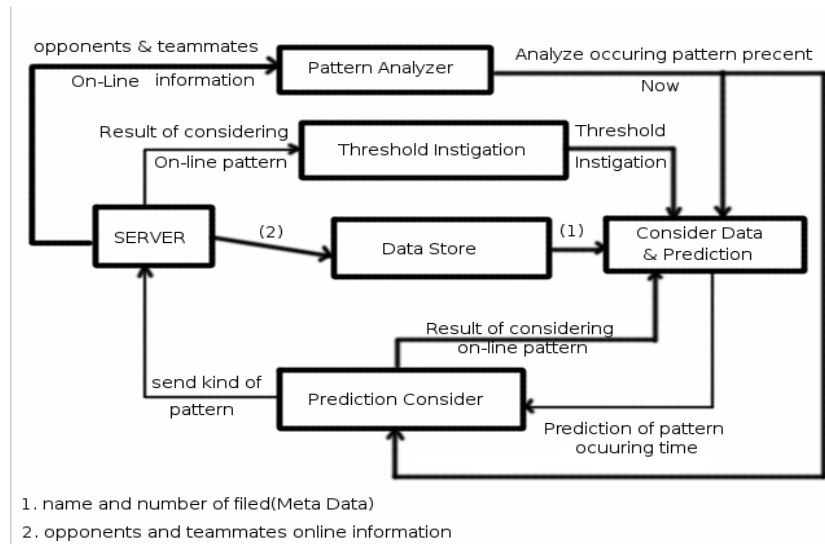


Fig.8. Team Structure and events

4.2. Learning and deciding

After the coach analyzing and getting suitable information about environment, now should decide for teammates and use the experiment to suitable deciding.

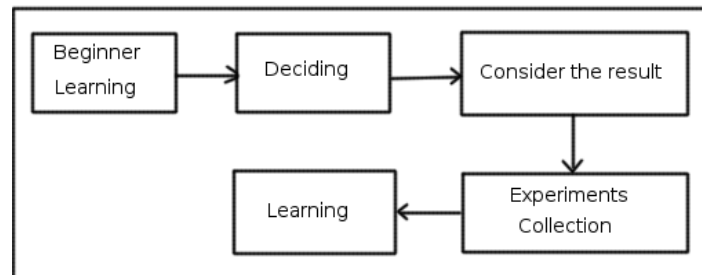


Fig.9. Learning with beginner learning

5 Conclusion

In this paper we showed an overview of the RoboSampad soccer 2D agents design. We can to dismount our algorithm well. We use fuzzy-logic and neural system in high level skills to improve them and got the best result that arrange agents. We separate agents with type of them and create role for them to run command rapidly. Finally, team achieves the end and decreases the dangerous of the lost ball.

References

- [1] M. Veloso, E. Pagello, and H. Kitano, editors. RoboCup-99: Robot Soccer World Cup III, Springer-Verlag, Berlin, 2000.
- [2] Alireza F. Naeeni, “Advanced Multy-Agent Fuzzy Reinforcement Learning,” DEGREE PROJECT Computer Engineering, Hogskolan Dalarna University Press, 2004
- [3] Kh. N. Maleki¹, M. H. Valipour, R. Y. Ashrafi, S. Mokari, S. A. Zahiri and M. R. Jamali, “Scorpions Team Description Paper Soccer Simulation 2D league, Iran Open 2008”
- [4] H. Mobasher, N. Alamedi, A. Manzoori, “Knights Team Description Paper Soccer Simulation 2D League, IranOpen 2008”
- [5] 5. V. Salmani, A. Milani Fard, M. Naghibzadeh. A Fuzzy Two-Phase Decision Making Approach for Simulated Soccer Agent, IEEE International Conference on Engineering of Intelligent Systems, pp. 134- 139, Islamabad, Pakistan, April 22-23 2006.