Android Based Cellphone Control Robot

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Abstract-*Nowadays everyone is becoming more creative and wanted to know about the place where they are unable to reach or do the work without getting harm .In this paper we are using Bluetooth technology to operate the robot as Bluetooth technology. Industrial robots do not look like human beings but they do the work of humans.. The concept technology covers less distance that is 10metere therefore to increase the range or distance we can also use GPS of an industrial robot was patented in 1954 by G.C Devol.The present industrial robots are actually mechanical handling devices that can be manipulated under computer control. The computer, which is an integral part of every modern robot system, contain a control program and a task program. The task program are generated either by leading the robot through the required job or by using off-line programming language [1].*

Keywords-L293D, HC-05,ATMEGA32P-PU, DC motors.

I. INTRODUCTION

(a) Bluetooth technology

Bluetooth is a wireless radio technology standard for exchanging data over short distances between mobile phones, computers and other devices. It is a short range standard radio link which has unlicensed spectrum about 2.45 GHz (ISM band 2400-2483MHz). Bluetooth Technology adopted Frequency Hopped Multiple Access (FHMA) technology for power efficiency and low cost implementations. A Bluetooth product, like headset or watch, contains a tiny computer chip with a Bluetooth radio and software that makes it easy to connect. One need to pair Bluetooth devices to make communication between them over ad-hoc networks of shot range known as Pico-nets. A Pico-net is a network of devices connected using Bluetooth technology. In Pico-net network of Bluetooth devices, two and more devices can be connected. Many services offered over Bluetooth can expose private data or let a connecting party control the Bluetooth device. Security reasons make it necessary to recognize specific devices, and thus enable control over which devices can connect to a given Bluetooth device. At the same time, it is useful for Bluetooth devices to be able to establish a connection without user intervention (for example, as soon as in range).

(b) L293D

The L293 and L293D are quadruple high-current half-H drivers. These devices are designed to drive a wide array of inductive loads such as relays, solenoids, DC and bipolar stepping motors, as well as other high-current and high-voltage loads. All inputs are TTL compatible and tolerant up to 7 V. Each output is a complete totem-pole drive circuit, with a Darlington transistor sink and a pseudo-Darlington source. Drivers are enabled in pairs, with drivers 1 and 2 enabled by 1,2EN and drivers 3 and 4 enabled by 3,4EN. When an enable input is high, the associated drivers are enabled, and their outputs are active and in phase with their inputs. When the enable input is low, those drivers are disabled, and their outputs are off and in the high-impedance state. With the proper data inputs, each pair of drivers forms a full-H (or bridge) reversible drive suitable for solenoid or motor applications. On the L293D, external high-speed output clamp diodes should be used for inductive transient suppression. On the L293D, these diodes are integrated to reduce system complexity and overall system size. A VCC1 terminal, separate from VCC2, is provided for the logic inputs to minimize device power dissipation. The L293 and L293D are characterized for operation from 0°C to 70°C.

Table.1: pin description of L293D

SYMBOL	PINS	DESCRIPTION
EN	1,9	Enable pins
A	2,7,10,15	Input pins
Y	3,6,11,14	Output pins
GROUND	4,5,17,13	Ground pins

(c) HC-05

The HC-05 is a class 2 Bluetooth module designed for transparent wireless serial communication. It is pre-configured as a slave Bluetooth device. Once it is paired to a master Bluetooth device such as PC, smart phones and tablet, its operation becomes transparent to the user. No user code specific to the Bluetooth module is needed at all in the user microcontroller program. The HC-05 supports two work modes: Command and Data mode. The work mode of the HC-05 can be switched by the onboard push button. The HC-05 is put in Command mode if the push button is activated. In Command mode, user can change the system parameters (e.g. pin code, baud rate, etc) using host controller itself of a PC running terminal software using a serial to TTL converter.

Any changes made to system parameters will be retained even after power is removed. Power cycle the HC-05 will set it back to Data Mode. Transparent UART data transfer with a connected remote device occurs only while in Data Mode. The HC-05 can be re-configured by the user to work as a master Bluetooth device using a set of AT commands. Once configured as master, it can automatically pair with a HC-05 in its default slave configuration or a HC-06 module, allowing a point to point serial communications. The HC-05 will work with supply voltage of 3.6VDC to 6VDC; however, the logic level of RXD pin is 3.3V and is not 5V tolerant. It can be damaged if connect directly to a 5V device (e.g. ARDUINO Uno and Mega). A Logic Level Converter is recommended to protect the HC-05. The power to the HC-05 will cut off if the "EN" pin is pulled to logic 0. [1]

(d) ATMEGA32P-PU

The ARDUINO board is a microcontroller board, which is a small circuit (the board) that contains a whole computer on a small chip(the microcontroller) this computer is at least a thousand times less powerful than the Mac book but it is a lot cheaper and very useful to build interesting device. The chip is the AT Mega 328 p-pu microcontroller with 28 legs it is the heart of the board.The ARDUINO board communicates with connected devices via its input and output pins. On the left side you have the USB port (grey box) and the power input jack (black box). During testing I will be powering my ARDUINO with a USB cable, but the final robot will receive power from a battery box connected to the power input jack.

