RESEARCH ARTICLE OPEN ACCESS

RF Based Spy Robot

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ABSTRACT

The intention of this paper is to reduce human victims in terrorist attack such as 26/11. So this problem can be overcome by designing the RF based spy robot which involves wireless camera. so that from this we can examine rivals when it required. This robot can quietly enter into enemy area and sends us the information via wireless camera. On the other hand one more feature is added in this robot that is colour sensor. Colour sensor senses the colour of surface and according to that robot will change its colour. Because of this feature this robot can't easily detected by enemies. The movement of this robot is wirelessly controlled by a hand held RF transmitter to send commands to the RF receiver mounted on the moving robot. Since human life is always Valueable, these robots are the substitution of soldiers in war areas. This spy robot can also be used in star hotels, shopping malls, jewelry show rooms, etc where there can be threat from intruders or terrorists.

Keywords – wireless, robots, spy robot, colour sensor, gas sensor

I. INTRODUCTION

The project is designed to develop a robotic vehicle using RF technology for remote operation attached with wireless camera for monitoring purpose. The robot along with camera can wirelessly transmit real time video with night vision capabilities. This is kind of robot can be helpful for spying purpose in war fields. An 8051 series of microcontroller is used for the desired operation.

At the transmitting end using push buttons, commands are sent to the receiver to control the movement of the robot either to move forward, backward and left or right etc. At the receiving end two motors are interfaced to the microcontroller where they are used for the movement of the vehicle. The RF transmitter acts as a RF remote control that has the advantage of adequate range (up to 200 meters) with proper antenna, while the receiver decodes before feeding it to another microcontroller to drive DC motors via motor driver IC for necessary work. A wireless camera is mounted on the robot body for spying purpose even in complete darkness by using infrared lighting.

This robot is also the colour sensing device which senses the colour of the surface and according to this, by using LED's which is mounted in it, it changes it's colour. In this robot we basically use 3 colours that are Red, Green, Blue because these are the basic colours. the input to these LED's is given through the AT89S52 microcontroller. The input to the LED's Red, Green, Blue is given through the pin no. 14, 15, 16 of the microcontroller.

Gas sensor is used to detect the poisonous gas at the war field where we suppose to send soldiers. So that the lie of soldiers is protected. Technologies used are,

1. RF technology
2. Embedded system
3. C language

II. ROBOT DESIGN PRINCIPLE

A **robot** is a virtual or mechanical artificial agent in practice, it is usually an electro-mechanical machine which is guided by computer or electronic programming, and is thus able to do tasks on its own. Another common characteristic is that by its appearance movements, a robot often conveys a sense that it has intent or agency of its own. The Robotic Industries Association defines *robot* as follows: "A robot is a reprogrammable, multifunctional manipulator designed to move material, parts, tools or specialized devices through variable programmed motions for the performance of a variety of tasks."

The main aim of this project is to control the robot with wireless technology. For this purpose we designed two separate boards .One is transmitter and another is receiver which is placed on the robot. Here we are using RF technology (wireless communication). In the transmitter, if we press the

buttons according to that some predefined data will be transferred through RF communication and the receiver will receive the data. According to the command, the robot will do the specific task i.e. FORWARD, BACKWARD, LEFT and RIGHT. And through the wireless camera, the receiver receive that information.

After receiving the command robot will stop. After that the robot will move in the same direction in which previously the robot is moving. For this purpose we designed programs in embedded C .In order to fulfill this application there are few steps that has been performed i.e.

1) Designing the power supply for the entire circuitry.
2) Selection of microcontroller that suits our application.
3) Selection of Robot.
4) Selection of DRIVER IC.
5) Selection of wireless camera

For the movement of our robot, we are using DC motors. It is operated by 12VDC power supply. In any electric motor, operation is based on simple electromagnetism. A current carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field. F. Motor Driver L293D

The Device is a monolithic integrated high voltage, high current four channel driver designed to accept standard DTL or TTL logic levels and drive inductive loads and switching power transistors. To simplify use as two bridges each pair of channels is equipped with an enable input. A separate supply input is provided for the logic, allowing operation at a lower voltage and internal clamp diodes are included. This device is suitable for use in switching applications at frequencies up to 5 kHz. The L293D is assembled in a 16 lead plastic package which has 4 center pins connected together and used for heat sinking. The chip is designed to control 2 DC motors. There are 2 Input and 2 output pins for each motor. The behavior of motor for various input is shown in Table 1.

