TECH-CHRONICLE
AN INTERNATIONAL E-JOURNAL ON
EMERGING TRENDS IN SCIENCE, TECHNOLOGY AND MANAGEMENT

# *DESIGN AND IMPLIMENTATION OF "OFFICE BOY ROBOT" USING ARDUINO UNO*

Miss. Princy S Vaidya
Dept. of Electronics & Telecommunication Engineering
J D College of Engineering & Management,
Nagpur, India
Princy.vaidya@gmail.com

Mr. Prajyot P Sahare
Dept. of Electronics & Telecommunication Engineering
J D College of Engineering & Management,
Nagpur, India
Prajyot.sahare@gmail.com

Mr. Vishal K Aney
Dept. of Electronics & Telecommunication Engineering
J D College of Engineering & Management,
Nagpur, India
vishalaney@gmail.com

Miss. Ekta S Walde
Dept. of Electronics & Telecommunication Engineering
J D College of Engineering & Management,
Nagpur, India
ektawalde227@gmail.com

Miss. Prajakta N Bele
Dept. of Electronics & Telecommunication Engineering
J D College of Engineering & Management,
Nagpur, India
prajaktabele795@gmail.com

**Abstract:** A robot is usually an electromechanical machine that is guided by computer & electronic programming. Many robots are found in industries, offices, hotels for completion of different kind of tasks. Designing and implementation of "Office Boy Robot" is controlled using an App which is used in android mobiles in which we can use Bluetooth communication to interface Arduino UNO and Android. Arduino Uno can be interface to the Bluetooth module through UART protocol. According to command received from android app, the robot motion can be controlled. An "Office Boy Robot" is a line follower robot which follows line either black or white for finding the path. This robot is programmable and can be interchanged to provide multiple applications. The basic need to build an "Office Boy Robot" is to save time and man power. Now-a-days people get less time and more work. So in order to reduce the man power and energy we have designed this robot. It will also save our money. For ex. Now-a-days peon has salary of about 20000 per month. It means you can save 2,40,000 in a year.

## I. INTRODUCTION

Line follower is a machine that can follow a path. The path can be visible like a black line on a white surface (or vice versa) or it can be invisible like a magnetic field. Sensing a line and maneuvering the robot to stay on course, while constantly correcting wrong moves using feedback mechanism forms a single yet effective closed loop system.

The project we have designed i.e. "Office Boy Robot" is designed primarily for working in offices as per the name of the project. By using "Office Boy Robot" in offices we can save the time and man power which are the too important things of our lives. We can use the office boy robot to transfer the file or other things from one place to another weighing up to 5kgs.Apart from that, the secondary use of Office Boy Robot is they can be used in industries for transferring mechanical parts of any machines from one place to another. Also they can be used in houses for transferring utensils or food stuffs.

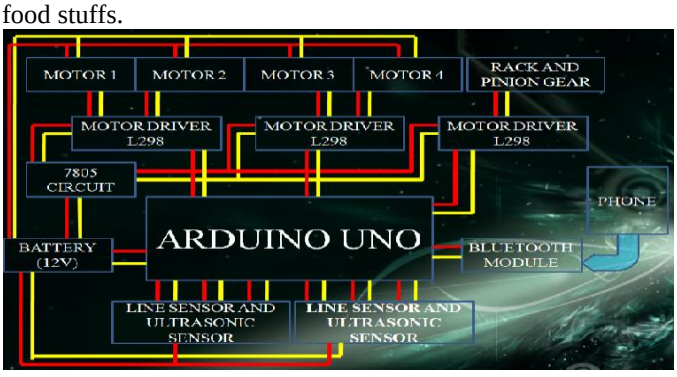



**Fig. 1: Block Diagram**

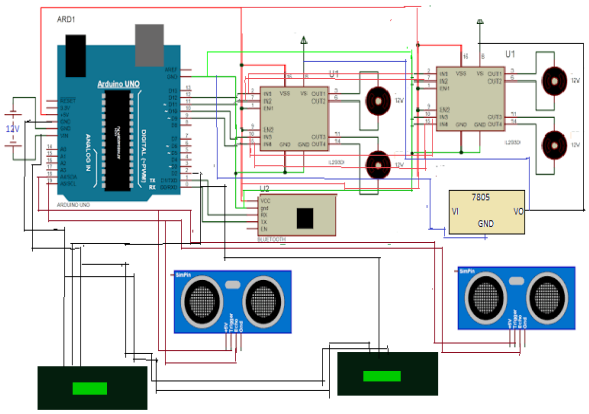



**Fig. 2: Circuit Diagram**

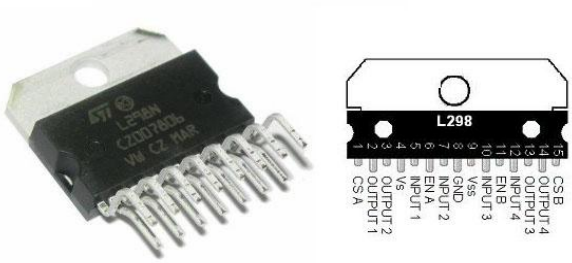
## II. HARDWARE USED

### 1. Johnson DC motor :-

A Johnson gear DC motor is a simple DC motor with gear box attached to the shaft of the motor which is mechanically commutated electric motor powered from direct current. It has exclusive high torque, best suitable with highly developing capable robots or robotic platform, various automation purposes.

