AVAN Simulation Team

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1 Introduction

AVAN will be a novel competitor in the coming simulation league. Islamic Azad University of Qazvin Branch in Iran represents the team. Using CMUnited_99[1] low-level code with a little modification, the team has been improved for 2002 RoboCup competition. Major modifications and improvements are in the high level code.
The main idea is based on MAS (Multi Agent System). A 3-layer architecture is used for the entire team and a decentralized method is used for the agents. Mainly, Blackboard architecture has inspired a unique idea for implementation. This paper is trying to describe the architecture used in this team and more descriptions about strategy techniques.

2 Team Features

the reliability time of information message in upper layer that will be explained in detail is the first one. Shoot skill is the other feature of the team.

3 Multi Layer Architecture

This architecture is consisting of three different layers[2]. In the upper layer (Strategy Layer), there is an agent memory. This memory includes all information about teammates, marker and communications between other agents .It can also estimate the

The order of movements is planned in the mid layer (Player Layer). Finally, in the lowest layer (Sequence Skill Layer), same skills are accomplished. In order to perform these skills, the same related skills (Sub Skills) must be accomplished probably. Figure 1 describes this execution.

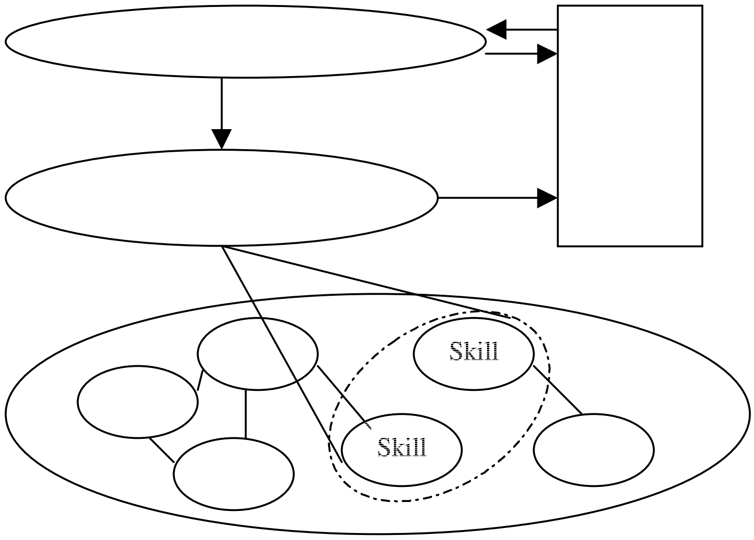

Figure 1: 3 Layer architecture illustration Memory and the Communication between them.

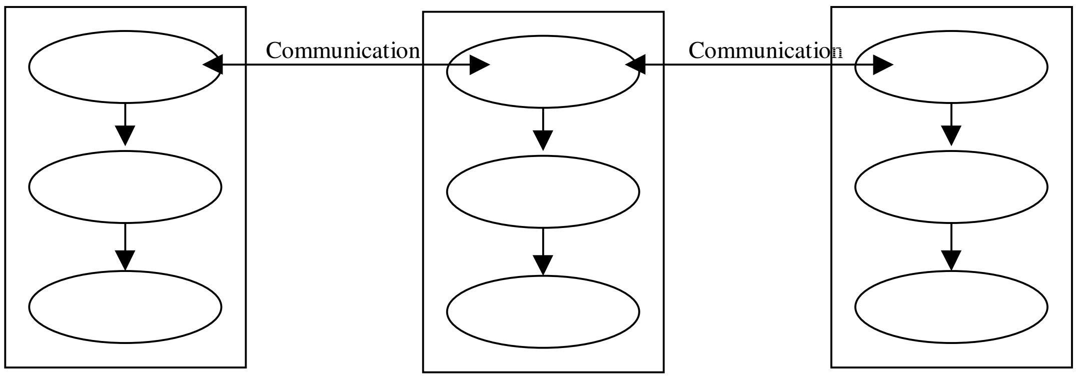

Figure 2: The way of communication between the agents.

4 Communications

Communication between the agents is a necessary progress. Figure 2 describes the communication between the agents. As a result of using a decentralized method, an

information layer is needed in this architecture. The method that is used is similar to Blackboard architecture. There is just a difference in communication method.
A message is sent out to all agents simultaneously but in RoboCup Simulation, this ability dose not exists and the message is sent out in a restricted area around the sender agent. Lets, imagine that a sender agent sends out a message including

3). This message is just received by child agents and then, through child to their child and so on. With this explanation, the entire agent network receives the message.
So the reliability of this message depends on time. For example child agent will receive the cycle in which the position of parent agent is announced and then the code will be decide on reliability of the message. So the credibility time effects on the first layer (Strategy Layer).

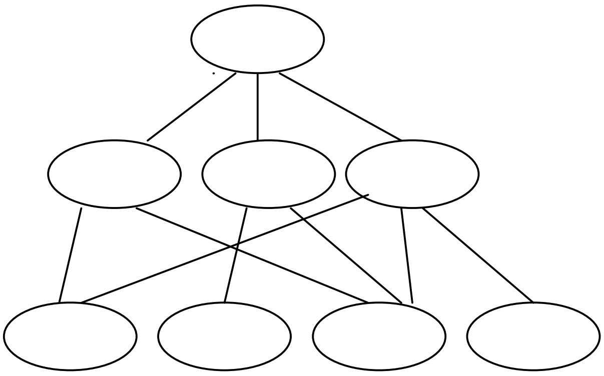

Figure 3:Message propagation hierarchic cone

This architecture is using multi cast method. It sends intimations about decision-making and strategy of an agent as well as the information messages.

5 Skills

In this section Shoot Skill and Pass Skill will be described. Several skills are used for

ot skill is the best-implemented skill. In this skill the goal point and also all directions ended to that, are determined and controlled. Shooting in to the goal point is achieved by an optimal path, which is calculated and performed by an agent.

6 Future Works

In order to increase the effect of implemented calculation and to make better decisions and best-taken strategy by an agent, a *Learning Method* will be executed. These succeeds will be expanded into all the fields by using *Neural Network Method*. Reliability time is one of the most effective items used as input information for the Neural Network.

Using various types of agents called *heterogeneous agents* is a prospective progress. Altering the system from a full decentralized to a half-decentralized system is another plan for the future. In order to do this, a section with the role of making decision, will be omitted from the strategy layer and then, a new type of agents will be added as a *Coach* gies.

7 Team Developers

Team Leader:
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Undergraduate students
Attended the competition
Web page:
http://Qazviniau.ac.ir/robocup

References

[1] Stone, p. et al (1999). The CMUnited-99 Champion Simulator Team AT&T Labs-Research, 180 Park Ave, room A273, Florham Park, NJ07932.

[2] Reid Simmons, Sanjiv, David Hershberger, Josue Ramos, Trey Smith;First Results in the Coordination of Heterogeneous Robots for Large-Scale Assembly