OTTO - AN Interactive Robot

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***Abstract*— Otto is an interactive robot that is truly open source. It means the hardware is easily discerned so that others can make it. It is Arduino compatible, 3D printable and customizable. The act of building and coding own Otto creates an emotional attachments between you and Otto.**

I. INTRODUCTION

Otto brings children and people closer to technology. Building Otto, one can learn logical connection between code and action, and by assembling it they understand how its components and electronics work. The ideal companion for developing steam skills. Via the instructions, people exercise mathematical thinking, reinforce their technological and physical knowledge and enhance abilities such as problem solving and creativity. Through play and experimentation people can learn about this technological product in a fun and educational way.

II. TECHNICAL REQUIREMENT

A. Component

1) Arduino Nano
2) Arduino Nano Shield
3) Mini USB cable
4) HC-SR04 Ultrasound sensor
5) Bluetooth HC-05
6) Mini servo SG90 9g x4 (each comes with 2 pointed screws and one small screw also arm keys to attach legs and feet)
7) 5V passive Buzzer 12mm
8) Female to Female breadboard connectors cable 10cm x6
9) 4 AA Battery case
10) 1.5V AA batteries x4
11) Phillips screwdriver (important: magnetized)
12) Square micro Switch 8x8mm
13) 3D printed head
14) 3D printed body
15) 3D printed leg x2
16) 3D printed right foot
17) 3D printed left foot
18) Computer with mblock installed and tested

B. Component Description

- Arduino Nano: The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328P (Arduino Nano 3.x). It has more or less the same functionality of the Arduino Duemilanove, but in a different package. It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one.

- Arduino Nano I/O Shield: Nano IO shield is a breakout board for Arduino Nano. It breaks out all pins as a 3pin interface for driving servos or interfacing with sensors, Zigbee XBee Series Modules and nRF24L01 wireless interfaces. Supports 7-12V external power supply.

- Ultrasound Sensor: Ultrasonic transducers or ultrasonic sensors are a type of acoustic sensor divided into three broad categories: transmitters, receivers and transceivers.

- Blutooth: HC05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module,designed for transparent wireless serial connection setup.The HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication.This serial port bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Bluecore 04External single chip Rluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature).

- Mobile Application: In this project used a built in mobile app that sends commands so that otto can perform as commanded.

- Mini servo SG90: Tiny and lightweight with high output power. Servo can rotate approximately 180 degrees (90 in each direction), and works just like the standard kinds.

- Buzzer: A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

- Jumper: Jumper is used to connected with full circuit.Here used M2M and M2F jumper.

- Battery: Battery is used for power supply.

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III. PROCEDURE

Otto is a bluettoth control interactive robot that can be controlled through Mobile application. It follows command as directed signals. Otto walks, dances, makes sounds and avoids obstacles.It also find out its path when there is any object detected infront of it. It can be coreographed in different music. We can set different steps to move or walk or dance like a human on music.It has emotions that it express through its matrix mouth and buzzer. If it doesn't get any command, it will automatically go in sleeping mode and obviously it snors like a human while sleeping.

IV. APPLICATIONS

- Learners can describe the components of a Robotic system, including hardware, software systems, and applications.
- Learners can give examples of how Robots are used in the real world.
- Learners build Ottos and drag and drop blocks of code.

V. LIMITATION

- This robot has no hands. So it can't act those human activities made with hands.
- The module includes the Bluetooth 4.0 Low Energy (BLE) technology and requires only a serial port for communication.

VI. CONCLUSION

Otto was inspired by another robot instructable BoB the BiPed and programmed using code from another open source biped robot called Zowi. Otto walks, dances, makes sounds and avoids obstacles. Otto is design using Autodesk 123D Design software you can modify it for customization or further improvements.