TakAI

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1 Introduction

The "Gullwing" developed by Tetsuhiko Koto since March 1999 is now assigned to the official name for the second strongest team of Takeuchi Lab. It gained the third position in the Japan Cup Open '99 [1] held in May 1999. Since then, it has been thoroughly revised and it participated the Japan Autumn Camp[2] held in 1999, with the official name YowAI-2 at that time.

2 Architecture

Each agent (player) of TakAI has the architecture shown in figure1. I made all the programs from scratch. The language is C++.

The Connection Manager manages all the communication with the Soccer Server[3]. It sends commands such that kick, turn and dash issued by the Synchronization Manager to the Soccer Server, and receives sensory information such as sense_body and see. Every communication between the Connection Manager and the Soccer Server is notified to other modules as I/O Notifications.

The Synchronization Manager synchronizes the internal clock of the agent and the clock of the Soccer Server. It provides functions such that KickAndWaitNextStep which enables the agent to issue a command and wait for the next clock when it can issue another command without overriding the command it has issued. These functions order the Connection Manager that their own commands be sent the Soccer Server, and watch I/O Notifications to be sure that the Soccer Server clock advances by one step.

The World Model maintains the positions, velocities, and accelerations of its own agent, other agents, and the ball. It watches I/O Notifications, gets the sensory information (visual, auditory and bodily) and calculates the positions, velocities, and accelerations of agents and the ball based upon it. Of course, it reflects the expected effect of the commands the agent issues. It tries to simulate the soccer field as exactly as the Soccer Server does, based upon the information obtained by the Synchronization Manager.

Various Skills are implemented on the basis of the Synchronization Manager and the World Model. The Skills include simple reflective ones, and higher ones such that skill for running to the position designated as an absolute coordinate.

The Tactician decides the player's short term tactics based upon the World Model, and the Skills make the tactics be fulfilled.

