

Driving a Wireless Robotic Car

Priyanka Gavali, Punam Sontakke, Deepika Dhabhade.

Guided by – Mr. A. P. Gargade

E&TC Engineering Department, Govt. College of eng. & research, Awasari, Pune, India.

Abstract: This paper discusses techniques to handle the car wirelessly To allow various movements of car like left, right, backward, forward movement. For large coverage range RF module is the best solution. Therefore our project is best on we introduce a technology which will not only save money and time but also will prove to be beneficial and effective for the economy.

Keywords: Controllers, Modules, Sensors, Encoder and Decoder.

I. Introduction

Our project is aimed at wireless robotic car can controlled using IR sensor pair. In this project four pair of IR sensors are used. IR sensor contains LED and Photodiode here we only need to touch the IR sensor to control the robot. Transmitting device which contains RF transmitter and encoder will transmit command which is received by RF receiver so that it can do the required task like moving of car like forward , backward , left, right.

II. Need

There are many different reasons for using a robot but the central reason for most application is to eliminate a human operator. To save labours and reduced cost. People need robots for dangerous ,repetitive and high precision work.Robot perform task which are impossible for humans while also carrying out repetitious tasks with speed and accuracy. We have robots in order to maximize our time efficiency and productivity.

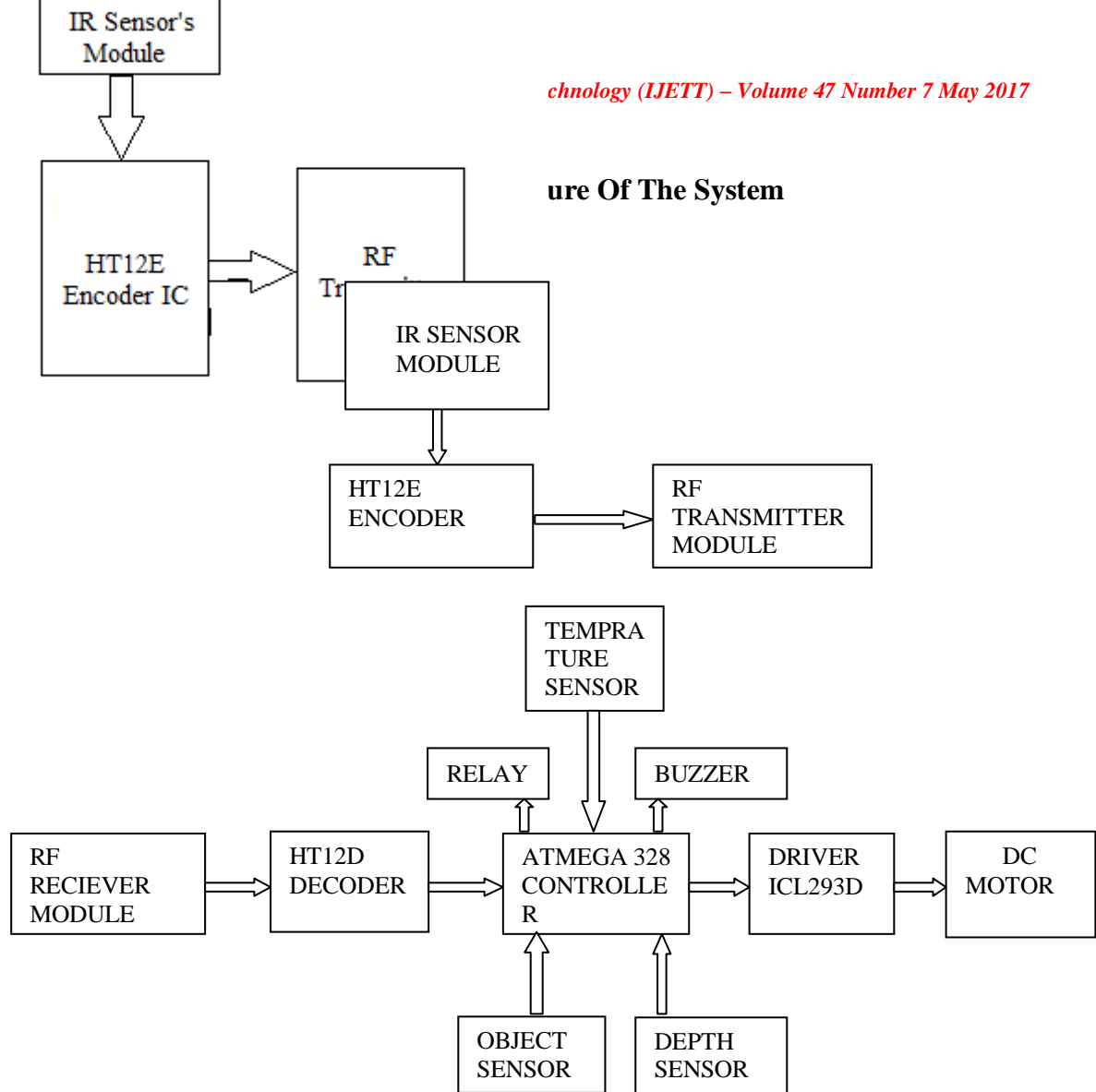
III. Existing System

Existing system is implemented using the arduino uno board. In this project user can controller the devices from the switching system remotely. Existing

system contain the two sections one is transmitter section another is receiver section. Transmitter section contain the keypad enable arduino system and receiver section contain the robot with arduino board. Arduino device is connected with the RF module for transmission of the information between the transmitting arduino system and receiving robot section for wireless communication. Power supply section is provide the power to the arduino board as well as all the electronic circuit of the receiver section for operate the all device properly. For wireless communication system uses the UART protocol. This project is used to control the robot navigation through the remotely using the keypad mobile using RF module.

