ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

Home Automation Robot Using Wireless Technology

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ABSTRACT:

Care issues and costs associated with an increasing elderly population are becoming a major concern for many countries. The use of assistive robots in "smart-home" environments has been suggested as a possible partial solution to these concerns. A challenge is the personalization of the robot to meet the changing needs of the elderly person over time.

Historically speaking, a robot used to be shaped like humans, and referred to as machines and electric systems that were capable of performing similar actions as humans. And since they look like humans in appearance, they are often called "androids" or "humanoids.

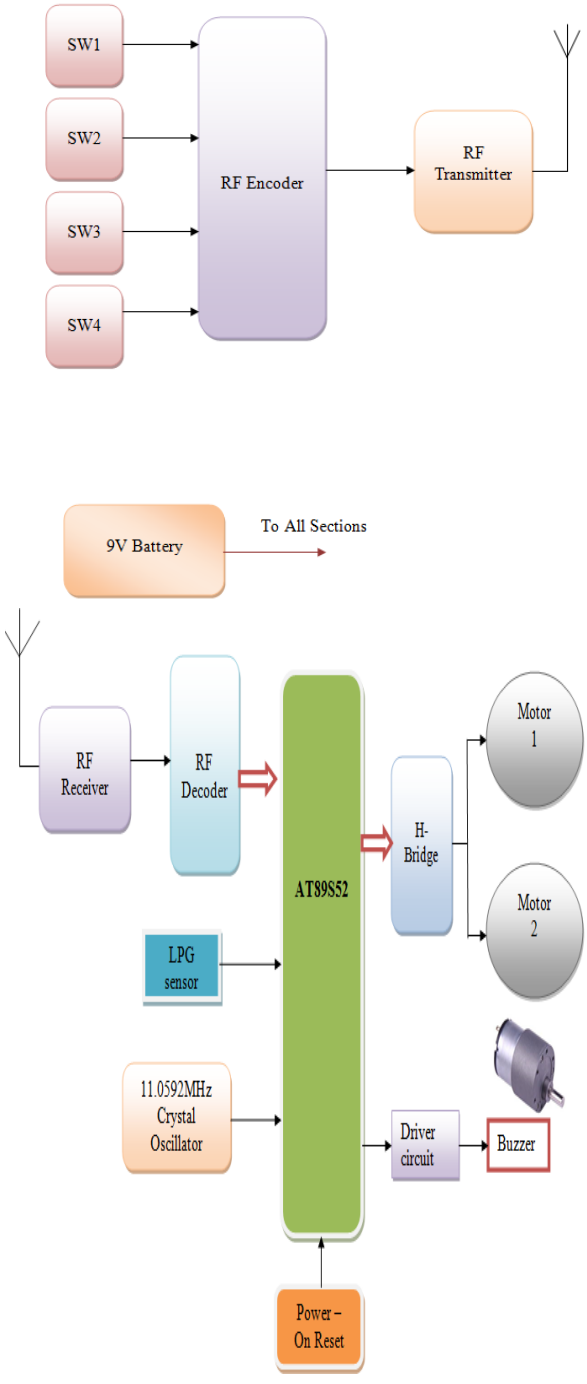
Existing system

This robot is controlled by a RF remote. This can be moved forward and reverse direction using DC motors. Also this robot can take sharp turnings towards left and right directions

This project uses AT89S52 as its controller. A high sensitive induction LPG sensor is fixed to this robot. When the robot is moving on a surface, the system produces a beep sound when dangerous gas is detected.

The RF modules used here are Transmitter, Receiver, RF Encoder and RF Decoder. The four switches are interfaced to the RF transmitter through RF Encoder.

The encoder continuously reads the status of the switches, passes the data to the RF transmitter and it transmits the data. At the receiver end RF decoder takes the data bit wise and moves the robot accordingly.



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Drawbacks

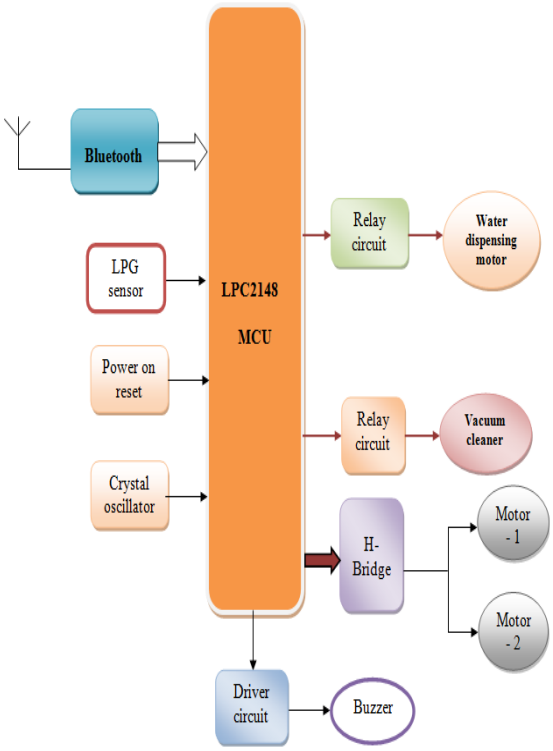
- Hardware modules are more
- Only gas detection is implemented

Proposed system

The robot will be moving according to the voice commands given by the teacher (user). This robot (assistant) will be taught by an android mobile. This can be moved forward and reverse direction using DC motors. Also this robot can take sharp turnings towards left and right directions.

