

Team BSRU-I: Team Description Paper

Mr.Chokchai Pengyasa, Mr.Pakorn Butngam, Mr. Settawut Babyang,
Mr.Totsapon Keawsri, Mr.Theerathawan Panklang(Advisors),
Mr. Prajin Palangsantikul(Advisors), Ms.Rattanasuda Supadanaison(Advisors),
Mr.Chalit Wanichayanan(Advisors)

Bansomdejchaopraya Rajabhat University,
1061 Soi Lsaraphab 15, Lsaraphab Rd.,Dhonburi, Bangkok 10600 Thailand,
Theerathawan@yahoo.com , new_set@hotmail.com,
<http://fibo.kmutt.ac.th/blog/bsru-i>

Abstract. This document is designed to introduce development the hardware and software our humanoid robot. BSRU-I Team used the AVR ATmega128 microcontroller board in control digital servo-motors Robotis dynamic model AX-12 total volume 19 and development the software with C language by the AVR Studio4 program for robot control. The selection process for the chip to see the ARM 9 Mini 2440 and also connected through to the processing chip AVR ATmega128 via RS232 to control the robot and the location of the object you want to search

1 Introduction

Because of Bansomdejchaopraya Rajabhat University has offered computer technology and electronics courses. And taught about robots in history, evolution and development of various kind robots. The students have opportunity to learn with the robot model such as BIOLOID, ROBONOVA, KONDO, etc. Moreover still have the instruction can give a student designs a robot assemble a robot for study the structure and the principle work of a robot .From this subjective can make student group is interest to study about a robot seriously and seen enrolling competition notice Robocup 2010 Humanoid League , then get collect who take an interest do applying for attends robot competition Robocup 2010 Humanoid League for this time.

2 The Robot Design

BSRU-I team never experienced in the Robocup Humanoid League competition before. In designed robot, then got consult and has a conclusion will lead a original BIOLOID robot in the education and develop for lead a robot attend the competition for this time.



Fig. 1. Chongkho-I

3 System overview

This section explains the hardware used in our humanoid robots. Each robot is composed of mechanical hardware, sensors, and computing hardware. Figure 2 shows the overall systems. Mechanical hardware is composed of robot structure and motor. The main structure of robot is the same as Bioloid robot and there are only little changes in it. Both robots use 19 TTL networked servo-motors.

All robots use the same set of sensors. These are 3-axis accelerometer [$\pm 3g$], 2 rate gyros $\pm 500^\circ/\text{sec}$ (X-OUT/Y-OUT) and one Jpeg camera. The camera installed on the robot is a single lens RS-232: 115.2K bps for transferring JPEG still pictures or 160x128 preview @8bpp with 0.75~6 fps.

The main computer for all robots, which was MINI2440 Development Board is based on the Samsung S3C2440 microprocessor (400MHz-533MHz CPU). The MINI2440 board computer receives information from the CCD camera via the RS232 port. The computer computes the walking path and sends locomotion command to the AVR ATmega128 (16MHz RISC Microcontroller) motor controller via TTL port.