IV. Proposed system

In proposed system overcome the all the unsupported things in existing system. This system is designed for secured wireless communication, our system is based on the WSN system user can access the system from Arduino based remote device using RF module. Project contain the two section one is transmitter section and another section is receiver. Transmitter section is contain the IR sensors enabled with the RF module. Receiver section is the actual controlling electronic robot system for navigation which is designed using the 8051 microcontroller circuit containing the RF module for wireless communication. IR sensors are used to sense the switching status as well as the detect the obstacles & depth in path. Actuators are used to perform the appropriate physical operations. RF module is used to wireless communication between transmitting section as well as receiving section circuit.



VI. Modules Used in Designed System

Arduino:

Arduino/Genuino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again. "Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.

Regulator LM7805:

7805 is a voltage regulator integrated circuit. It is a member of 78xx series of fixed linear voltage regulator ICs. The voltage source in a circuit may have fluctuations and would not give the fixed

voltage output. The voltage regulator IC maintains the output voltage at a constant value. The xx in 78xx indicates the fixed output voltage it is designed to provide. 7805 provides +5V regulated power supply. Capacitors of suitable values can be connected at input and output pins depending upon the respective voltage levels.

Encoder HT12E IC:

It is an encoder IC that converts the 4-bit parallel data from the 4 data pins into serial data in order to transmit over RF link using transmitter. (Practically we can use the 12 data pins but it's not necessary in our project Hardware Implemented.

Decoder HT12D IC:

It is a decoder IC that converts the serial data received by the RF Receiver into 4-bit parallel data and send the data to microcontroller accordingly.

RF Module:

Radio frequency (RF) consists of a transmitter and a receiver, which is connected to an isolated circuit that is to be controlled. A control signal is transferred from the transmitter end in the form of radio waves or electromagnetic waves, such that to control the device remotely, which is

connected to the receiver end. This control signal is transmitted by using electromagnetic waves or radio waves of radio frequency. Thus, the control signal received at the receiver end and get the accurate output such as robotic vehicle, special purpose robot, communication purpose device, and so on.

RF modules are usually very small size and operate in the voltage range of 3V to 12V. RF transmitter modules are designed to work with 433.98MHz frequency only. If transmitting logic zero, then no power is drawn by the transmitter. For transmitting, logic is one, it consumes power about 4.5 mA with 3V. RF transmitter has supplied voltage in the range of 3V to 6V and output power in the range of 4V to 12V.

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IR sensor:

We have already discussed how a light sensor works. IR Sensors work by using a specific light sensor to detect a select light wavelength in the Infra-Red (IR) spectrum. By using an LED which produces light at the same wavelength as what the sensor is looking for, you can look at the intensity of the received light. When an object is close to the sensor, the light from the LED bounces off the object and into the light sensor. This results in a large jump in the intensity, which we already know can be detected using a threshold.

DC Motor:

A DC motor in simple words is a device that converts direct current (electrical energy) into mechanical energy. It's of vital importance for the industry today, and is equally important for engineers to look into the working principle of DC motor in details that has been discussed in this article. In order to understand the operating principle of DC motor we need to first look into its

constructional feature. The very basic construction of a DC motor contains a current carrying armature which is connected to the supply end through commutator segments and brushes.

