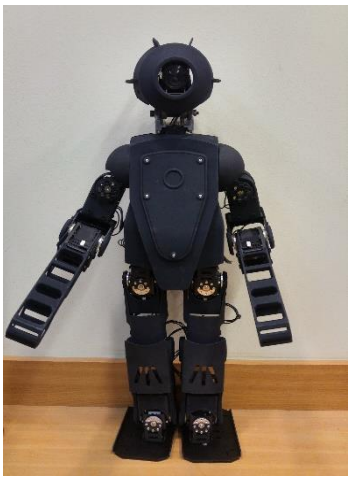
אוניברסיטת בר-אילן
Bar-Ilan University

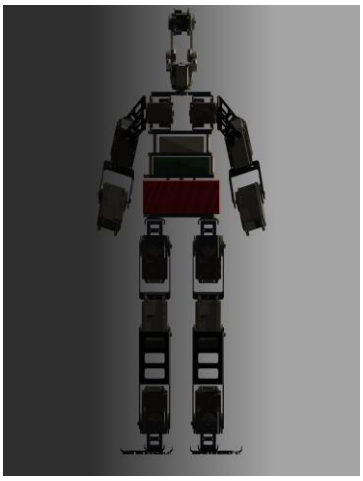
Team RoBIU - Robot Specification Document

Mechanical Design

We chose to use ”HR-OS5 Humanoid Research Robot” which is based on Intelligence-Open Platform (DARwIn-OP) nicknamed *Jimmy*[1].



Profile



Without Shields

Figure 1: Jimmy’s Photos

The robot's complete mechanical specifications is presented in figure 2

Humanoid Specification	
Height	68.5 CM / 27 Inches
Weight	6 kg / 13.2 lbs
DOF	20
Walking Speed	30 CM/s
Runtime	45 minutes
Actuators	12 x MX-106 / 6 x MX-64 / 2 x MX-28
Sensors	Gyro, Accelerometer, cameras , microphone
Processor	Intel NUC quad Core i5, 4gb RAM, 32 gig SSD
Sub Controller	CM730 (Arbotix-PRO coming soon)
Wireless Control Options	Xbee, Wifi, Bluetooth
Battery	4 cell 14.8V 4000 mAh LiPo
OS	Choice of Ubuntu 14.04 or Yocto OpenEmbedded Linux
Code	Open Source C++ framework based on the DARwin-OP software with integrated REST based API
Frame	5052 Aluminum Metal Brackets
Body Panels	3D printed Nylon

Figure 2: Jimmy's Mechanical Specifications

Actuators

The "HR-OS5 Humanoid Research Robot" uses the following Dynamixel Servos:

- 12 × MX-106T Dynamixel Actuator.
- 6 × MX-64T Dynamixel Actuator.
- 2 × MX-28T Dynamixel Actuator.

Sensors

The "HR-OS5 Humanoid Research Robot" uses the following sensors:

- 3-axis gyroscope
- 3-axis accelerometer for posture estimation and balancing.
- Camera - Sony ICX424 0.3 MP, 84 FPS, resolution 648x488.
- 3 microphones in the robot'head.

Controller

The ”HR-OS5 Humanoid Research Robot” uses Intel NUC D54250WYB SBC, featuring Intel Core i5-4250U (Haswell 4th generation).
WiFi is enabled for team communication.
The robot has Arbotix-Pro/CM-730 ARM sub-controller. The Arbotix-Pro/CM-730 ARM connects between the servos and the NUC. The CM-730 is connected to the NUC via a USB port. The camera is connected to the NUC via a USB port as well.

References

[1] HROS5-Framework wiki, https://github.com/Interbotix/HROS5-Framework/wiki.

[2] Robotis Product Information, http://www.robotis.com.