

Voice, Gesture & Touch Screen Operated Smart Wheelchair With Obstacle Detection

N. Bhagyasri

B.Tech,
Mallareddy College of
Engineering.

S.Sai Manikanta Reddy

B.Tech,
Mallareddy College of
Engineering.

K.Sabitha

B.Tech,
Mallareddy College of
Engineering.

ABSTRACT:

A Robot is a mechatronics device which also includes resourcefulness or autonomy. A device with autonomy does its thing "on its own" without a human directly guiding it moment-by-moment. Some authors would contend that all mechatronic devices are robots, and that this book's restriction on robot entails only specialized software.

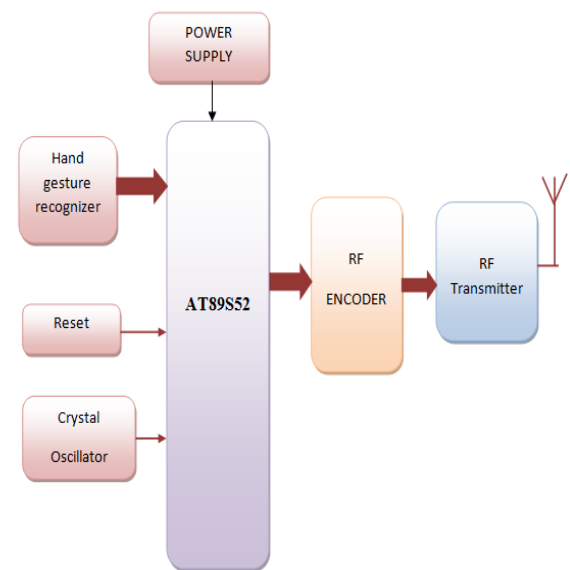
The use of robotics is increasing day by day to replace the manpower for many reasons and uses with high navigational intelligence is one of the great steps towards the integration of severely physically disabled and mentally handicapped people. The Robot is being developed to overcome the problems, allowing the end-user to just perform safe movements and accomplish some daily life important tasks.

Here our robot can take commands through three types.

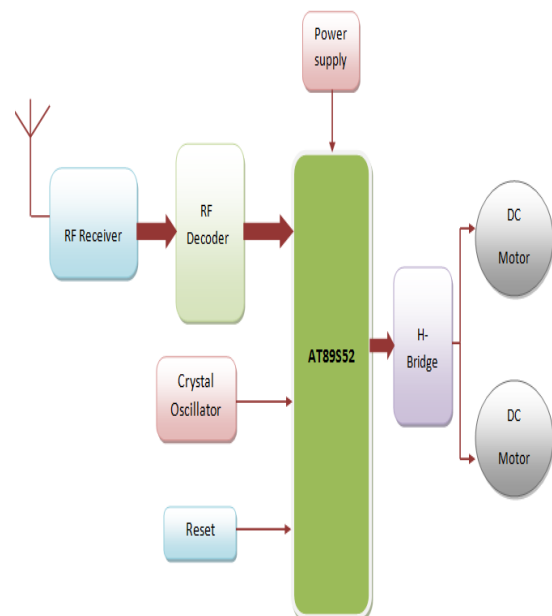
Existing system

- A prototype chair is implemented with a small chair and DC motors are used to move the chair. This project uses 12V rechargeable battery. This project is very much useful for the disable.
- In this system we are implementing with AT89S52 microcontroller at Transmitter and Receiver sections. MEMS sensor is used to control the wheel chair as per the movement of the hand. This is done using wireless RF communication.

TRANSMITTER



RECEIVER:



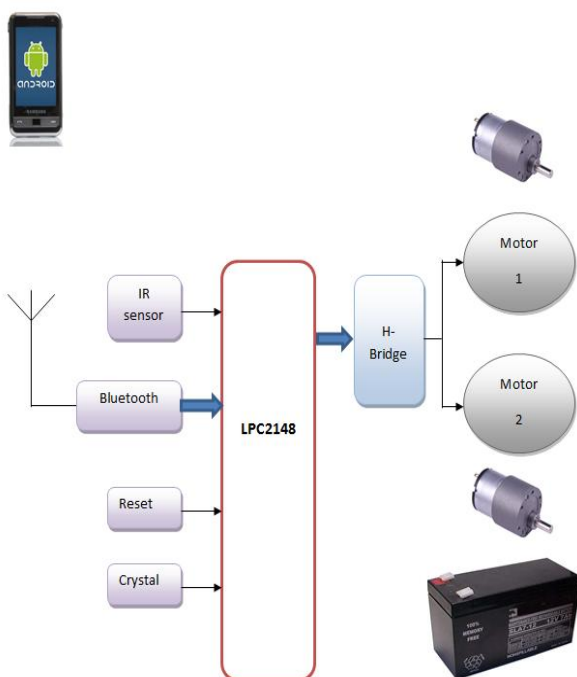
Drawback: Transmitter part is an extra hardware module which increases the cost.