On the top, from right to left there are 14 pins labeled 0 to 13. These are the digital pins. These pins can be individually configured as inputs or outputs, meaning that digital data can be read or written from connected devices on these pins. Since these pins are digital, they have only two possible states, HIGH and LOW. Some of the digital pins have pre-assigned functions. Pins 0 and 1 are also labeled RX and TX respectively. These are used by the serial communication hardware to send and receive data. Pin 13 has a LED attached to it on most ARDUINO boards, so it is a convenient pin to send simple visual information out to the real world. The pin 13 LED is located below the pin 13 itself, labeled with the letter L in the diagram above. Pins 3, 5, 6, 9, 10 and 11 are marked with a ~ or a PWM label, short for pulse width modulation. These pins are capable of producing simulated analog output over a digital line. These can be used, for example, to light a LED at different levels of intensity**.** The next pin on the top from right to left is GND, short for ground. The ground is what closes a circuit and allows the electric current to flow uninterrupted. Connected devices can connect their own GND pin here. The next pin on the top left is labeled AREF, short for analog reference. This pin is rarely used; it tells the ARDUINO how to configure the voltage range of the analog pins. Some ARDUINO boards have more pins to the left of AREF. Since these are not in all boards I will not discuss them here.

On the bottom right we have six pins labeled 0 to 5. These are the analog input pins. Unlike the digital pins which have only two possible states, an analog pin can have 1024 possible states, according to the voltage applied to it. Typically the voltage range goes up to 5V, but the range can be changed by applying the desired maximum voltage to the AREF pin. Also unlike the digital pins which can be configured as inputs or outputs, the analog pins can only be inputs. An interesting property of the analog pins is that they can be used as digital pins as well, with pin numbers 14 to 19. You will see later that an important part of any project is allocating pins to components. If you are running short of digital pins keep in mind that you have six more available to you. Continuing on the bottom from right to left we find a pin labeled VIN. This pin provides direct access to the voltage provided by the power supply. So for example, if you power your ARDUINO with a 9V power supply through the power jack, then this pin gives you 9V.The next two pins are labeled GND and are two more ground pins, exactly like the one in the top row. They are here just for convenience. The next two pins are labeled 5V and 3.3V and just return those voltages, regardless of what the voltage of the power supply is Next we have the RESET pin. When this pin is connected to GND the board will reset. So this is a handy pin to build an external reset button. This is a single-chip 8-bit microcontroller based 28 pin ATMEGA328P-PU AVR series IC. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. [2]

TABLE.2: Pin Description of ATMEGA328P-PU

PIN NO.	PIN NAME	MAPPED PIN NAME
1	RESET	RESET
2	RXD	RX/DIGITAL I/O 0
3	TXD	TX/DIGITAL DIGITAL I/O 1
4	INT0	DIGITAL I/O 2
5	INT1	DIGITAL I/O 3
6	T0	DIGITAL I/O 4
7	VDD	SUPPLY VOLTAGE
8	GND	GROUND
9	XTAL1	CRYSTAL PIN1
10	XTAL2	CYSTAL PIN2
11	T1	DIGITAL I/O 5

12	AIN0	DIGITAL I/O 6
13	AIN1	DIGITAL I/O 7
14	ICP1	DIGITAL I/O 8
15	OC1A	DIGITAL I/O 9
16	OC1B	DIGITAL I/O 10
17	MOSI	DIGITAL I/O 11
18	MISO	DIGITAL I/O 12
19	SCK	DIGITAL I/O 13
20	AVCC	SUPPLY VOLTAGE
21	AREF	VREF
22	GND	GROUND
23	ADC0	ANALOG INPUT0
24	ADC1	ANALOG INPUT1
25	ADC2	ANALOG INPUT2
26	ADC3	ANALOG INPUT3
27	ADC4	ANALOG INPUT4
28	ADC5	ANALOG INPUT5

(e) DC Motor

A dc motor is any of a class of electrical machines that convert direct current electric power into mechanical power. The most common type relay on the forces produced by magnetic fields. Nearly all types of dc motors have some internal mechanism, either electromechanical or electronics, to periodically change the direction of current flow in part of the motor. Most type produce rotary motion; a linear motor directly produces force and motion in a straight line. Dc motors were the first type widely used, since they could be powered from existing direct – current lighting power distribution systems. A dc motor speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings

II. DESIGN METHODOLOGY

Here our android phone is working like a transmitter which will transmit the commands that we want and that command is received by the Bluetooth receiver which will received that command and send that command to the ARDUINO. The main function of the ARDUINO is to move the motors 1 and motors2 according to the command that has given by the transmitter for which we have connected motor driver IC with the ARDUINO. ARDUINO will send the command to the motor driver IC which is L293D to move the motor according to the command .Our proposed module consist mainly two sections TX and RX. Our TX and RX section of proposed module is very efficient and at the same time power consumption is very less.

