

Agribot: Android Controlled Robot

K.A.Kupade¹, Pradeep Y. Patil², Shreyash R. Jadhav³, Saddam S. Patel⁴

Assistant Professor¹, Students^{2,3,4}

Department of Electronics and Telecommunication Engineering

Sharad Institute of Technology College of Engineering, Yadav, Maharashtra, India

Corresponding Author's Email id: shreyash74780@gmail.com

Abstract

This report deals with the control of automated vehicle type robot which can move in desired direction. An android application has developed using Bluetooth control Robo App and a Bluetooth communication is made with robot 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. Robot is a re-programmable, multi-functional 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 24 hours without rest. This paper deals with the design and control of automated vehicle type robot which can move in desired direction. An android application has developed using App and a Bluetooth communication is made with robot which interfaces with microcontroller to control its speed and direction. The controlling device of the whole system is a microcontroller. The data received by the bluetooth from Android smart phone is fed as input to the controller. In achieving the task the controller is loaded with a program written using Embedded 'C' language.

Keywords: *Microcontroller, Android control App, Bluetooth Module*

INTRODUCTION

Robotics is an evolving technology. The framework equipment comprises of a

controller outfitted with Bluetooth communication module. It'll be connected to the motors and other alternative

components of car. When the Bluetooth app is turned on and is connected with the current system via Bluetooth, one will operate the car by giving wireless commands from the app using the functions already programmed in the app. The vehicle will motion in four directions: Forward, Backward, Right and Left. In forward movement, all motors will motion in the same direction and for backward motion; movement of the motors will be in opposite direction. For left and right movements, either of the motors will rotate and to stop the motors will stop. Instructions are given to the motors through the Bluetooth app of Android Smartphone by the user.

The special vehicle plays a major role in various fields such as industrial, medical, military applications etc. The special vehicle fields are gradually increasing its productivity in agriculture field. Some of the major problems in the Indian agricultural are rising of input costs, availability of skilled labors, lack of water resources and crop monitoring. To overcome these problems, the automation technologies were used in agriculture. The automation in the agriculture could help farmers to reduce their efforts. The vehicles are being developed for the processes for Ploughing, leveling, water

spraying. All of these functions have not yet performed using a single vehicle. In this the robots are developed to concentrate in an efficient manner and also it is expected to perform the operations autonomously.

In this project, we will deliberate how to control robot- controlled car using Bluetooth module through Bluetooth application of an android mobile phone. The benefit of using robot-controlled car is it can be used to reduce manual work.

SYSTEM DESIGN

Assemble the robot, make the necessary connection and upload the code to 89C51 Microcontroller. If you understood the HC-05 Bluetooth Module tutorial, then understanding the bluetooth controlled robot project is easy. The framework equipment comprises of a controller outfitted with Bluetooth communication module. It'll be connected to the motors and other alternative components of robot. When the Bluetooth app is turned on and is connected with the current system via Bluetooth, one will operate the Robot by giving wireless commands from the app using the functions already programmed in the app.

The vehicle will motion in four directions: Forward, Backward, Right and Left. In forward movement, all motors will motion in the same direction and for backward motion; movement of the motors will be in opposite direction. For left and right movements, either of the motors will rotate and to stop the motors will stop. The vehicles are being developed for the processes for Ploughing, leveling, rotavator, pesticides spraying. All of these functions have yet performed using a single vehicle. In this the robots are developed to concentrate in an efficient manner and also it is expected to perform the operations autonomously. The proposed idea implements the Robot to perform the functions such as ploughing, Rotavator, mud leveling, and pesticides spraying. In Automatic turn on and turn off of water pumping motor. Instructions are given to the motors through the Bluetooth app of Android Smartphone by the user.

HARDWARE DESIGN

Microcontroller

The AT89C51 is an age old 8-bit microcontroller from the Atmel family. It works with the popular 8051 architecture and hence is used by most beginners till date. It is a 40 pin IC package with 4 Kb flash memories. It has four ports. It is a

low-power, high-performance CMOS 8-bit micro- computer with 4K bytes of flash programmable and erasable Read Only Memory. The device is developed using Atmel's high-density nonvolatile memory technology and is compatible with the MCS-51 instruction set. The on-chip flash uses the program memory to be reprogrammed in- system. Versatile 8-bit CPU with flash on a monolithic chip. Atmel AT89C51 is a very powerful microcomputer which provides flexibility and low cost effective solution so many embedded control applications.