Proposed system

In existing system, the robot is operated using android application through Bluetooth technology, the man power elimination can be enhanced using a wireless technology called MEMS. Depending on the movement of our android phone the robot also moves accordingly.

The MEMS sensor is used wirelessly to operate the Robot which is in-built the android mobile phone. Remote operation is achieved by any smart-phone/Tablet etc., with Android OS, upon a GUI (Graphical User Interface) based touch screen operation. This robot also takes voice commands to move. An application is also provided to move as per commands given through touch screen. An IR sensor is also interfaced to detect the obstacle. This is to stop the wheel chair.

This project is based on the android application, android application send data through Bluetooth. Another Bluetooth device connected at the receiving end which is fed to the controller.



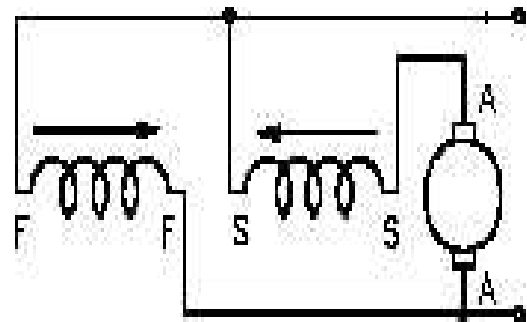
Hardware modules

DC motor

A DC motor is an electric motor that runs on direct current (DC) electricity.

DC Motor Connections

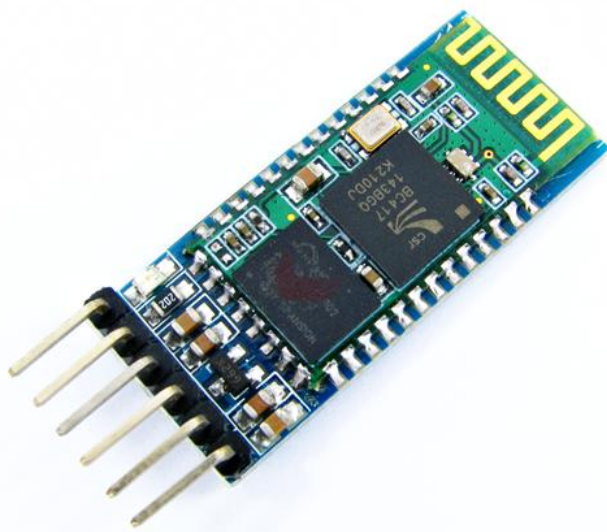
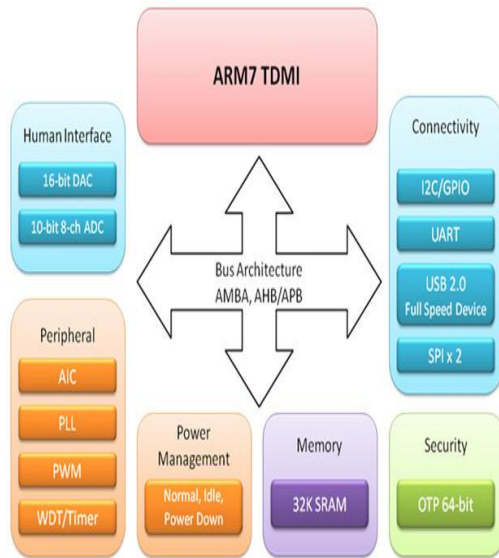
Figure shows schematically the different methods of connecting the field and armature circuits in a DC Motor. The circular symbol represents the armature circuit, and the squares at the side of the circle represent the brush commutator system. The direction of the arrows indicates the direction of the magnetic fields.



ARM7

The **LPC2148** are based on a 16/32 bit ARM7TDMI-S™ CPU with real-time emulation and embedded trace support, together with 128/512 kilobytes of embedded high speed flash memory.

A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at maximum clock rate. For critical code size applications, the alternative 16-bit Thumb Mode reduces code by more than 30% with minimal performance penalty. With their compact 64 pin package, low power consumption, various 32-bit timers, 4- channel 10-bit ADC, USB PORT, PWM channels and 46 GPIO lines with up to 9 external interrupt pins these microcontrollers are particularly suitable for industrial control, medical systems, access control and point-of-sale. With a wide range of serial communications interfaces, they are also very well suited for communication gateways, protocol converters and embedded soft modems as well as many other general-purpose applications.