TABLE 1. BEHAVIOR OF MOTORS

Operation	**A**	**B**
Stop	Low	Low
Clockwise	Low	High
Anti Clockwise	High	Low
Stop	High	High

III. CIRCUIT DIAGRAM

PLC caused the success in dealing with the problem. As there were 24 inputs in existing system we deduct it to 16 inputs. During this deduction process selector switch which is used for selecting bin is of three positions so we use only two inputs out of three. The third input for third bin is selected automatically when both input for other bins are in normally closed position. Here there is saving in one input.

As there are four motors are used for travelling purpose. In control circuit for each contactor MCB are used hence there were eight MCBs, instead of that we use only one MCB and its connection is given in series of each contactor hence we deduct here seven inputs. So eight inputs are reduced causes deduction in size of plc module.

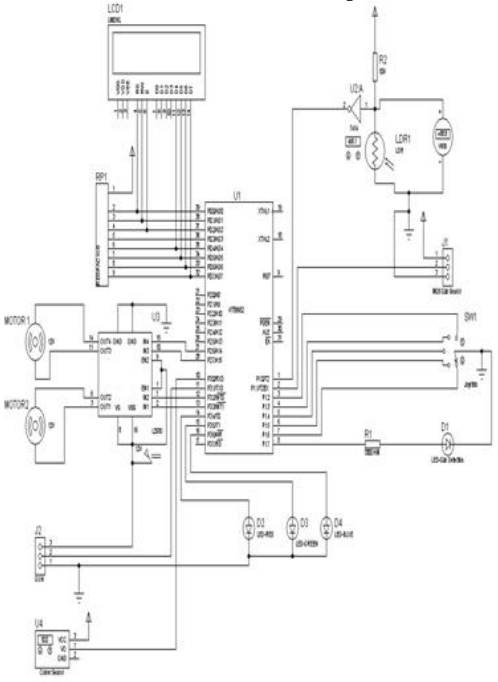

Fig.1:-Circuit Diagram

In proposed system we provide the provision of hooter for acknowledgement of operator. In addition of that we also provide extension to existing system by providing both the auto cycle and the manual cycle in parallel running. In will give flexibility for system in case of maintenance or any fault condition. For this the plc output is connected in parallel with push button.

During manual operation the bucket pours the scrap material in bin at specific spot hence it does not get fully filled hence timer provision is done so that the bucket will pours the material equally in bin that is in first time it will pour it at rightmost part, during second time it will pour it at middle position and at third time same procedure will repeat for leftmost position. For fourth operation it will continued from rightmost side.

IV. RF COMMUNICATION WORKING

Imagine an RF transmitter wiggling an electron in one location. This wiggling electron causes a ripple effect, somewhat akin to dropping a pebble in a pond. The effect is an electromagnetic (EM) wave that travels out from the initial location resulting in electrons wiggling in remote locations. An RF receiver can detect this remote electron wiggling. The RF communication system then utilizes this phenomenon by wiggling electrons in a specific pattern to represent information. The receiver can make this same information available at a remote location; communicating with no wires. In most wireless systems, a designer has two overriding constraints: it must operate over a certain distance (range) and transfer a certain amount of information within a time frame (data rate). Then the economics of the system must work out (price) along with acquiring government agency approvals (regulations and licensing).

V. RF SECTION BLOCK DIAGRAM

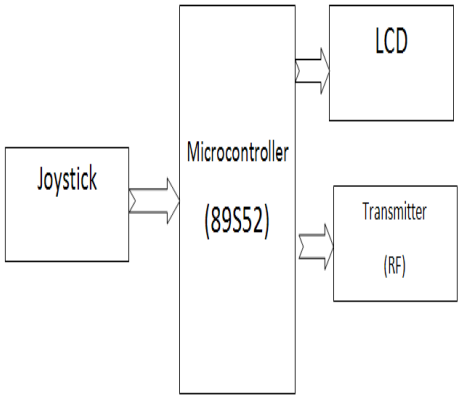

Fig 2 :- Transmitter Section

Radio frequency (RF) is a term that refers to alternating current (AC) having characteristics such that, if the current is input to an antenna, an electromagnetic (EM) field is generated suitable for wireless broadcasting and/or communications. These frequencies cover a significant portion of the electromagnetic radiation spectrum, extending from nine kilohertz (9 kHz),the lowest allocated wireless communications frequency (it's within the range of human hearing), to thousands of gigahertz(GHz).

When an RF current is supplied to an antenna, it gives rise to an electromagnetic field that propagates through space. This field is sometimes called an RF field; in less technical jargon it is a "radio wave." Any RF field has a wavelength that is inversely proportional to the frequency.

