

Artisti Humanoid Team for RoboCup 2006

Technical Questionnaire

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A spin-off of the University of Padua

1 Introduction

In this paper, we give a technical overview of our humanoids. Both robots are based on Robovie-M platform, produced by Vstone Inc. (Japan).

2 Robovie-M

Our robots are based on Robovie-M vers. 2. They mount the extension board VS7054 by VStone, that gives enough computational power for image processing and motor control, in order to exhibit an autonomous behaviour. Their bodies have been modified in order to be compliant with the RoboCup 2006 rules on the body shape. The height of these robots is 47 cm and their weight is 2.2 Kg.

The robots can walk (a static walk) at the speed of 1.5m per minute; they can rotate, they can stand up if felt down and they can kick the ball.

They have 22 degrees of freedom (DOF):

- 6 DOF for every leg;
- 4 DOF for every arms;
- 2 DOF for the body.

2.1 Actuators

Robovie-M is equipped with 22 servo motors of two different types:

- SPEC-APZ for arms;
- Hyper ERG-VB for legs and body.

Both of them are produced by Sanwa, that gives these specifications:

Motor	Torque	Speed	Size
Hyper ERG-VB	13 kg×cm (6V)	60 deg/0.10s (6V)	39×20×37.4 mm
SPEC-APZ	4 kg ×cm (4.8V)	60 deg/0.20s (4.8V)	39×20×35.5 mm



Fig. 1. Leonardo and Galileo in the two camera configurations.

2.2 Sensors

Two sensors are mounted on our Robovie:

- Two-axis accelerometer: ADXL202E (ANALOG DEVICES) on VS7054 board;
- CMOS Camera: OV7620 (OmniVision), working at high resolution (VGA: 640x480) or low resolution (QVGA: 320x240), interlaced and progressive scan mode.

The camera can be mounted as a perspective camera or as an omnidirectional camera coupled with an hyperbolic mirror.

2.3 Processing Boards

CPU Board: VS7054 (VStone Inc.).

Available on-board hardware:

- CPU: SH7054 (Renesas) 40MHz;
- External RAM: CY7C1041CV33 (Cypress), 256K x 16bit;
- External EEPROM: AT24C512 (ATMEL), 512K (65536x8);
- Serial Converter SP3222E (SIPEX).