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# Design and Implementation of Robotic Arm for Pick and Place by using Bluetooth Technology

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**Abstract:** *In today's age of advanced computing, robots are far more reliable than humans when it comes to doing hazardous jobs. Earlier iterations of robotics required human interaction, but recent advancements in wireless technology have made it possible to operate robots wirelessly, via Bluetooth, for example. The robot in this paper can be operated wirelessly through Bluetooth. An android app coupled with a microcontroller performs the necessary functions. Bluetooth is used to establish a link between the smartphone app and the car. The user operates the robot using buttons on the app. The robot can move thanks to two dc servo motors that are linked to a microcontroller on the receiving end. For the wireless RF transmitter to reach the robot, it must first transform the Bluetooth orders into digital signals. The data is received by the receiver, where it is decoded, and sent on to the microcontroller, which in turn controls the DC motors to perform the required action. The purpose of this study is to develop and deploy a low-priced, adaptable, and secure Bluetooth-controlled robotic vehicle capable of carrying out the user's specified tasks. Bluetooth has several benefits as an interface medium. To begin, you won't need any special instruction to use this technology. Second, if services were simplified, more people would use them, and those with a wider range of impairments would be able to use the same tools as everyone else.*

**Keywords:** *Arduino, Bluetooth, DC Motor, DC Regulated Power Supply, Battery.*

## 1. INTRODUCTION

The goal of this paper is to create a pick-and-place robot equipped with a gentle gripper. The goal of this paper is to create a catchable gripper for use on a pick-and-place robotic vehicle. The project will involve the creation of an android app and a mobile robot that can transport items. Bluetooth module (HC-05) is used as a connection among Mobile & vehicle (robot),

and signals (i.e., ASCII code) are sent from the transmitting end, where an android application device is located, to operate the vehicle. AVR Studio is used to programme the microcontroller that operates the motors that propel the robot and those that grasp items with the mechanical arm. To drive the robot forward, backward, left, or right, etc., orders are sent from an android application device at the sending end to a receiver at the receiving end. On the receiving end, a microcontroller is connected to four motors, two of which move the robot's arms and grippers and the other two its body. The transmitter android app device functions as a remote control with sufficient range, while the Bluetooth device at the receiver end is fed to the microcontroller to operate DC motors through motor driver IC to complete the required tasks.

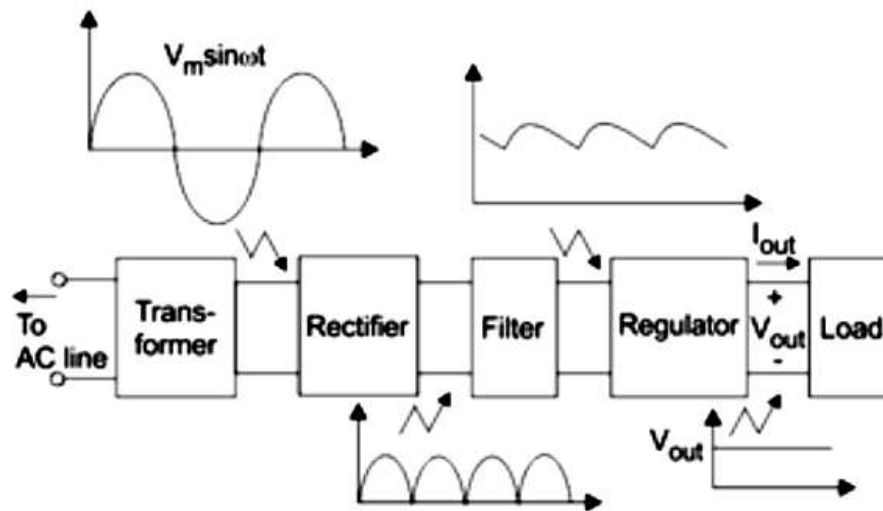
Any Android-powered smartphone, tablet, etc., with a touch screen, may be used as a remote control using the device's GUI (Graphical User Interface). The key benefit of this robot is its soft grabbing arm, which is intended to prevent applying any more pressure on the questionable object. Some of the applications are listed below.

