

WIRELESS SENSOR REMOTE CONTROL ROBOT

NEELADHEERAJ¹, B.SANTHOSH², K.VIGNESWARAN³, R.RAMKUMAR⁴,
M.NARENDARAN⁵

¹Student, computer science and engineeringt, SRMIST, Chennai, India

² Student, computer science and engineeringt, SRMIST, Chennai, India

³Student, computer science and engineeringt, SRMIST, Chennai, India

⁴ Student, computer science and engineeringt, SRMIST, Chennai, India

⁵ Professor, computer science and engineeringt, SRMIST, Chennai, India

ABSTRACT

This project was about to study how the wireless technology has advanced in today's world. Radio frequency controlled car is one such great example which always fantasizes the world about the exploring of the technology. Now-a-days the modern trend has made more emphasis on performing the tasks wirelessly. This in turns leaves a greater impact on the youth which motivates them to continue the progress and the inventions of the technology. This project basically deals with the operation on the performance of the car through the Sensor and wireless signals. Transmitter at the senders end on transmitting the signal is thereby received by the receiver which acts as an order for the driver IC to carry out the following instructions. Any object which makes a motion wirelessly is a robot and so this car is too a robot which acts as an artificial intelligence performing the called out instructions. This project being on the basic level when carried out on the higher level can do wonders if used in the correct directions for the betterment of the nation and humanity

Keyword : -Sensors, Wireless Technology, IC

1. MAIN OBJECTIVE

Communication systems play a major role in maintaining communication between humans or organizations or institutions or even people get entertainment programs or news or other television or radio broadcasting programs via wired or wireless communication systems. To overcome disadvantages of wired communications, advancement in technology has resulted in the development of most advanced wireless communication systems including wireless radio frequency technology, infrared technology, GSM technology, and so on. These wireless communication systems can be used to transmit different types of signals from transmitting end to receiving end. The control signal from transmitter is sent to the receiver which is connected to an object or device or vehicle that is to be remotely controlled. For example, IR remote is used to control TV remotely. Similarly, this article mentions about a wirelessly controlled robot controlled using radio frequency technology. A robot which would perform tasks assigned to it through rf signals. Being the part of the wireless technology this would serve an immense ease to the people to do some stuff without and mechanical energy lost. Now-a-days the technology growing very fast the adaption of this technology will become inevitable in the near future

2. RELATED WORK

There are many example of related work combining mobile robots with wireless sensor networks. The latter are usually used to report events that need further investigation and intervention by the robots in the environment whereas robots' mobility helps the WSN to monitor and operate in a larger area than is possible with fixed sensor deployments. For instance, a Mobile Robot is used in to collect sensed data from a WSN in order to prolong the lifetime of the sensor nodes, and also to reduce the hop count cost, when the WSN is partitioned in islands.

Mohammad Rahimi et al. studied the feasibility of extending the lifetime of a wireless sensor network by exploiting

mobile robots that move in search of energy, recharge, and deliver energy to immobile, energy-depleted nodes. With the Plant Care project, have demonstrated how a robot can be used to deploy and calibrate sensors, detect and react to sensor failure, deliver power to sensors, and otherwise maintain the overall health of the wireless sensor network. Navigation strategies employing WSNs usually rely on the fact that the positions of all network nodes are well known or can be inferred. The solutions for the localization problem often employ RSSI readings, which are well documented as unreliable in dynamic environments, to determine node or robot positions, often as part of Robot.

Batalin addresses the problem of monitoring spatiotemporal phenomena at high fidelity in an unknown, unstructured, dynamic environment. The robot explores the environment, and based on certain local criteria, drops a node into the environment, from time to time. Sensor nodes act as signposts for the robot to follow, thus obviating the need for a map or localization on the part of the robot. All these solutions for the integration of WSN and mobile robotics usually are developed to solve specific problems in specific scenarios. However, a number of research initiatives have tackled the creation of generic communication frameworks to be used within the robot/WSN application domain. Gil et al. describes a data-centric middleware for wireless sensor networks in the scope of the European project AWARE. The middleware implements a high-level abstraction for integration of WSNs with mobile robots. This is achieved by providing data-centric access to the information gathered by the wireless sensor network, which includes mobile robotic nodes. Nodes in the network organize themselves to retrieve the information needed by the robots while minimizing the number of transmitted packets in order to save energy. Robots are connected via a high-bandwidth IEEE 802.11 WiFi network and interact with the low-bandwidth IEEE 802.15.4 WSN via a Gateway. The Gateway is in turn connected to both networks and used to collect the data gathered within the WSN

3. BLOCK DIAGRAM

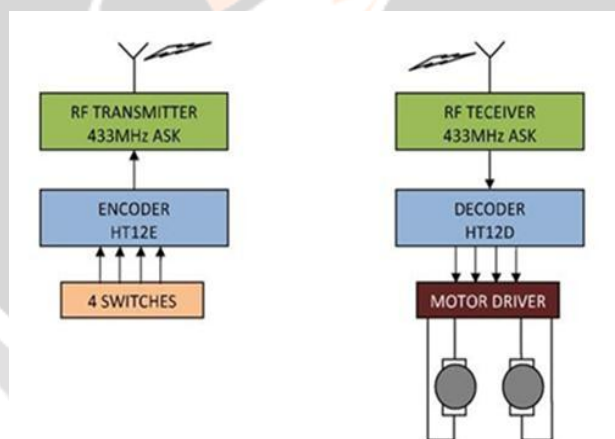


Fig2.1 Block Diagram

The figure is the block diagram of the entire radio frequency controlled car. Here we are using an ASK transmitter receiver module. Remote which is having a transmitter is used to transmit the signal from one point to another. There are controlling switches used which are used pinpoint which way the car should take a turn and move. The supply when applied to the switches it gives to the encoder which encodes the signal. This encoded signal is then sent to the RF-Tx transmitter which is used to perform the task of transmitting the signal from one end to the receiver.