By using a voice commands given by the user will be recognized by the android application. According to the different commands given by the user the robot will move front, back and left, right directions.This micro controller provides all the functionality of wireless control. Android app which is in your hand (mobile phone) is used as remote to control the action of robot by using Bluetooth. Teacher will give the instructions to the assistant to do different tasks. Here are two tasks. To switch on the motor for water and second one to clean the floor. This robot can also verify the leakage of LPG gas in kitchen and then gives buzzer alert in such situations.

In this project I am using H-Bridge, so that it would be helpful for the movement of the robot. The H-Bridge is used to control the direction of the motors used for moving purpose. Android application in the mobile which is a bit far away from the robot can control the movement of robot. This robot takes the instructions from the android mobile which is communicating through Bluetooth and act accordingly.



Hardware modules

LPC2148 controller

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

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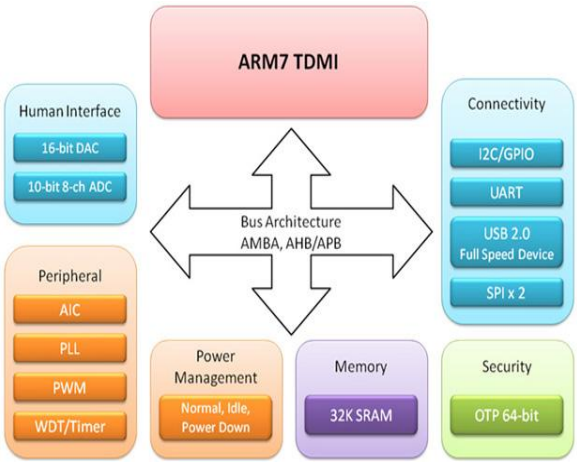
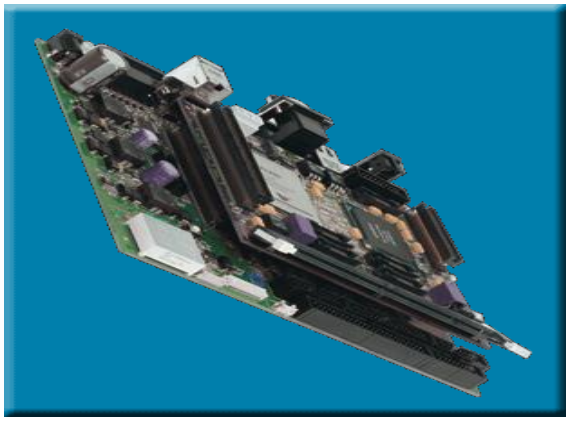
converters and embedded soft modems as well as many other general-purpose applications.

Architecture



ARM7 board



Bluetooth

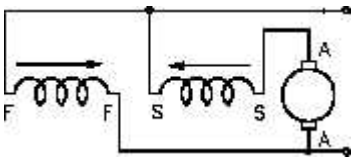
Bluetooth uses a radio technology called frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it on up to 79 bands (1 MHz each; centered from 2402 to 2480 MHz) in the range 2,400-2,483.5 MHz (allowing for guard bands). This range is in the globally unlicensed Industrial, Scientific and Medical (ISM) 2.4 GHz short-range radio frequency band.

DC motor

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

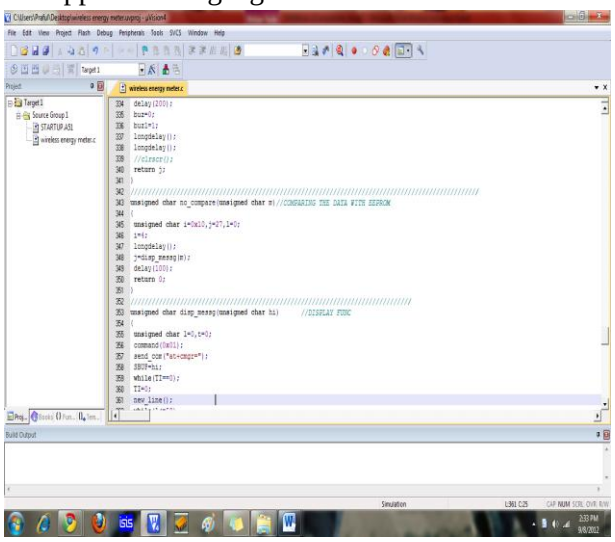
DC Motor Connections

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.



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.



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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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
- Forest Applications
- Agriculture
- Mining

Future Scope:

This application can be implemented DTMF technology. This is to operate the robot from remote place.

Conclusion

This project presents user independent speech recognition based moving robot. The project is been designed and implemented with LPC2148 MCU in embedded system domain. Experimental work has been carried out carefully. The result shows that speech recognition for moving robot using embedded system according to requirement of the user.

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