# AUA3D Team Description Paper For RoboCup 2012

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Abstracct:We are waiting for RoboCup Iran Open 2012, we achieved well rank in RoboCup China open 2011, what more, we get 15th rank in RoboCup Iran Open 2011, this paper mainly introduce architecture, strategy, connection and Passing and Defend Decision of AUA3D.

## 1 Introduction

AUA3D Team was established in 2005, and successfully attended several competitions. We have won the Robocup China Open 2010 in 7th place. The agent is much like the real robot. This creature attracts a large amount of students to devote to this field. Thanks to the devotion and cooperation of these students and our teacher, several achievements had been made in the past year.

In the following section2, the architecture of AUA3D is presented, the method for agents' strategy is presented in section 3, the agents' communication will be shown in section4, the description of agents' passing decision and defend decision can be seen in section 5, and section 6 shows our future work.

## 2 Team Architecture

AUA3D can simply described Server/Client architecture, the server is mainly work for clients.

World Model module contains several states updating and some calculating of motions key parameters like whether robot is falling down. Basic Action module is designed to control Joints to finish quite complex task. Strategy module is the brain of robot.

We get message from communication module firstly. After parsing the mes-sage, World Model module updates all of the states including joints state, game state and object state(ball, itself, teammates, opponents and etc.). Strategy module analyzes current situation and then chooses one tactic with the best benefit. To achieve the strategy, the robot should also make a series of joints commands to perform motions finished by Basic Action module, joints com-mands will be put into the command queue. At last, Communication module gets command from command queue. All show in Figure 1.

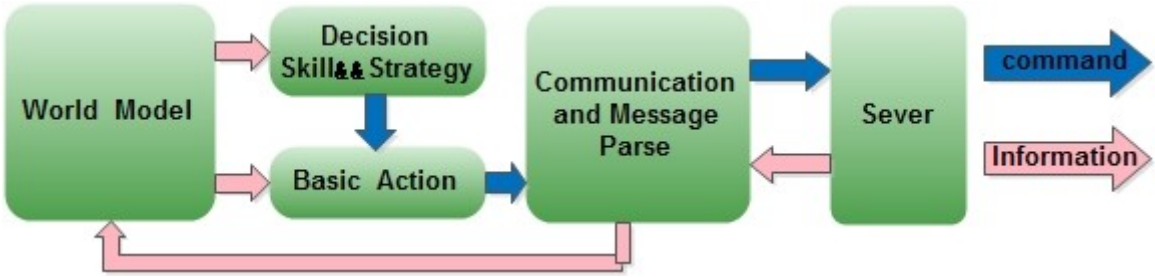


Figure 1: AUA3D main running flow in about one cycle

# 3 Agent Strategy

With the competition's model developed to 9vs9, the difficult we face and the most important task must be done is how to make 9 agents work together, our program not only include method of kick, kick off, corner kick, goal kick when agent attract and defend when one agent need other agents' assist, but the strategy of combination of these basic skill. And all show in Figure 2.