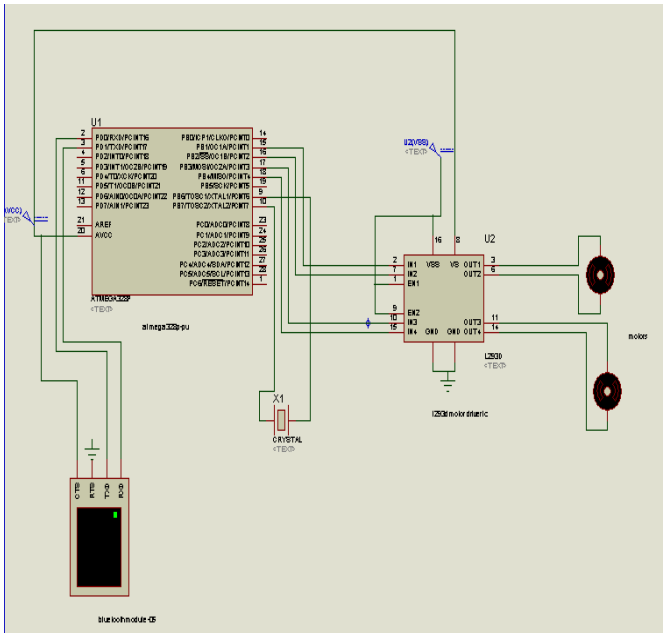

Fig.1 Simulation of Proposed Design In Proteus

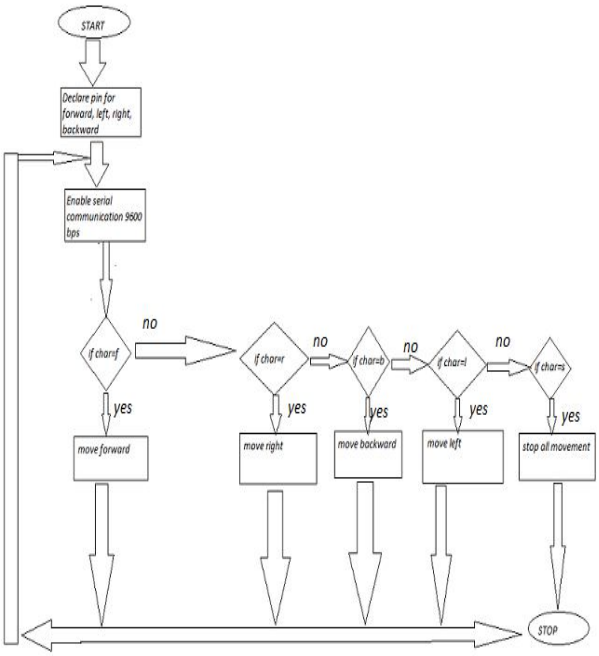

Fig.2: Proposed Design Flow Chart

III. RESULT AND CONCLUSION

This project is made after seeing that there are many lives get destroy due to natural hazards like earth quake because the rescue team has less in number and they cannot go everywhere to see whether the people is alive or dead under the mud of the destroy elements like bricks or many things. For this we have to design a robot which will control like a remote by the android phone as android phones are mostly used by the peoples.

IV. CONCLUSION

It is feasible to implement Bluetooth communication between smart phone and microcontroller. It is User friendly. This can be used by any person very easily. Our proposed model is android based mobile control system. This can be Easily implemented because of its wireless communication standards.

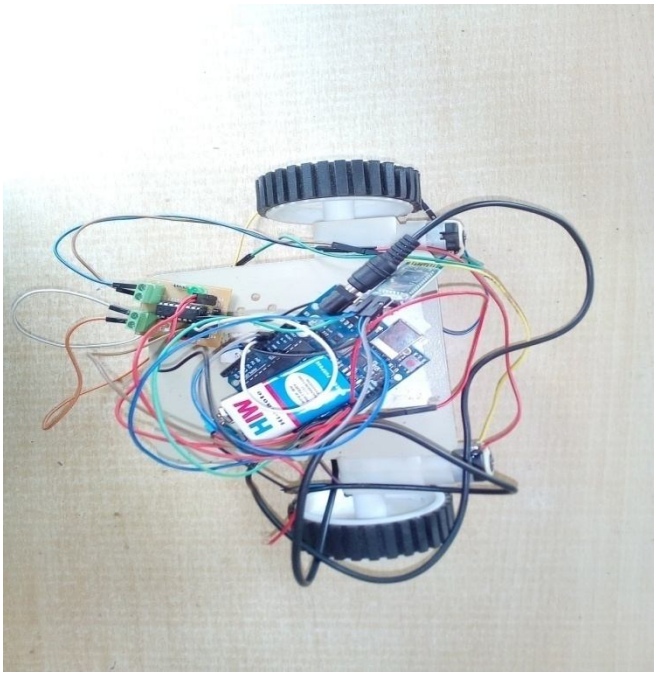

Fig3. Hardware of our proposed model

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