Fig. Microcontroller 89C51

DC Motor

A DC motor is any of a class of rotary electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic; to periodically change the direction of current flow in part of the motor.



Fig. DC Motor

Motor Driver

Motor drivers act as an interface between the motors and the control circuits. Motor require high amount of current whereas the controller circuit works on low current signals. So the function of motor drivers is to take a low-current control signal and then turn it into a higher-current signal that can drive a motor. Wide supply-voltage range: 4.5V to 36V



Fig. Motor Driver

Bluetooth Module

A Bluetooth module is usually a hardware component that provides. a wireless product to work with the computer; or in some cases, the. Bluetooth may be an accessory or peripheral, or a wireless headphone. or other product (such as cellphones can use.

HC Serial Bluetooth product consists of Bluetooth serial interface module and Bluetooth adapter. Bluetooth serial module is used for converting serial port to Bluetooth. This module has two modes: master device and slaver device. A named of device after even number is defined to be master or slaver when out of factory and it can't change to the other mode. But after odd number, users can set the work mode of the device by AT commands.



MOSFET

The MOSFET (Metal Oxide Semiconductor Field Effect Transistor) transistor is a semiconductor device that is widely used for switching purposes and for the amplification of electronic signals in electronic devices. In general, the MOSFET works as a switch, the MOSFET controls the voltage and current flow between the source & drain. The working of the MOSFET depends on the MOS capacitor, which is the semiconductor surface below the oxide layers between the source and drain.



The diagram illustrates the connection between an Android phone and a Bluetooth Controller. On the left, a Samsung smartphone is shown with the Android robot mascot standing next to it. A large purple arrow points from the phone to the right, where a screenshot of the Bluetooth Controller app interface is displayed. The app shows a list of connected devices, including 'F orward', 'S top', and 'left', 'stop', 'right', 'backward', and 'forward' buttons.

Fig. Bluetooth Controller Application

6V BATTERY

DIODE

Motor

Motor

Motor Driver

Asm/C Program

8051 SERIES MC

BUETOOTH DEVICE

ANDROID APPLICATION DEVICE

Pinout details for 8051 SERIES MC:

VCC	XTAL1	P0.0	P0.7
GND	XTAL2	P1.0	P1.7
RD	RST	P2.0	P2.7
WR	INT0	P3.0	P3.7
RD	ALE	P4.0	P4.7
WR	CP	P5.0	P5.7
		P6.0	P6.7
		P7.0	P7.7

ADVANTAGES

- Agriculture robots are capable of collecting crop and soil samples.
- They are also capable of moving, spraying pesticides, finding diseases or parasites, and performing mechanical operation.
- Their sensors are used to spray only the area affected by the parasite of the entire crop.
- This has helped to protect our environment by reducing the amount of harmful chemicals released in the air and also potentially harmful for the safety or the health of the workers.
- The robot does not get sick or tired and does not need time.
- They are small in size.

FUTURE SCOPE AND APPLICATION

- Flying Micro Robots: It is expected that it can be used in agriculture for the control of weed and insects.
- It is one of the significant phase of Humanoid robots.
- Discourage and voice acknowledgment security frameworks.
- The robot can be used for monitoring or investigation.
- The robot fields are gradually increasing its productivity in agriculture field.

- Programmed targeting system can be executed in the robot for following the objective.
- The robot plays a major role in various fields such as industrial, medical, military application etc.

CONCLUSIONS

- The higher quality products can be sensed by machines (colour, firmness, weight, density, ripeness, size, shape) accurately. Robots can improve the quality of our lives but there are downsides.
- It may mean a rethinking of how crop production is done. Crop production may be done better and cheaper with a swarm of small machines than with a few large ones.
- The operating system of smart phone is android which can develop effective remote control program. At the same time , this program uses blue-tooth connection to communicate with robot. It has proven to allow for meaningful two-way communication between the Android phone and the robot which would allow a non-expert to interact with and adjust the functionality of a system which uses AT89C51/52 controller, a single board micro-controller intended to make the application of interactive objects or

environments more accessible. The surveillance is always has been a quite sensitive task. And it includes so many risks. So it's better to use robot for this job instead of people. And if you are able to control the robots with efficiency and accuracy then you can guarantee yourself with good results and success. This system is a good step for secure surveillance using robots.

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