- Mobile phone management and conversation through wireless headset.
- All of this became one of the first widely used programmes of its kind.
- Using wireless connections between computers in a small area when there is a low demand for data transfer.
- Wireless connectivity to standard PC input/output devices including mice, keyboards, and printers.
- OBEX allows for the transfer of data between electronic gadgets.
- With OBEX, you can sync your contacts, calendar events, and alerts across all of your devices.
- Test instruments, GPS receivers, medical devices, bar code detectors, and traffic control systems can do away with their wired serial connectivity.
- In places where infrared controls have been utilised before.
- Bluetooth-enabled billboards may broadcast little commercials to nearby Bluetooth-enabled smartphones.
- Bluetooth is used in the wireless controllers of both the Nintendo Wii and the PlayStation 3, both seventh-generation gaming systems.
- Use of a data-capable mobile phone as a modem for dial-up browsing on a personal computer or personal digital assistant.

## **System Components**

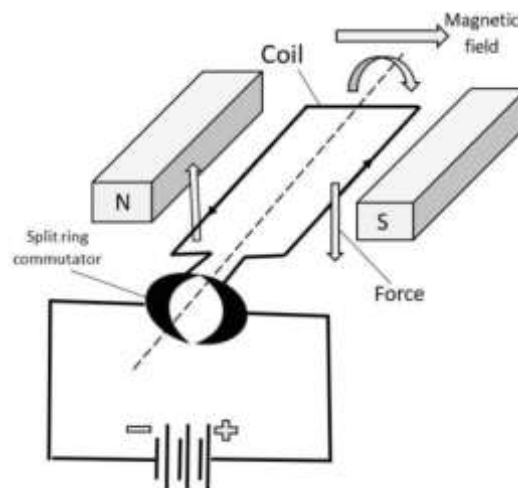
### **A. Power Supply:**

The purpose of these power supplies is to reduce the voltage of the AC mains energy so that it may be used by electronic circuits as well as other devices. Each component of a power supply serves a specific purpose and may be analysed independently. The regulated electrical supply takes in alternating current and outputs a stable direct current. See an example of a typical regulating DC power supply's block diagram in the image below.



### B. Dc Motor

A DC motor requires DC electricity in order to function properly. The ball-bearing motor, which is still relatively new, & Michael Faraday's homopolar drive are two instances of pure DC designs. The two most prevalent forms of DC motors, brushed and brushless, convert the DC power they receive from an external or internal commutator to an alternating current (AC), making them not, strictly speaking, DC machines.



### C. Bluetooth:

Bluetooth is a wireless system that uses short-range communications technology to allow for the transfer of data between mobile and stationary devices over short distances, hence enabling the creation of Bluetooth-based personal area networks (PANs). The goal in developing Bluetooth was to build only one digital wireless protocol that could link various devices and solve problems associated with keeping them in sync. The radio technique utilised by Bluetooth is known as frequency hopping spread spectrum, and it is incredibly reliable. The data being delivered is broken up into smaller pieces and broadcast over a wide range of frequencies (up to 75 in total).



#### D. Arduino:



The Arduino Uno is the most widely used board in the Arduino family. When people talk about an Arduino, they usually mean this board. The Uno is a wonderful option for those just getting started with Arduino. There have been several iterations of the Arduino Uno, and we've included information about the most recent one (Rev3 or R3) below. The Arduino Uno is an ATmega328-based microcontroller board. It is equipped with a reset button, a USB port, a power connector, an ICSP header, and 14 digital I/O pins (6 of which may be utilised as PWM outputs).

