

Design & Development of Bluetooth Handling Robot

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Abstract

Robot is a re-programmable, multifunctional device which is primarily designed to do work like human such as pick and place, loading and unloading, Surveillance, health care, industrial, aerospace application. Robots can perform dangerous and accurate work to increase the productivity as they can work many hours without rest.

This paper deals with the design and control of automated vehicle type robot which can move in desired direction.

Which interfaces with microcontroller to control its speed and direction. Aim of this work is to design and control the motion of robot using Bluetooth device of an android phone.

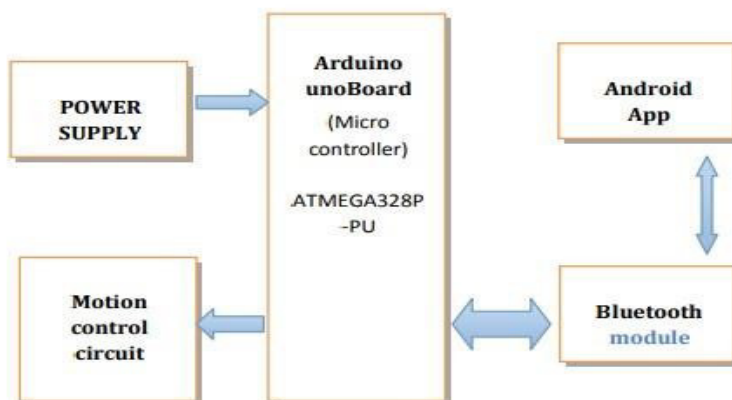
Key words: Bluetooth device, GUI (Graphical user interface), Android OS, Smartphone, Microcontroller.

Introduction:

A robot is an electromechanical machine that is controlled by computer program to perform various operations. Industrial robots have designed to reduce manufacturing cost. Today human machine interaction is moving away from mouse and pen and becoming much more pervasive and much more compatible with the physical world. Android app can control the robot motion from a long distance using Bluetooth communication to interface controller and android.

As per the commands received from android app the robot motion can be controlled. The output motion of a robotic vehicle is accurate and repeatable. Pick and Place robots can be reprogrammable and tool can be interchanged to provide for multiple applications.

SYSTEM ARCHITECTURE



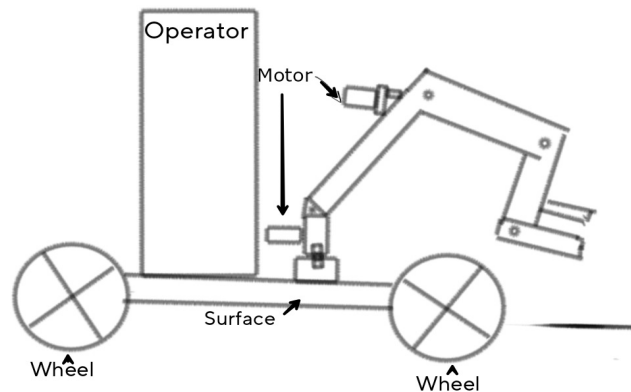
microcontroller with android Smartphone device. The controlling devices of the whole system are a microcontroller. Bluetooth module, DC motors are interfaced to the microcontroller.

Components

1. Arduino UNO
2. DC Motors
3. Bluetooth module HC-05
4. Motor Driver L293D
5. 9 Volt Battery and 6volt battery
6. Battery Connector
7. Robot
8. Microcontroller
9. LCD Display

•Working Explanation

In this project we have used a Robot for demonstration. Here we have selected a RF Robot with moving left right steering.



Feature

After buying this Robot we have replaced its RF circuit with our Arduino circuit. This Robot have two dc motors at its front and rear side. Front side motor is used for giving direction to Robot means turning left or right side (like car steering feature). And rear side motor is used for driving the Robot in forward and backward direction. A Bluetooth module is used to receive command from android phone and Arduino UNO is used for controlling the whole system.

Bluetooth controlled Robot moves according to button touched in the android Bluetooth mobile app. To run this project first we need to download Bluetooth app form Google play store. We can use any Bluetooth app that supporting or can send data. Here are some apps' name that might work correctly.

After installing app you need to open it and then search Bluetooth device and select desired Bluetooth device. And then configure keys. Here in this project we have used Bluetooth controller app.

Download and install Bluetooth Controller.

Turned ON mobile Bluetooth.

Now open Bluetooth controller app

Press scan

Select desired Bluetooth device

Now set keys by pressing set buttons on screen. To set keys we need to press 'set button' and set key according to picture given below:

After setting keys press ok.

When we touch forward button in Bluetooth controller app then Robot start moving in forward direction and moving continues forward until next command comes.

When we touch backward button in Bluetooth controller app then Robot start moving in reverse direction and moving continues reverse until next command comes.

