Intership Project Status Report

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1 Personal Details

Name: Vijay G. Belurkar

Email Id: vijaybelurkar@gmail.com

**Department:** Electronics and Communication

College: PES Institute Of Technology, Bangalore

Mobile Number: +918147007507

Title of Project: Humanoid Robot

Duration of the internship: 26 May 2014 to 10 July 2014

Summary of your contribution to the project: The project assigned to my team was Humanoid Robot which was mentored by Saurav Shandilya and Vishwanathan Iyer under the guidance of Prof.Kavi Arya. First of we identified that the project involved both Electronic as well as mechanical work and having a mechanical team member helped a lot. So we decided to split the work among us depending on our specialization. I had to basically do the embedded system part of the robot like interfacing and controlling the servo motors and troubleshooting when required. The programming part was handled by me to achieve all the basic motions of the robot. Since the given design had many faults we had to re-design the entire robot.The design and construction part was handled by both of us were we both brainstorm the faults in the existing design and came up with the new design and build the whole structure together.

Schematic Diagram Representing degree of freedom
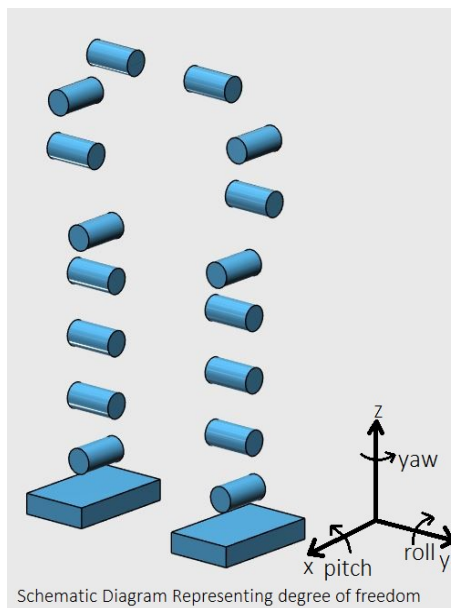
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Objective of the work: I have always liked to work with hardwares rather than only programming stuff. So, I was inclined towards hardware projects given the list to us which involves automation using embedded programming.

Our mentor initially instructed us that we have only concentrate on building a robust robot which can perform some basic moves and if time permitted we could do the advanced stuff like GUI,Camera etc

So,this was quite my kind of job and I choose to go with Humanoid Robot.

Scope of the work: Build a humanoid robot with 16 Degrees of Freedom and perform basic movements

Completion: Construction of Robot, Study Timers and Interrupts in ATMEGA 640, PWM generation using Interrupts, Interfacing Servo Motors, Calculation of the C.G, Sequence of servo for motion of the robot and design & construction of the robot
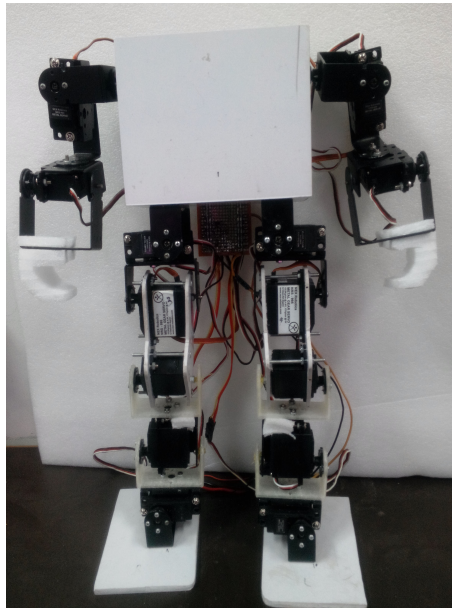
Results and Discussion: We were successful in building a 16 DOFs humanoid which can walk, balance on one leg, do sit-ups. We had a choice of working on existing structure or build our own design from Scratch. We went with choice of working with the existing structure because it would save time, but we found many faults in the existing structure so we discarded that structure. Built our own structure simultaneously interfaced 16 servos on the micro-controller and calculated the C.G of the structure and then robot was programmed. Stability and motion of the robot was handled by me which involved calculation of C.G (center of gravity), describing the sequence of servos for motion of the robot both were completed successfully.

Features & Bugs: The features of the robot are, walk is human like, can balance on one leg, can perform sit-ups. Drawbacks are, existing structure cannot accommodate a battery on its body, and this can be fixed with little modification of the structure or the physical modification of the battery. Cannot walk on uneven surface

Future Work:

1. Making modules for different possible movements.

2. Interfacing gyros for auto stabilization of the robot.

3. Building a GUI for controlling the robot autonomously.

4. Interfacing camera along with a smart processor like raspberry pi or a beagle board

5. Interfacing various sensors like ultrasonic sensors for distance calculation, accelerometer,Xigbee for wireless communication.

References

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