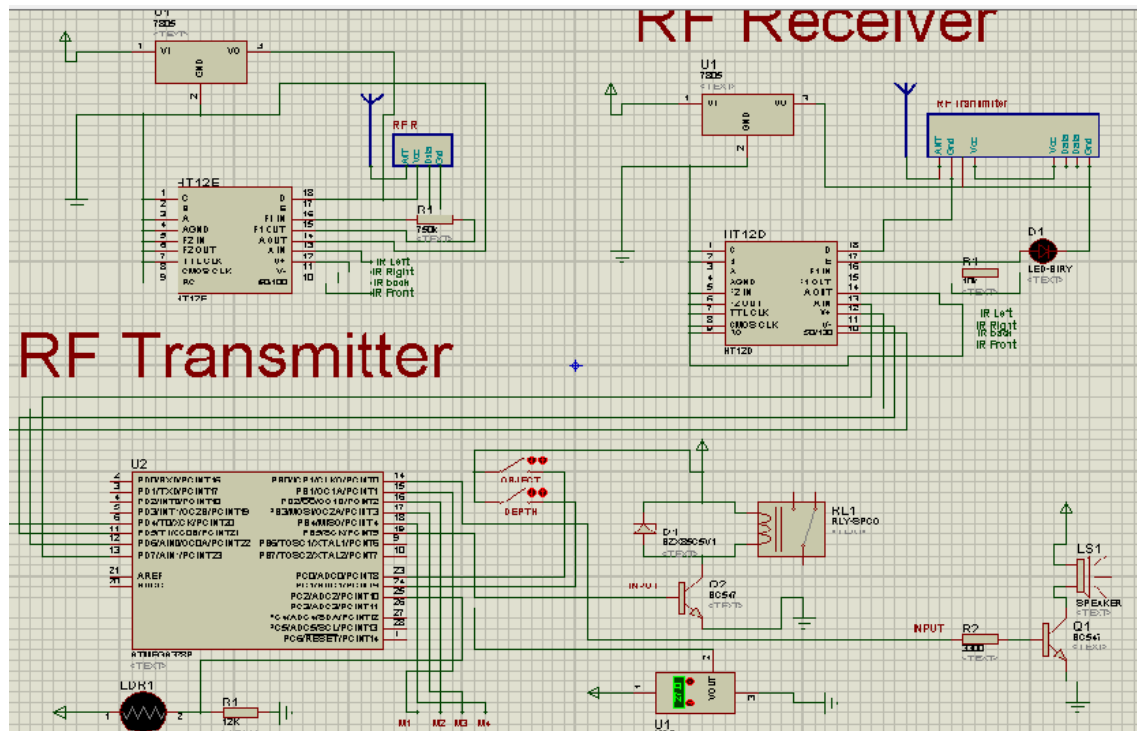
Relay:

We know that most of the high end industrial application devices have relays for their effective working. Relays are simple switches which are operated both electrically and mechanically. Relays consist of an electromagnet and also a set of contacts. The switching mechanism is carried out with the help of the electromagnet. There are also other operating principles for its working. But they differ according to their applications. Most of the devices have the application of relays. The main operation of a relay comes in places where only a low-power signal can be used to control a circuit. It is also used in places where only one signal can be used to control a lot of circuits. The application of relays started during the invention of telephones. They played an important role in switching calls in telephone exchanges. They were also used in long distance telegraphy. They were used to switch the signal coming from one source to another destination. After the invention of computers they were also used to perform Boolean and other logical operations. The high end applications of relays require high power to be driven by electric motors and so on. Such relays are called contactors.

Temperature Sensor

The most commonly used type of all the sensors are those which detect **Temperature** or heat. These types of temperature sensor vary from simple ON/OFF thermostatic devices which control a domestic hot water heating system to highly sensitive semiconductor types that can control complex process control furnace plants. We remember from our school science classes that the movement of molecules and atoms produces heat (kinetic energy) and the greater the movement, the more heat that is generated. Temperature Sensors measure the amount of heat energy or even coldness that is generated by an object or system, allowing us to sense or detect any physical change to that temperature producing either an analogue or digital output.

VII Circuit Diagram:



Working:

First for controlling the movement of robot command is given by IR sensor module like forward, backward, left, right. In IR sensor contains photo-detector which converts light signal into electrical signal. This signal is encoded by the HT12E Encoder IC and given to the RF transmitter Module for the purpose of transmission. Signal is transmitted in the form of Frequency.

At the Receiver side the signal is captured by RF receiver Module and given to Decoder HT12D which perform the reverse operation of encoder. Decoded signal is given to the ATMEGA328 arduino controller which control the movement of CAR as per required by using L293D driver IC which drive the DC motor of Robot by converting 5V into 12V .

The another operation perform by the Robot is object and depth detection. If object is detected then Robot is stop. But backward action can takes place. If Depth is detected robot is stop. We add the function of detecting Fire by using Temrature sensor LM35 and LDR. If fire is detected then system is alert by buzzer and Relay is ON.

Advantages:

1. Safety driving.
2. Sensor technology could potentially perceived the environment better than human senses, therefore less traffic accidents.
3. Freedom of car travel. There would be no need for driver's licenses or driving tests.
4. Reduction in car theft.

Applications:

1. Military application
2. Industry: These robots bring into play in an industrialized manufacturing atmosphere. These robot is used in industries to control trolley and lift also for carrying materials from one place to another.
3. Hospital application
4. Automobile industry.
5. Banking.

Conclusion

It can be concluded that Driving a wireless robotic car was a success. This system consists of an Arduino-Uno board development board, a RF Transceiver, IR sensor, power sockets, robot. It is user friendly and it is cost effective. Also it can be concluded that the objectives of this project has been successfully met and they are as Constructed a wireless robot control system controlled by a IR based hand movement specifically from remote device as well as threads detection in path. Designed and implement cost effective Wireless robot system yet an efficient one. Designed a user friendly and a safe system to control the navigation of robot.

Future Scope

One of the most important uses for personal robots in the coming year Will be in elderly care facilities that means do everyday task easier helping to lift heavy objects and keep their minds sharp with trivia games.

Robots will recognize facial expression, body language and verbal clues to provide more human like interaction. The robots in our future will, one day, be able to read and understand this page. In our future, entire job sector will disappear means in

school there is a robotic staff, nurses will be replaced with robots, bank and financial institutions will be operated by robots.

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