PASS STRATEGY FOR 3D SIMULATION

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1 Introduction

One of the objectives of the 3D simulation soccer is to encourage the development of cooperation between agents. Thinking about this purpose, BahiaRT is developing a strategic pass, which is currently in validation phase. Acording with our knowledge, BahiaRT is one of the first teams to actually use strategic pass in this competition.

2 Development

At first the agent maps all possible trajectories to shoot the ball, as shown in figure 1. Theoretically the agent can choose between an infinite number of trajectories, but since that wouldn't be possible, the method for choosing them has an interval of a certain distance in between trajectories to limit its number so it won't overload computer processing in a real time environment, but allows the agent to have suitable chances of success. It also considers field limitations, excluding possibilities that would lead the ball outside of the field. Then it narrows down the number of trajectories based on the probability of interception by nearby opponents. The next step is to search for the best players available to receive the pass, according to their distance to the chosen trajectories. The best trajectory is the one that has the closest agent.

After the trajectory is chosen, the agent broadcasts a message through the comunication channel saying in which direction he is kicking the ball to, and who is supposed to receive the pass. After receiving the message, the agents not involved on the pass are progammed to avoid the trajectory of the pass in order not to become an obstacle. The agent that will receive the pass will then move to a strategic position to wait for the ball.

Being the goal the highest priority in a football game, at the beginning the agent analyzes the possibility of kicking the ball in the opponent's goal direction. If there is no obstacle in the way, it chooses the closest agent to the kicking trajectory and sends a message to it as a safety measure
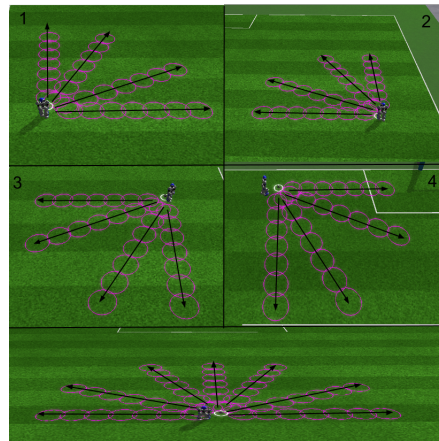

Figure 1: Mapping of trajectories

in case the ball misses.

The success of this play depends not only on this module, but also on the accuracy of the kick, which is currently being optimized to give better results.

3 Conclusions

The pass between agents showed an improvement in strategic advantage for BahiaRT because it avoids ball interception which not only interrupts the play but can also result in a counter attack. The best result was seen in set plays, because the agent has enough time to position itself towards the best trajectory and time is not something to worry about.

The development of high level intelligence requires an efficient low level set of behaviours, so for future work BahiaRT will optimize its kick motion to reach better results in terms of execution time and success rate.