

# Biped Walk and Talk Robot

Prof. M.V.Wagh<sup>1</sup> Nikhil Jogi<sup>2</sup> Ronit Gurav<sup>3</sup> Juilee Talele<sup>4</sup> Kalpesh Mahajan<sup>5</sup>

<sup>1,2,3,4,5</sup>Department of Electronics & Telecommunication Engineering

<sup>1,2,3,4,5</sup>Sandip Institute of Technology and Research Centre, Savitribai Phule Pune University

**Abstract**— A vast growth in the technology over the past couple or three decades, due to new advancements it is possible to reduce the human efforts with the help of machines. So, the robot which is an electromechanical machine is the best examples to reduce the human efforts. Robots are widely known in the field of automation, interaction with human being as well as entertainment. Robotics has been a glittering star in the field of human interaction and entertainment. Controlled and manoeuvre using computer program and an electronic circuitry, robot can move and manoeuvre using wheels. Many of today’s robots with a boon of scientific advancements are inspired by human-like actions. Walking on two legs has been one of key success of today’s humanoid robots. Bipedalism or walking on two legs is something that a “biped robot imitates from a human being. These biped robots teamed up with a well equipped programmed board and a speaker can walk and talk as well. These robotics applications are mostly used in institutes for administration offices and also in corporate companies for an interestingly amazing interaction with visiting guests and employees.

**Key words:** Humanoid, Bipedalism, Biped, Interaction with Humans, Interesting and Amazing

## I. INTRODUCTION

A humanoid robot is a robot that resembles the biological human like body structure. These robot can manouver using two legs just like a human being. It also has a human torso and a head having human like features. One such best example has been Honda’s ASIMO. Humanoid are widely utilized in research and utility tasks. They are tool-kits in several scientific and research areas. This knowledge has helped in field of military and security as well. In terms of security issues a humanoid is capable to act and move just like a human being. This has been a major advantage considering many robots use wheels to manouver. Apart from research and security tasks, humanoids are efficient in regular jobs such as receptionist or a campus guide for visitors.

Humanoids are advanced versions of simple biped robots. Biped robots use the concept of bipedalism. Bipedalism is a biological term that is used to define the walking of living things on two legs. Biped robots thus manouver using their two legs instead of traditional concept of wheels. This makes the robot move like a human. An audio playback consol and ultrasonic sensors can be further used to make the robot speak and detect things around. Further a wired system or a Bluetooth controlled wireless system can be used to control and command the robot.

## II. LITERATURE REVIEW

Sr. No	Paper Title	Objectives
1	A Microcontroller Based Four	In this paper we studied that, the robot arm system has fourteen

	Fingered Robotic Hand	individual instructions/commands for all the four fingers. These instructions include opening and closing of the fist, wrist movements like upwards and downwards, rotating the wrist, Pick and Place instruction and Home position for the moving fingers. [1]
2	Virtual Reality Simulation of Humanoid Robots	The aim is to describe humanoid motions using advanced level language and blueprint a humanoid motion description language. The new syntax new motion primitives and that allow programmers the ease to study and review complicated humanoid movements and motions.[2]
3	Walking Pattern Generation with Non- Constant Body Height Biped Walking Robot	To develop a method of walking pattern generation with non-constant body height towards quasi natural walking.[3]
4	Experiment and Analysis of Quadrupedal Quasipassive Dynamic Walking Robot “Duke”	In this paper the walking of a quadruped is studies and gait of animals is intensively observed so as to study the maneuvering pattern.[4]

Table 1: Literature Review

## III. SYSTEM DEVELOPMENT AND WORKING

In our project the controller the biped robot is controlled using USB 16 servo controller board. This board uses ATMEGA8A IC. A total of four servos are used to manoeuvre the robot. The top two servos control the hip movement while other two are used for controlling ankle movements. The ankle servos are provided with a delay more than the hip servos as to form a firm base when the opposite leg is lifted. This helps to stabilize the biped. The movements of the biped are and commanded from a Bluetooth application that helps to operate the robot wirelessly. When “stop” instructed the robot can produce the speech pre-recorded in the Audio Playback module interfaced on the USB 16 Board. The biped is powered with a rechargeable battery which is fixed upon the biped’s torso. The CNC cut parts make the total system weigh lighter thus improving the movements of the biped and making it easy to stabilize.