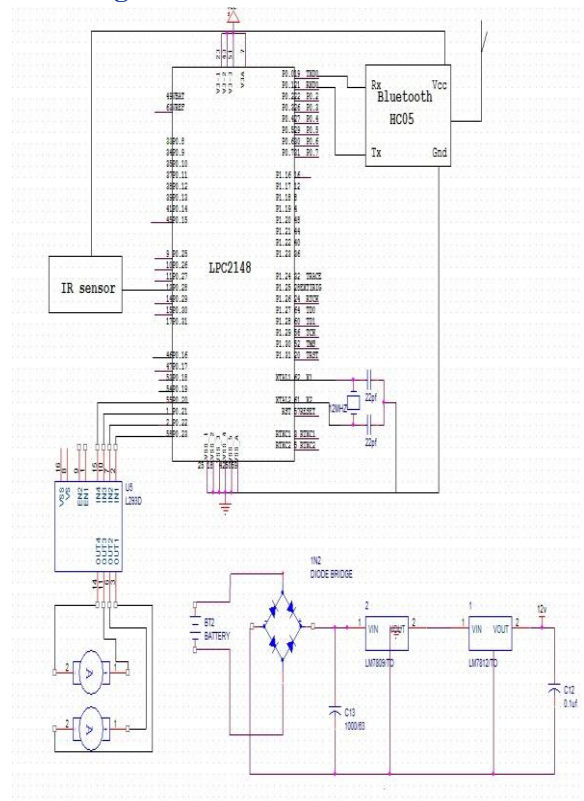


BLUETOOTH

Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength radio transmissions in the ISM band from 2400–2480 MHz) from fixed and mobile devices, creating personal area networks (PANs) with high levels of security. Created by telecom vendor Ericsson in 1994, it was originally conceived as a wireless alternative to RS-232 data cables. It can connect several devices, overcoming problems of synchronization. Bluetooth dongle is simply defined as

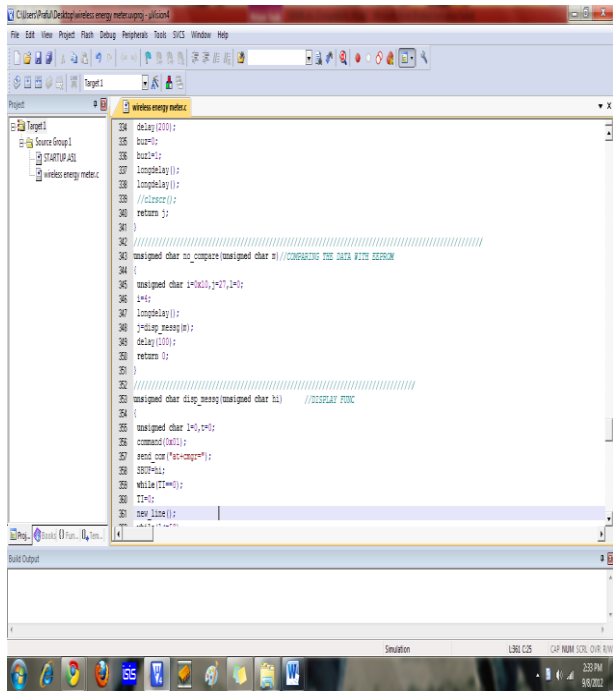
an accessory to the computer. By using a Bluetooth dongle a computer can be wirelessly linked to other devices. By using these dongles one can easily connect a computer with any other computer, printer, digital cameras or cellular devices. Actually Bluetooth dongle possesses a small microchip, which makes it capable of connecting and exchanging the data with all other devices which contain such microchips and with all other dongle devices. USB ports are used to connect a Bluetooth dongle with the computer. Just like other USB attachments these dongles also get powered from computers itself. Once we disconnect a Bluetooth dongle it gets deactivated on its own.

Circuit Diagram



Software tools

Keil compiler is a software used where the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. Keil compiler also supports C language code.



Advantages:

- Not blocked by common materials: can penetrate most solids and pass through walls
- Not light sensitive
- Not as sensitive to weather/environmental conditions

Applications:

- In military Applications
- Patients

Conclusion

In this project we have studied and implemented an Android based Robot Designed for patients using wireless communication.

References

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Flash Magic

Flash Magic is a tool which is used to program hex code in EEPROM of micro-controller. It is a freeware tool. It only supports the micro-controller of Philips and NXP. It can burn a hex code into that controller which supports ISP (in system programming) feature. Flash magic supports several chips like **ARM Cortex M0, M3, M4, ARM7 and 8051.**





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