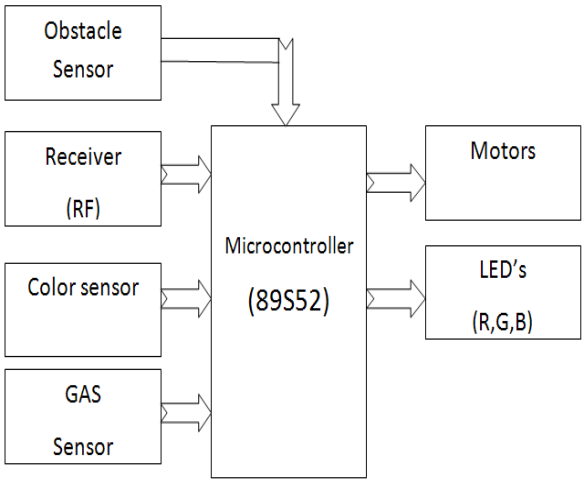

Fig 3 :- Receiver Section

VI. COLOUR SENSOR:

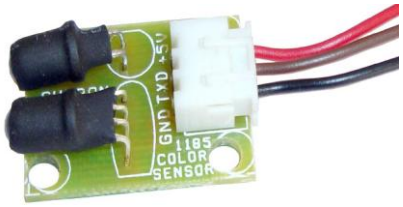

Fig.4 colour sensor

This colour sensor identifies colour and gives serial output of RBG value. It can identify 16.7 million colour shades giving RGB value for the detected colour. The detected colour is identified as amount of three primary colour values namely Red, Green & Blue with 8 bit accuracy for each primary colour. Any colour can be separated or combined into three primary colours Red, Green and Blue using the RBG values.

VII. PRINCIPLE OF COLOUR IDENTIFICATION:

The sensor switches each primary color RGB, one by one and checks what intensity of color is reflected by the surface of detection. This reflected intensity is converted to 8 bit value. For example a RED surface will strongly reflect RED. While a Yellow surface will reflect RED and GREEN both. According to the induction principle of the three primary colours which create various other colors in nature, once the value of three primary colours is confirmed, the color of the tested object is known. Knowing the value of RGB helps people gain the color of the light which is projected onto the sensor since each color correspond to only one value of RGB.

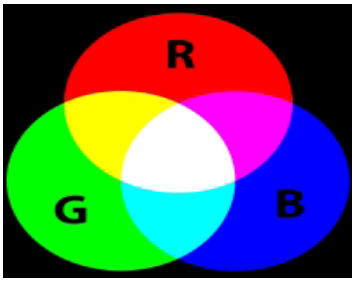

Fig.5:-color identification

VIII. SOFTWARE

C Language:

It provides simple, direct access to any addressable object (for example, memory-mapped device control registers), and its source-code expressions can be translated in a straightforward manner to primitive machine operations in the executable code. The Use of higher-level programming languages, such as C, resolves these problems. Programs written in C are very portable, since they can generally work on any CPU type without modification. They are also easier to write and read, since they are more compact and use a much more descriptive set.

IX. SYSTEM MODELLING:

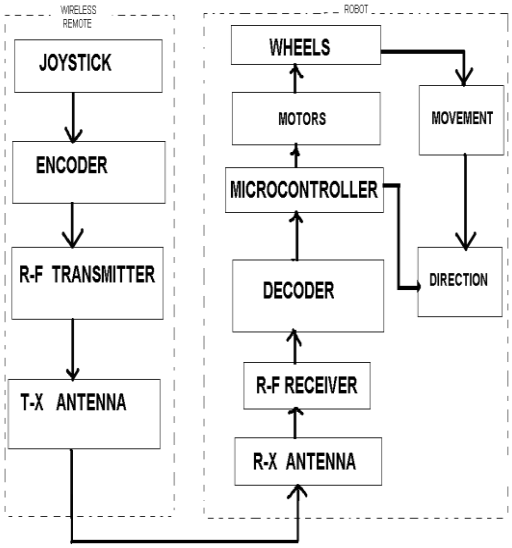

Fig.6:-System Flow diagram

X. CONCLUSION:

The project was come out with the operations of Receiver and transmitter circuit. The functions and the operations of the circuits interrelated are very important to be analyzed. With appropriate steps and methodology, any process of completing the project can be managed wisely and will be make a good result. Currently Wireless controlled omnidirectional monitoring robot with video support that can monitor using webcam.

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