

# WinKIT 2003 Team Description

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**Abstract.** This paper describes our research interests and technical information of the WinKIT team for RoboCup 2003. Our robots have been developed to have a capability of pass-based tactics since 2002. That is, the capability of position estimations of robots and a ball, the distinction between our team and opponent team, and the cooperative behavior. To achieve the capability, robots have omnidirectional systems and omnidirectional vision systems and omnidirectional mobile systems. In these efforts the WinKIT team won the second place at the RoboCup 2002 world championship. Our goal is to realize the pass plays.

## 1 Introduction

The WinKIT team has been participated in RoboCup as extracurricular activities. In RoboCup 2002, all members are undergraduate students except two staffs. However, the team won the second place at the championship. The secret of this splendid feat is in our educational system, Yumekobo, factory for dreams and ideas. The educational system in Yumekobo attracts attention very much among people engaged in the educational system reform in many universities in Japan. The WinKIT team is one of the Yumekobo student projects.

## 2 Hardware Architecture

We participated in RoboCup2002 with the third generation of our robots as shown in Fig.1. The performance made rapid progress as compared with previous generations, but motor control system had many trouble. There were several scenes that our robots cannot move. Therefore we will heighten the stability on robot's moving.



**Fig. 1.** WinKIT Robots

We have been developing new motor control system for easy maintenance.

## **2.1 Specification**

Dimension: Length 450mm x Width 480mm x Height 660mm  
 Weight: 15kg  
 Motion Speed: 4m/s  
 Acceleration: 4m/s  
 Battery: NiMH 24V  
 Moving System: Omnidirectional System with 3 omniwheels[1]  
 Processor: Hitachi SH4 166MHz (IP-7500EB)  
 Image Processor: Hitachi SuperVchip (IP-7500EB)  
 Wireless LAN: Corega CG-WLAP11MN  
 Local Camera: SONY EVI-370  
 Omnidirectional camera: ACCOWLE Panorama Eye

## **2.2 Vision**

Vision program has discrimination of seven colors like red and black, white and so on. It is possible to dispose to 16 frames per second from both an omnidirectional and a local camera with IP7500EB. The robot decides a self-position depends on relationships between two goals positions.

### 3 Research Topics

The purpose of participating in RoboCup is not research but education for our team. However, we have been developing new technology for the future RoboCup.

First the vision system that classification a normal black and white soccer ball has been developing for more than two years. It uses the correlation template matching. The present performance is up to 400cm in detection distance, and 8frame/s in computation. However the matching rate is low on the whole. There is some case of error. There is a danger of mistaking something for a ball when a ball doesn't exist.

Second, humanoid robots and humanoid simulators have been developing since 2001[3,4]. Our goal is to develop the humanoid robots that have a capability running. Developing humanoid robots is a very challenging, and we plan to participate in RoboCup humanoid league in 2005.

Finally, evaluating the educational effects for students to participate in RoboCup is most important research topic for staffs in WinKIT team.

### 4 Conclusion

This paper presents the overview and research topics in our team in RoboCup2003, all members are undergraduate students except two staffs. However, the team won the second place at the championship. The reason is in our educational system, Yumekobo, factory of dreams and ideas.

This year, we have been developing the vision system and the kicking device mainly to accomplish the pass-based tactics. Furthermore, the vision system that classifies a normal black and white soccer ball has been developing for RoboCup2004.

### References

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