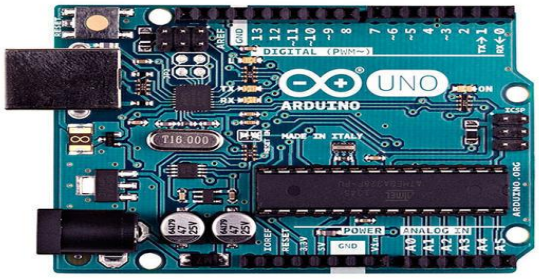
Gear box is built to handle the stall torque produced by the motor, the motor shaft comes with a metal bushing for wear resistance.

### 2. Motor driver L298:-




This is a high power motor driver IC perfect for driving DC motors and stepper motors. It uses the popular L298 motor driver IC and has onboard 5v slot regulator which it can be supplied to an external circuit. It can control up to 4 DC motors or 2DC motors with directional and speed control. This motor driver is perfect for robotics and Mechatronic projects and perfect for controlling motors from microcontrollers, switches, relays, etc. perfect for driving DC and stepper motors for micro mouse, line following robots, robot arms etc.

### 3. Arduino uno:-

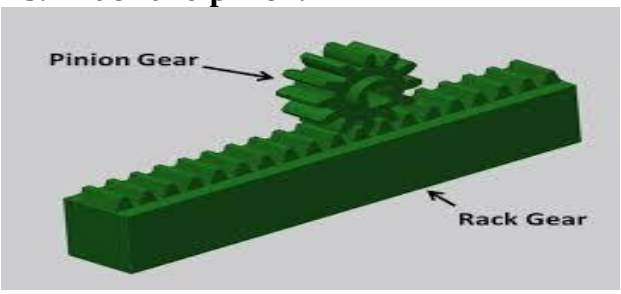



The Arduino uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins, 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, an power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding board in that it does not use the FTDI USB (future technology devices international)-to-serial driver chip. It features the ATmega8U2 programmed as a USB-to-serial converter.

### 4. Line sensor:-

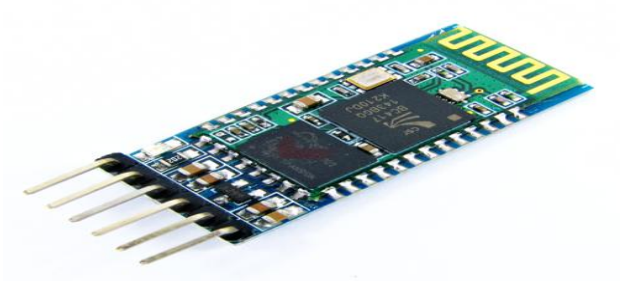
LSA08 (Advance line following sensor bar) consist of 8 sensor pair. LSA08 is typically use for embedded system or robots for line following tasks. The specially selected wavelength of super bright green led as the sensors transmitter enables LSA08 to operate on various different colour surfaces. LSA08 is a capable to operate on surface with colour of red, green, blue, white, black, gray and possibly other colours with distinct brightness different. LSA08 has several different output modes, for the convenience of use for any system.

### 5. Rack and pinion:-



A rack and pinion is a type of linear actuator that comprises a pair of gears which converts rotational motion into a linear motion. A circular gear called “the pinion” engages teeth on a linear “gear” bar called “the rack”; rotational motion applied to the pinion causes the rack to move relative to the pinion, there by translating the rotational motion of the pinion into linear motion.
The rack carries the full load of the actuator directly and so the driving pinion is usually small, so that the gear ratio reduces the torque required.

### 6. Bluetooth module HC-05:-



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 Bluetooth 04-External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature). It has the footprint as small as 12.7mm x 27mm. hope it will simplify your overall design/ development cycle.

### 7. Battery:-


Batteries deliver the full rate capacity at a price everyone can afford. Orange batteries are equipped with heavy duty discharge leads to minimize resistance and sustain high current loads. Orange batteries stand up to the punishing extremes of aerobatic flight and RC vehicles. Each pack is equipped with gold plated connectors and JST-XH style balance connectors. All orange Lithium Polymer batteries pack are assembled IR matched cells.