When we touch left button in Bluetooth controller app then Robot start moving in left direction and moving continues left until next command comes. In this condition front side motor turns front side wheels in left direction and rear motor runs in forward direction.

When we touch right button in Bluetooth controller app then Robot start moving in right direction and moving continues right until next command comes. In this condition front side motor turns front side wheels in right direction and rear motor runs in forward direction.

And by touching stop button we can stop the Robot.

How to operate Bluetooth module

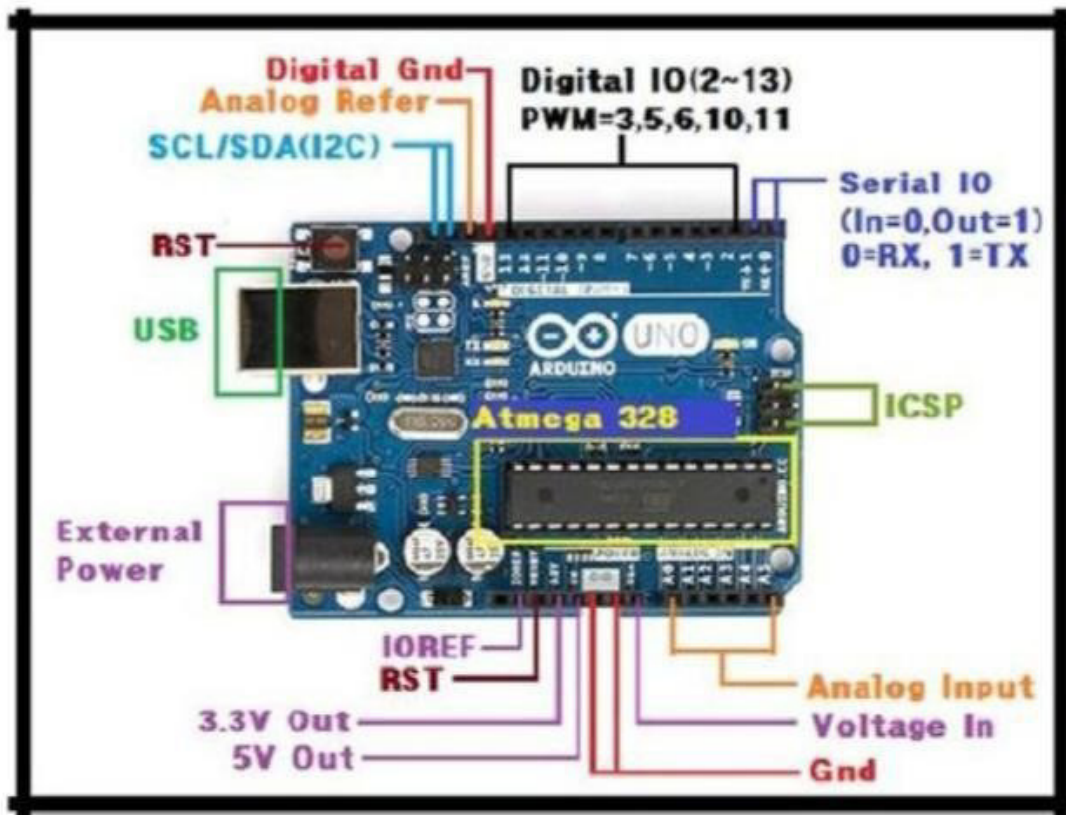


You can directly use the Bluetooth module after purchasing from market, because there is no need to change any setting of Bluetooth module. Default baud rate of new Bluetooth module is 9600 bps. You just need to connect Rx and TX to controller or serial converter and give 5volt dc regulated power supply to module.

Bluetooth module has two modes one is master mode and second one is slave mode. User can set either mode by using some AT commands. Even user can set module's setting by using AT command. Here is some commands uses are given:

First of all user need to enter AT mode with 38400 bps baud rate by pressing EN button at Bluetooth module or by giving HIGH level at EN pin. Note: all commands should ends with `\r\n` (0x0d and 0x0a) or ENTER KEY from keyboard

•Arduino Uno Board



This is the brain of robot loaded by a program written in embedded c language to do the required functioning and is interfaced with Bluetooth module. The motor driver are used to make the system work as required.

ADVANTAGES

1. Save time and energy
2. Can be Bluetooth controlled
3. Wireless easy to use
4. Lightweight and compact

4APPLICATIONS

1. **In Domestic Use:** This project can be used at homes for many purposes like picking up and placing some objects from one to other.
2. **In Spying Operations:** This robot can help in spying operations. The object recognition and android control makes it Hi-Fi.
3. **For Handicapped People:** This project can help the handicapped people especially those who had lost their feet unfortunately.
4. **Robo Races:** The tilt control of robots can be used in robot races which will be revolutionary.
5. Military Application and Hostage Rescue

5Future Scope

1. We can interface sensors to this robot so that it can monitor some parameters.
2. Improve production rate in industry.

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