The antenna is attached on both the modules which acts as a source to catch and transmit the signals. The signal which is transmitted by the transmitter is caught by the receiver in the receiving section with the help of the antenna.

4. CIRCUIT DIAGRAM

The circuit of the robot car is divided into two parts (i). Transmitter and (ii) Receiver. The first circuit diagram is the transmitter and followed by the receiver. The receiver has been supplied with a voltage regulator IC 7805 which will give a 5 volt DC supply to the circuit from 12 volt DC main supply. In the transmitter section circuit there are 5 switches used in the circuit for controlling the direction of the car. Four of them are used to give the direction instruction to the receiver and the fifth switch is used to switch on or off the switching control. It acts as the main switch for the transmitter section. The diode in the circuit with the help of the logic gates using binary language instructs the receiver for performing the tasks. Transmitter uses an encoder which IC i.e. HT-12E which encodes the voltage signal in the binary language which is connected to the switches. There is a transmitter ASK-RF-TX used which is capable of sending data to the other end

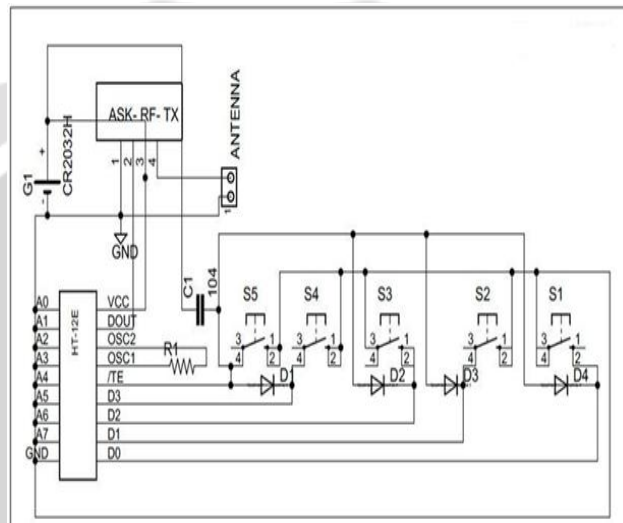


Fig3.1 Circuit diagram of transmitter section circuit

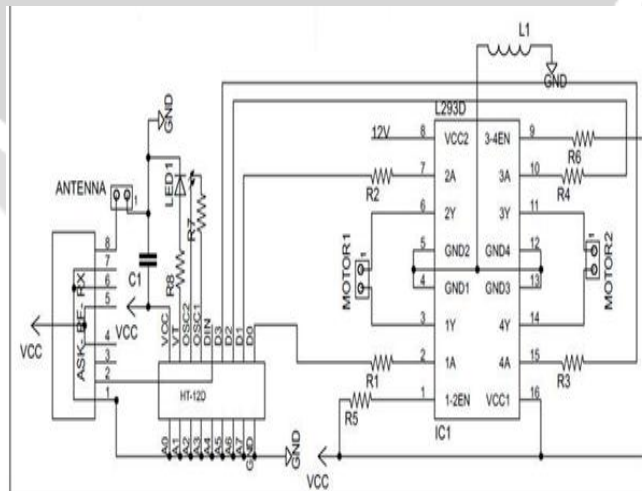


Fig 3.2 Circuit diagram of receiver section circuit

The receiver section has three ICs and one receiver module. It consists of a decoder HT-12D, driver IC L293D, voltage regulator IC 7805 and the receiver module ASK-RF-Rx. The working of the car starts with the 7805IC voltage regulator wherein the input voltage given to it is 12 volt DC and it converts that 12 volt to 5 volt DC. There are two 16 pins ICs as encoder and the decoder which are connected to the switches and transmitter and to the driver IC along with the voltage regulator respectively

Each of the IC has its own basic properties and functions which have been discussed in detail in the below section. Wireless transmission can be done by using 433 MHz or 315MHz ASK RF Transmitter and Receiver modules. In these modules digital data is represented by different amplitudes of the carrier wave, hence this modulation is known as Amplitude Shift Keying (ASK)

5. ANALYSIS

From the project made it is understood that the use of the radio frequency can be used in the driving a simple robot car with the use of transmitter and receiver. The driver IC which is being connected to the decoder is also a great help to the project which can get programmed and can give out the called instruction for various occasions signaled by the transmitter with the help of antenna and the encoder. The voltage regulator on getting a power supply gives out a stable dc voltage of 5 volt. This prevents the other components especially the decoder and the receiver module from the getting damaged.

The led in the receiver circuit gives an ease in understanding about the receiving of the signal from the transmitter end. This led when glows it indicates that the signal is transmitted

6. CONCLUSION

A transmitter on the one side sends the signals to the receiver end. The antenna on both the side of the module are used as a help to catch the signals which are been transmitted through the transmitter. The receivers on receiving the signal with the help of the decoder decode the signal and are transmitted to the motor driver IC. The motors which are connected to the driver IC on getting the logic signals turns on and gives the direction to the car

7. FUTURE SCOPE

Radio frequency which helps in the communication of the information has increased its value for the use of the same in future. With the advancement of technology in the radio frequency a gesture control robot is one of the finest projects which can be worked upon. Herein the gestures gives out by the person are sensed by the RF module which performs the task as shown by the gestures

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