## IV. SYSTEM ARCHITECTURE

Simplified system architecture of “Biped Walk and Talk Robot”

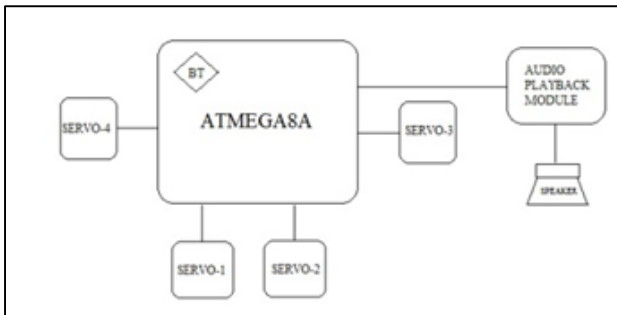


Fig. 1: Architecture of Biped walk and talk robot

A. Algorithm of the Biped functionality:

- 1) Start
- 2) Set the biped servos to centre position
- 3) Connect the system with Android UI Application using Bluetooth
- 4) Command for Forward/Backward/Right/Left movement
- 5) If "Stop button"="="1"
- 6) Stop Movement and reset biped servos to centre position
- 7) Talk the pre-recorded speech from the Audio Playback
- 8) Else "Continue movement" ;as instructed
- 9) Stop

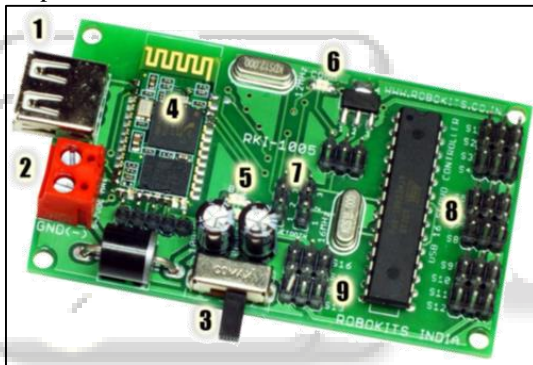


Fig. 2: USB 16 Servo Controller

B. Description-USB 16 Servo Controller

1	USB Connector .
2	Power connector for 5V – 7.5V input.
3	Power ON/OFF.
4	Bluetooth Module.
5	Bluetooth Status LEDs.
6	USB connection LED.
7	USB / Bluetooth Selection Jumper 1-2 used for Bluetooth, 2-3 for USB.
8	Servo 1 to Servo 12 Connectors.
9	Servo 13 to Servo 16 Connectors.

Table 2: Description - USB 16 Servo Controller

V. CONCLUSION

The main purpose of the project is to create interesting biped that can greet visitors at institutes and company reception desks. The robot is hand and light weighed. It uses a rechargeable 7.4V battery to power up and can be easily operated wirelessly using an Android Phone. A Bluetooth operated system makes it easy to implement in the locations and looks cool and amazing with visiting guests and people around.

REFERENCES

- [1] P.S.Ramaiah M.Venkateswara Rao G.V.Satyanarayan, "A Microcontroller Based Four Fingered Robotic Hand", in April 2011, pp. 1-7.
- [2] Yingheng Zhou and Ben Choi, "Virtual Reality Simulation of Humanoid Robots", The 33rd Annual Conference of the IEEE Industrial Electronics Society (IECON), in November 2007, pp.1-6.
- [3] Ren C. Luo, Hong- Hao Chang, Jun Sheng, Peng-Hsi Chang, "Walking Pattern Generation with Non-Constant Body Height Biped Walking Robot", in 2013, pp. 1-6.
- [4] Takeshi Kibayashi, Yasuhiro Sugimoto, Masato Ishikawa, Koichi Osuka and Yoshiyuki Sankai, "Experiment and Analysis of Quadrupedal Quasipassive Dynamic Walking Robot "Duke"", 2012
- [5] IEEE/RSJ International Conference on Intelligent Robots and Systems, in "October-2012" pp. 1-6.