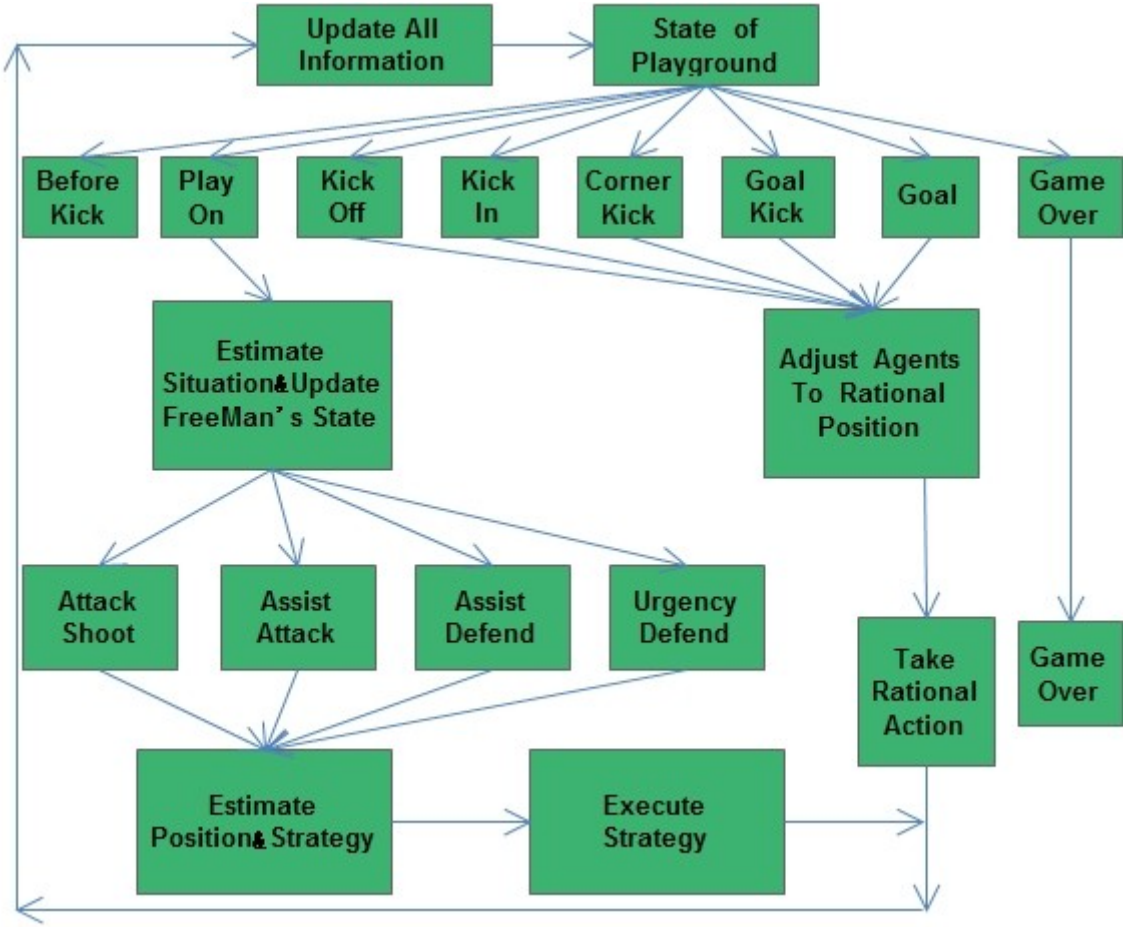


Figure 2: Agent Strategy

# 4 Connection

With the competition change to 9V9, the connection between agents becomes more important during the whole strategy. Say and Hear model were used send and receive message, messages from Say are coded in a string, and Hear decode this string when Hear received this string. Figure 3 shows our connection model.As messages are restricted to a maximal length (currently 20 bytes), we design algorithm to deal different sentence.

