

# BIBO



## **GROUP DETAILS...**

Group Name: TOTO

Preferred slot: Slot 1

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## **ABSTRACT...**

Through our ITSP 2015 project we aim to develop a biped robot which exhibit artificial intelligence. We aim to get taste of the exponentially expanding field of AI and our robot being our first step in this direction through opportunity provided by STAB.

## **MOTIVATION...**

We thought this idea because it would be a lot easier to use it through voice commands. This idea may be used in various fields such as industries, etc. Also, for old and handicapped people, the idea will serve as a boon as they would just have to order the bot.

## **SALIENT FEATURES...**

1. Easy to use and program.
2. More Intelligent Biped Robot.

**APPROXIMATED COST – Rs. 6000 to 8000**

## **INTRODUCTION...**

The robot works on the fact that when we give command it stores the action using sound and image processing and later when we repeat the command with a certain code before the instruction it recognizes it from its stored memory and produce the action that was recorded by it. The mechanical parts of the robot would involve servo motor giving it certain degree of freedom which would be restricted to only hand and legs.

## **COMPONENTS REQUIRED...**

Servo motors, Arduino board, microphone, mechanix kit, Webcam, basic electronic components, basic tools, Accelerometer.

## **WORKSHOPS REQUIRED...**

1. Image Processing
2. Sound Processing
3. Biped robot Basics sessions
4. Matlab Sessions

## **IMPLEMENTATION STEPS...**

1. Design the biped robot and prepare its mechanical structure. to aim use servo motors to give robot certain degree of freedom in legs and hand with hand ,feet ,torso remaining fixed.
2. We help our robot take input through sound involving certain kind of sound processing .for example if user says the initial command “take command” and then say line corresponding to command then end it with “end line”. Then whatever is said between “take command “and “end line “ is stored as a string .
3. If the line which is given (is not similar to any other line given before) then input action has to be given to the robot .if the line is unique robot will itself ask for action which has to be initiated through “start “ command and ended with “stop”. Action would reach the robot through image processing and can involve only movement of arm and legs for certain time interval which would be taken by robot through camera.
4. To get output later the command has to be initiated as “listen BIBO” and then the command line .If the command is present in one of the commands defined by the user then it will perform the action corresponding to it.
5. Apart from this certain basic commands would already be imbedded in the robot which would be designed by us in commands. Example-if u say listen BIBO and then say “how are u” then it would reply as “I’m fine” and a jerk of arm.

# **MILESTONES TO ACHIEVE...**

## **WEEK 1 : MECHANICAL MODULE**

- *Preparing the structure of the robot.*
- *Looking after the various mechanical aspects , involving motion of body parts and stability of robot.*

## **WEEK 2 : TEST CASES**

- *Predefined commands would be created by us which can directly be used by user by just giving the command and bot will perform the corresponding action.*
- *Testing of robot about sound processing.*

## **WEEK 3: SOUND PROCESSING**

- *Programming the bot to take input voice from the user and store it in certain form.*
- *Testing speech recognition and storing in memory.*

## **WEEK 4 : IMAGE PROCESSING**

- *Programming the bot to take input actions from the user and storing it to the corresponding voice commands (the action could be inform of voice output or movement of parts).*
- *Testing Image processing and storing actions in memory.*

## **WEEK 5 : DEBUGGING**

- *Debugging and buffer week.*
- *Removing errors if any, and a thought on its future enhancement.*

## **KEY CHALLENGES...**

1. We are likely to be challenged in making the working robot structure. It would be difficult to balance the robot on two legs just using servo motors.

Solution: A backup plan to replace biped robot by a Hexapod Robot.

2. Proper Image and sound processing can be other challenge in real time processing.

Solution: Test cases to test basic functioning of robot.

## **DEMONSTRATION...**

In the final phase, We plan to demonstrate working of the biped robot with commands such as "walk", "turn", "say hello", "detect red color", "capture image", "sit" and other similar actions. Other commands will be given by the user which the robot will learn to perform (real time handling of data).

## **REFERENCES...**

1. [http://en.wikipedia.org/wiki/Humanoid\\_robot](http://en.wikipedia.org/wiki/Humanoid_robot)
2. <http://www.instructables.com/id/Arduino-Biped/>
3. <http://www.instructables.com/id/Arduino-Robot-v1/>
4. <http://letsmakerobots.com/content/arduino-biped-code>
5. <http://www.3ders.org/articles/20120326-how-to-build-a-low-cost-4-servo-arduino-biped-robot.html>
6. <http://www.projectbiped.com/>
7. <http://www.robotshop.com/en/hexapod-development-platforms.html>
8. [http://en.wikipedia.org/wiki/Hexapod\\_\(robotics\)](http://en.wikipedia.org/wiki/Hexapod_(robotics))
9. <http://www2.cs.siu.edu/~hexmoor/classes/CS404-S09/RobotLocomotion.pdf>