Sharif Impossibles Team Description Paper

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Abstract. Sharif Impossibles team consists of previous members of Sharif Arvand and Helli-Respina teams, rejoining RoboCup soccer simulation competitions after one year absence of both teams. The main research focus of Sharif Impossibles team is an analytic solution for pass problem in both 2D and 3D environments, currently applied in 2D soccer server system.

1 Introduction

RoboCup soccer simulation system [1] is a well-designed complicated environment and a very good test bed for different areas of research mostly in machine learning field; however the complexity of this system also provides a good situation for analytic technique; Methods that involves calculus and geometry as a basis for analyzing the situation. Here we do not represent detailed specifications of our approach. Full description of this approach will be available in the future publications of the research team.

Section 2 briefly describes our analytic solution for pass problem and section 3 is about choosing a pass among collection of successful passes and section 4 is the conclusion and future works.

2 An Analytic Approach for Pass Problem

Our approach for pass problem is a successor for the solution that is previously used in 2D soccer simulation by Helli-Respina 2002 soccer simulation team [2]. The method that was used for evaluating whether a pass successfully reaches the teammate player or not was a computationally expensive method. It traces the movement of the ball until it reaches desired point and if no opponent player could reach the ball in that interval, the pass would be marked as a successful pass. Because this method was used to evaluate too many possibly beneficial passes in each time step, it would take too much time, considering that each agent has only 100 milliseconds to take an action. Because the running time of this method heavily affects the running time of the entire pass module, we decided to design a faster method to do this task.

In the newly created method for this problem, function f(t) is defined for each pass that is being evaluated and each opponent. Function f(t) is designed

in a way that if f(t) was positive for all t in the interval between sending the pass and receiving the pass by the teammate, the pass would be successful. The mathematical description of this function is not so brief to be in this paper and only the main idea of the approach is mentioned above.

3 Choosing a Pass

The new and previous methods that were used to evaluate whether a pass reaches the teammate or not, do not differentiate between different passes. In another words, a pass is whether successful or not, thus we have a collection of passes that all satisfy the requirement of reaching teammate, however we should finally choose one of the passes to execute. Helli-Respina [2] team tried to use a neural network to assign a value to each pass that represents the strategic benefit of a pass. The performance of the neural network was lower than the hand coded rules. We are trying to investigate reasons that lowered the performance of the machine-learned reasoning comparing to the human-written code.

4 Conclusion and Future Works

Our new method for pass problem is not yet fully compared with the previous method. Our future works consist of analyzing the outcome of the new method comparing with the old one. A similar method is designed for 3D simulation environment. We intend to apply the 3D version of this method in the newly created 3D soccer server.

References

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