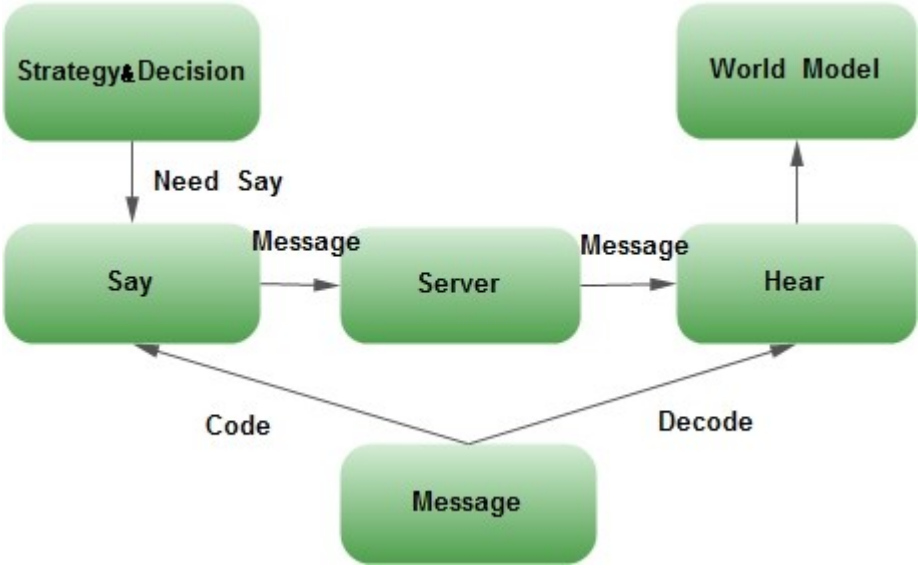


Figure 3: Connection Model

# 5 Passing Decision and Defend Decision

As Figure 4 show, we divide playground as 11 regions. Three edges are left(L),center(C),right(R).Three rows are front(F),middle(M),back(B); and specialregion: Shoot(S) and Dangerous(D). The calculate process as follow:

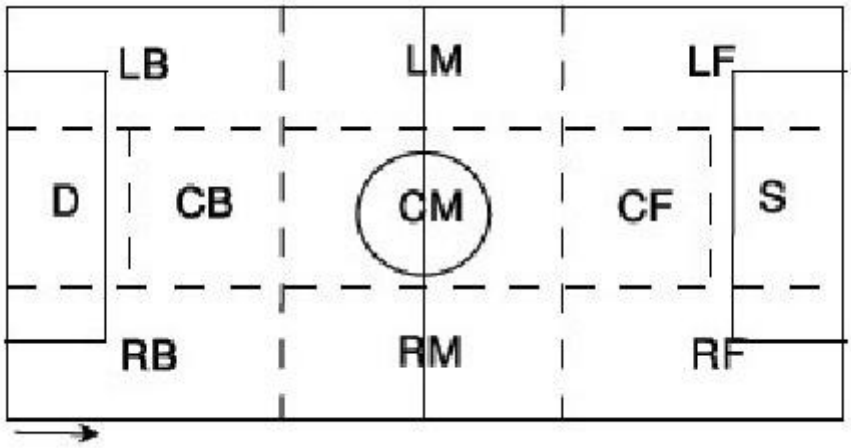


Figure 4: 11 regions of playground

(1) Calculate different kinds of region;

(2) Calculate the intersection of the regions;

(3) Select the target region;

(4) Passing ball to a region instead of a point could decrease the calculation and;

(5) Increase the success.

In this 11 regions, from left to right are our restricted area, our backcourt, midfielder, the other after the field and the other restricted areas.

A. ball in the midfield position in decision-making: Pass the ball forward along the border road in front of one of three forwards, to forward to provide breakthrough opportunities; does not meet the above conditions, breaking ball on their own; herself, unable to break through, select teammates to pass the center, so complete midfielder decision-making.

B. location of the ball field when the first decision: First, consider the ball can not break myself from the wing; ball fails to find a close with his teammates the X direction, the ball passed to him; If that fails, put passed the ball to the other side of the front, so I do not know each other's keeper should the attack,so the opportunity to get the ball to the striker.

C: the ball in the penalty area the decision-making: This step is the team I want, first of all to determine who the ball away from the other goal in a given distance to take the following decisions:

a) Determine the location of the other goalkeeper, if its position is invalid,a default location to mark;

b) The goalkeeper position to determine whether the shooting location to meet (in angular size as the standard), and decided to shot points, shot angle and shot speed;

c) If the conditions are not met, the other players pass the ball horizontally;

d) In c), that do not pass out, but not a waste of time and opportunity to directly fight, and small-angle shot;

e) If a), b), c), d) are not met, passed the ball to each other in the restricted area to wait for his teammates blank range.

# 6 Future Work

Based on teammates hardwork, we believe AUA3D will have a bright future, but there is much workto do in the future:

Both basic skills and decision making will be the primary work of AUA3D.Not only we should improve the stability of walking, decrease the time of adapt-ing kicking,but also we should design a good formation and strategy.

Considering that the agent often fall after shooting, we should improve the a ccurate of vision and optimize the kicking.

As the number of teammates increased, we will adapt the position of agents and

use the communication between agent s to keep the balance of o ffensive and defensive.

At the same time, our future work is also planned to explore other models of coordination, such as distributed systems, and to develop responsiveness to game situations (e.g. win-ning/losing, corner-kicks).

We still have a long-range goal to achieve.

# 7 References


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