#### Proposed System

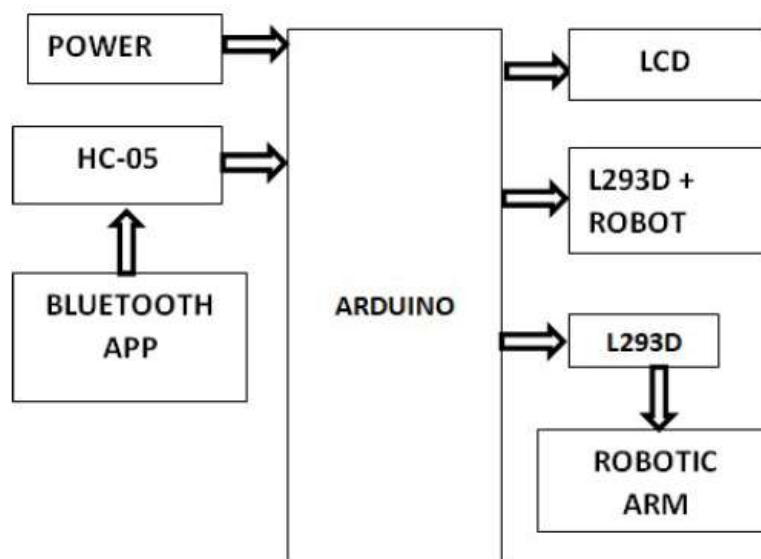
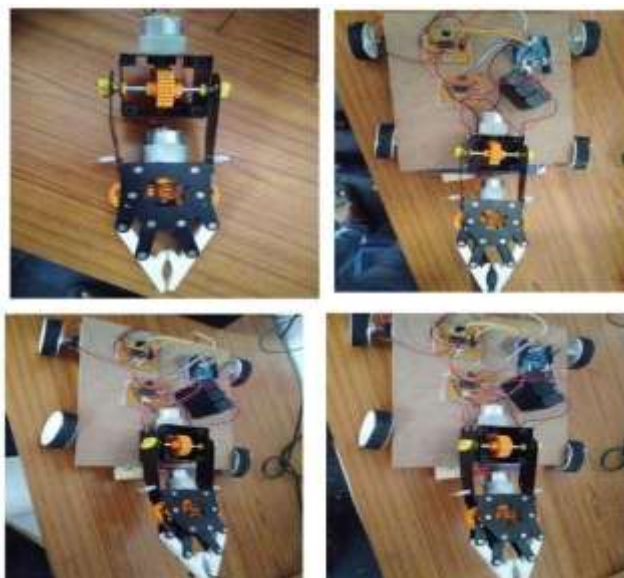


Fig: Block diagram of proposed system.

As part of this concept, we will build an app for Android and a mobile robot that can transport items. This allows you to operate the car from afar. Any Android-powered smartphone or tablet may be used for remote control with a graphical user interface (GUI) that allows for touch screen input. This proof-of-concept will pave the way for future, fully functional models based on the same idea. Bluetooth module (HC-05) is used as an interface among Mobile and vehicle (robot), and signals (i.e., ASCII code) are sent from the transmitting end, where an android application device is located, to operate the vehicle. AVR Studio is used to programme the microcontroller that operates the motors that propel the robot and those that grasp items with the mechanical arm. The robot's forward, reverse, left, and right movement are all controlled by orders supplied from the transmitting end utilising an android application device. On the receiving end, a microcontroller is connected to four motors, two of which operate the robot's arms and grippers, and the other two, the body. The transmitter android app device functions as a remote control with sufficient range, while the Bluetooth device at the receiver end is fed to the microcontroller to operate DC motors through motor driver IC to complete the required tasks. Any Android-powered smartphone, tablet, etc., with a touch screen, may be used as a remote control using the device's GUI (Graphical User Interface). The key benefit of this robot is its soft grabbing arm, which is intended to prevent applying any more pressure on the questionable object.

## 2. RESULTS

A study titled "Pick & Place Wireless Control Robotic Arm" is about to elaborate on the value of robots in the workplace. The fast development of technology in recent decades has prompted a corresponding shift in human thought; previously reckless individuals have learned to exercise caution and reduce their exposure to danger by making use of such development. Our work focuses on robotics, and as part of that we built a Robotic Arm that can be operated wirelessly over Bluetooth.





At first, we have to communicate with the arduino what to do. Here, Bluetooth serves as a communication mechanism, with orders coming from an Arduino. After that, the Bluetooth transmits the data to the circuits that power the motor. Here, we employ not one but two motor driver circuits: one for the wheels and the other for the arm and gripper. The drivers of the motor circuits receive orders and then transmit them on to the motors to perform the specified action. Once the Arm and gripper have received instructions from the Arduino & Motor Driver Circuit, they may move forward, backward, to the left, or to the right to safely pick up and place an object.

### **3. CONCLUSION**

The finished product is a functional model of a robotic arm vehicle designed to pick up and position components. Picking up heavy objects like bombs will be possible with future improvements and the addition of a high torque motor to the circuit, but the prototype is now incapable of doing so. If more improvements are made, such as the incorporation of a wireless camera into the circuit, further uses of the picking and arranging robot may be added, such as the ability to remove a bomb from a busy area and deposit it in a safe location.

### **4. REFERENCES**

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