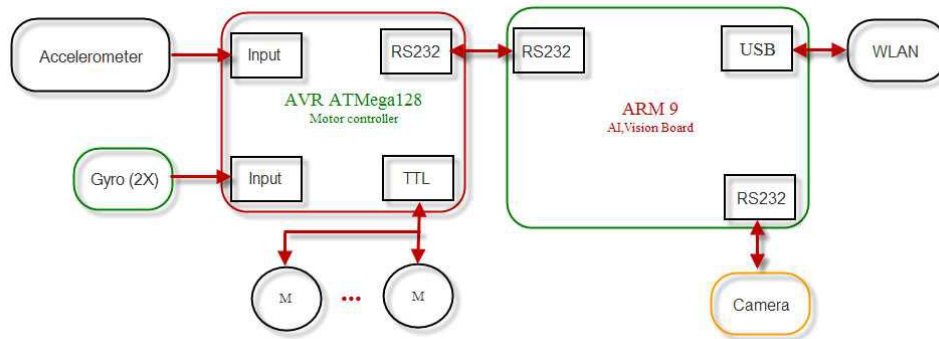


Fig. 2. System overview of the humanoid Chongkho –Series

4 Vision

We use process to detect objects are divided into 3 steps together. After image data from the camera. Conversion to RGB image data from one image to the color data HSI (RGB to HSI converter) with this step will be the color values of target objects and background. Then to find axle (Column) with the color values of objects with technical goals. Histogram for the main Histogram highest value to the location of objects in the target axis (vertical axis X) with a number of image points in the line up to make note midpoint of the target object. together with the process we will add a Histogram techniques called. Spacing image (Image Spatial) or may say that a reduced size, density (Density) of the image but will reduce the size of the image and adds speed to find too. In addition to the technical points. (Connectivity) in the check image point (pixel) adjacent (neighboring) to review the porcupine in a material. In the final step to strengthen a key connection (Column Links) To ensure that. Will be the main location of most of the material. Summary diagram of the work as follows.

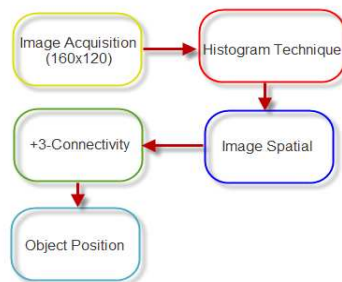


Fig. 2. Object detection process.

5 Game plan

Planning in playing football is the important factor . unless win or lose , will depend on the ability has of person play already still depend on laying plans plays . which the team BSRU-I get lay plans play keep give with person play both of 3 a position as follows .

- 1.Goal Keeper protect the door from the antagonist and wait for tell a position of the ball gives with Midfield and striker.
- 2.Midfield can can coordinate activities both of Goal Keeper and striker.
- 3.striker dare to kick a ball into the goal give with the team.

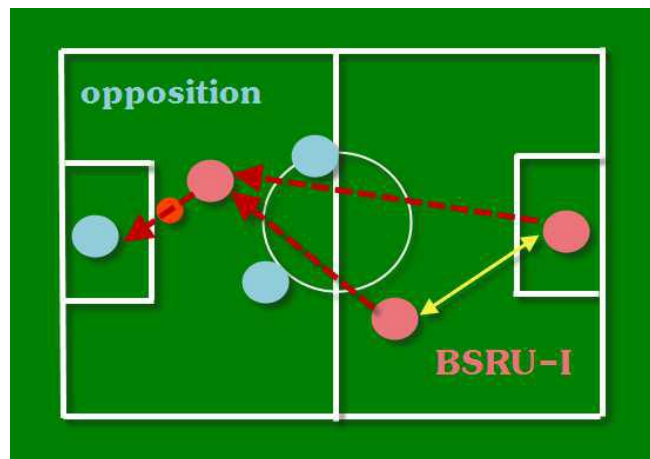


Fig. 2. diagram Game plan

6 Conclusions

we have the will and will intend to attend world-class competition in the list competes Robocup Humanoid League . which in this year the Singapore receives the fame is a host at a reception manages to compete in year 2010.

we have begun to study learn about Chinese gambling your writing smokes Microcontroller and get study about Humanoid Robot . from that time we have then to exert study and the development do Humanoid Robot extremely go together accompany the education in bachelor's degree level.

with the will intends to this extremely we have then to change the choosing stick 1 in 10 of the competition Thailand Humanoid Robot Soccer Championship 2009 . which compete in round compete for the championship on March this.

competition Robocup Humanoid League 2010 in this time. the team BSRU-I hope very much that committee way will something give the assistance. the team-

BSRU-I get attend the competition in this year and year next . for honorable build the team has and the university where reach world-class competition .

7 References

- 1.Laowattana D., et al.: Team KMUTT, Team description paper. Robocup 2009, Humanoid League (2009)
- 2.www.robotis.com
- 3.Mini2440 Manual,www.friendlyarm.net
- 4.ATmega128(L) Summary.pdf,<http://www.atmel.com>
- 5.ADXL335datasheet.pdf,www.analog.com
6. C328-7640 User Manual.pdf, <http://www.comedia.com.hk>
7. IDG-500 Integrated Dual-Axis Gyroscope datasheet.pdf, <http://invensense.com>
8. CMPS03.pdf, <http://www.robot-electronics.co.uk>