P. Stone, T. Balch, and G. Kraetzschmar (Eds.): RoboCup 2000, LNAI 2019, pp. 453-456, 2001.

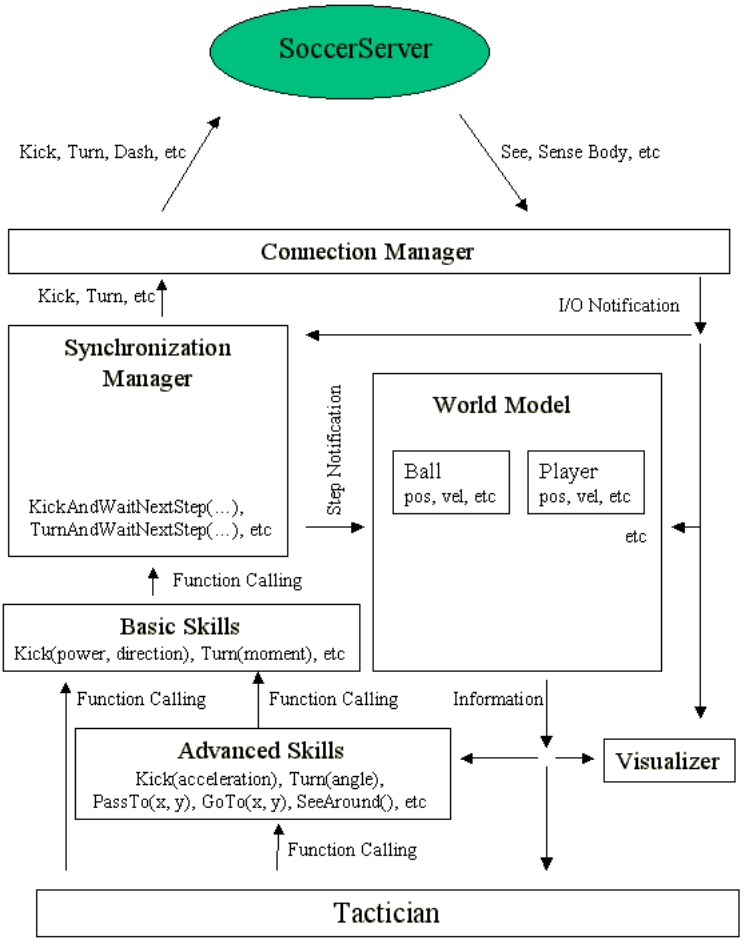

Fig. 1. Architecture of TakAI

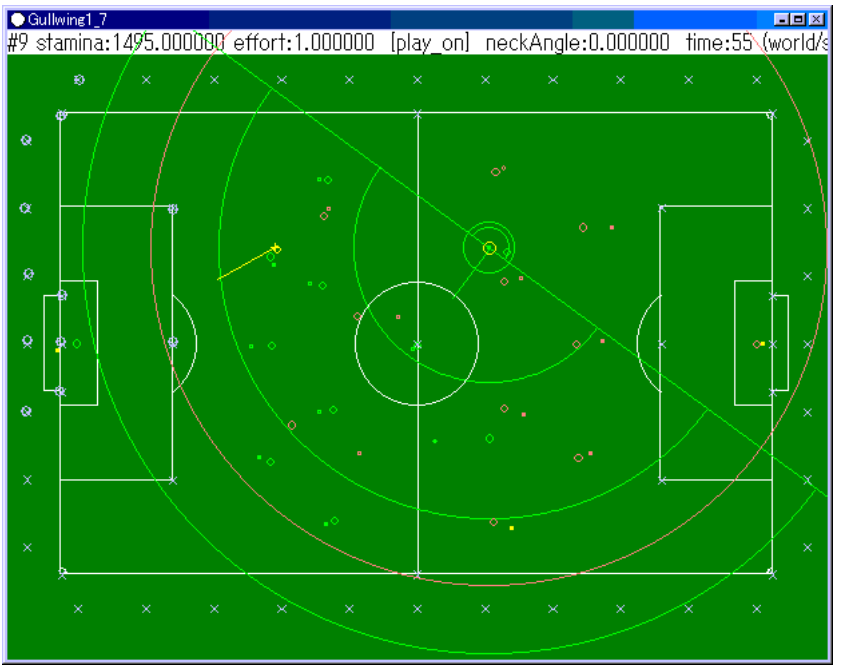

Fig. 2. Screenshot

The Visualizer makes the internal World Model be able to be seen on the display screen, mostly for debugging aids (See figure2).

All the algorithms (skills and tactics) are handmade and the players learn nothing and do not grow up.

3 Play Algorithm

The TakAI tactics can be summarized as follows:

(1) If the ball is too far from the player to kick,

It calculates which one of its teammates can touch the ball first. If it is the self, then it tries to get the ball, else it runs to the position if someone else tells it so, else it tries to take its desirable position; basically, it tries to keep apart from other teammates, not to make the team too crowded in a particular area.

(2) If the player is close enough to the ball so that the player can kick it,

If shooting is plausible, then it makes a shot. Otherwise it computes a simulation to examine that if it kicks this or that direction, then who is the first to touch the ball. If it can find such a kick direction that one of its mates can first touch the ball at the nearest position to the opponent's goalmouth, then it kicks the ball to that direction. In that case, it shouts to the mate to run to the

promising position. If the simulation does not yield any plausible pass course, the player tries to dribble the ball to the opponent's goalmouth.

4 Future Work

Long-range planning:

In the current version, the evaluation function for the player positioning simply relies on the distance from other teammates, and the evaluation function for pass course selection simply relies on the distance from the opponent's goalmouth. Both evaluation functions are too instantaneous or shortsighted, and have no long-range planning or strategy in mind. So I have to explore more intelligent evaluation functions that enables the agent to have time-consistent, long-range plan in its play.

References

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   j-info/events/99/jopen99/index.html
2. http://rook.fuis.fukui-u.ac.jp/~nishino/robocup99atcamp/
3. http://ci.etl.go.jp/~noda/soccer/server/index.html