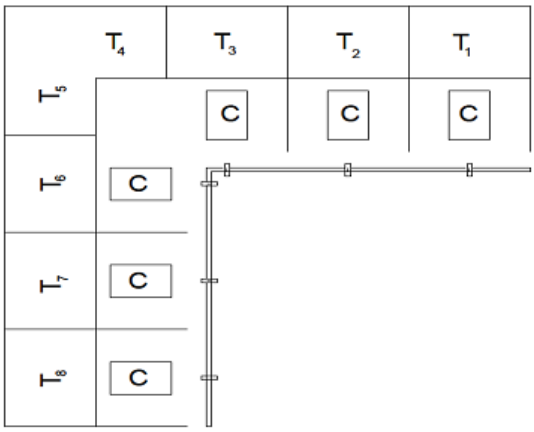
### 8. Ultrasonic sensor:-


The HC-SR04 ultrasonic sensor uses SONAR to determine distance to an object like bats or dolphins do. It offers excellent range accuracy and stable readings in an easy-to-use package. It operation is not affected by sunlight or black material like Sharp rangefinders are (although acoustically soft materials like cloth can be difficult to detect). Ultrasonic Ranging Module HC-SR04 provides 2cm-300cm non-contact distance sensing capabilities, Ranging accuracy up to 3mm; module comprises an ultrasonic transmitter, a receiver and a control circuit.

## III. SOFTWARE USED

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuine hardware to upload programs and communicate with them.
Arduino is an open-source project, enabling hobbyists to easily take advantage of the powerful Atmega chips. The Arduino IDE is the software where you can write code and upload it to the Atmega chip. The code is then executed on the chip. Most 3D-printer electronics are Arduino compatible. They use the Atmega chip and enable the user to upload their code using Arduino. This includes Megatronics, Minitronics and RAMPS. Before you can start using the electronics you need software 'firmware', that translates machine instructions (gcode) into actual movements. There are a few options here, including Marlin and Sprinter and Repetier. The actual firmware is not discussed in this document. You can use Arduino to upload this firmware onto your electronics.

## IV. WORKING OF PROJECT




This project is operated by an android app and it is Bluetooth controlled robot. For this, android user need to install an application in his/her mobile. Then user need to turn on the Bluetooth of his/her mobile. Then wireless communication techniques and to control the robot id Bluetooth technology. User can use various commands like move forward, reverse, stop, move left, move right. These commands are sent from android mobile to the Bluetooth receiver. After receiving the commands, Bluetooth module gives it to the Arduino UNO to control motors. The Arduino UNO transmits the signal to the motor driver L298 to operate motors.

So if 5th no. table member wants the file from 1st no. table member then the robot will start to move from 1st table. During this transformation, the robot will stop on every table for few seconds. So if any member between 1st to 5th table need to transfer the file, they can do it accordingly.

## V. APPLICATION

- **In Offices, Schools and Colleges** :- Employees in offices, teachers in schools, lecturers in colleges, sometime they want file and document from another person urgently . So they call peon to complete their wok or sometime they complete their work themselves. Therefore by using Office Boy Robot they can complete their work ,so that they can save their time and manpower.

- **In Industries**:- In industries , so many workers are working. If suppose they are working on any machine and they want their small parts which are kept in another place ,then they go that place for pick up the parts and after that they reach their place of machine. So it consume more time and manpower. Therefore for saving time and manpower this robot is nice option.

- **In Houses**:- Now a day if we see, women are doing a job i.e. mostly working women. They get less time to complete their house work. So with the help of this robot they can complete their work in less time.

- **In Hotels**:- In hotels, customers are received their orders of food by waiters of the hotels . Instead of waiters office boy robot can also work ,so that customer can received order of food in less time

# References


[1] (Android Developers Guide. Android Architecture.

[2] Heidi Monson (1999) Bluetooth technology and implementations, John Wiley & Sons.

[3] Piyare, R. and Tazil, M. (2011) "Bluetooth based home automation system using Android phones". IEEE 15TH International symposium on consumer electronics (ISCE), 14-17 June 2011, Singapore.

[4] Potts, J. and Sukittanon, S. (2012) "Exploiting Bluetooth on android mobile devices for home security application", proceedings of southeastcan, 15-18 March 2012, Orlando, Florida,USA.

[5] HC-06 Bluetooth module.

[6] (Arduino, ios, android and technology tit bits.

[7] AKSOZ, Ahmet, Salim ENGIN, and Mahir DURSUN. "The Implementation of Controlled Humanoid Robot with Android."

[8] Javale, Deepali, et al. "Home automation and security system using android adk." International journal of electronics communication and computer technology (IJECCT) 3.2 (2013).

[9] Khurana, Anil. "Bluetooth Based Robotic Car."

[10] G¨obel, S., Jubeh, R., Raesch, S. L., and Z¨undorf A., "Using the Android Platform to control Robots", Kassel University Germany.

[11] Harshavardhan B.Patil, Prof.V.M.Umale ―Arduino Based Wireless Biomedical Parameter Monitoring System Using Zigbee.‖ IJETT, Volume 28 Number 7 - October 2015.

[12] V. Naga phanindra, B. Suresh Ram ― Wireless Remote Control Car Based on ARM7.‖ IJETT, Volume 5 Number

move from 1st table. During this transformation, the robot will stop on every table for few seconds. So if any member between 1st to 5th table need to transfer the file, they can do it according