ADVANCED EMBEDDED WIRELESS ROBOT WITH MOTION DETECTION SYSTEM AND LIVE VIDEO / AUDIO TRANSMISSION

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Abstract- This paper is to design and develop an intelligence robot to detect dangerous Gas/Smoke by using an 8 bit microcontroller. In our project the robot is designed to move automatically. The robot acts according to the command given by the program. It will move all the direction like forward, reverse, right and left. The Smoke sensing unit is available in robot mechanism. If particular Smoke is detected, robot will switch ON the Alarm Unit. The video and audio are monitored at the control unit. For transmitting audio and video, RF camera has been used.

I. INTRODUCTION

Embedded systems are finding increasing application not only in domestic application but also in areas of industrial automation, automobiles, power electronic, and defense and space equipments. 8051 are the modern building blocks for many embedded systems. The available 8-bit versions manufactured by Intel, Motorola, Philips, Atmel, etc., They are available in the market with various configurations for different applications.

A robot is an apparently human automation, intelligent and obedient but impersonal machine. Basically, a robot is a machine designed to do a human job that is tedious, slow or hazardous. It is only relatively recently that robots have started to employ a degree of Artificial Intelligence (AI) in their work - many robots required human operators, or precise guidance throughout their missions. Slowly, robots are becoming more and more autonomous.

This project is to design and develop an intelligence robot by using an 8 bit microcontroller. In our project the robot is designed to move automatically. The robot acts according to the command given by the program. It will move all the direction like forward, reverse, right and left. The video and audio are monitored at the control unit. For transmitting audio and video, RF camera has been used.

In this prototype project we design in such a way that this robot can be moved anywhere. This project is very much useful in the places where a human cannot go in to the places like ground canals, Smoke oriented caves, etc., and this project is very much useful in such situations.

2. IMPLEMENTATION

The block diagram shows wireless industrial security robot with motion detection system with live audio, video transmission.
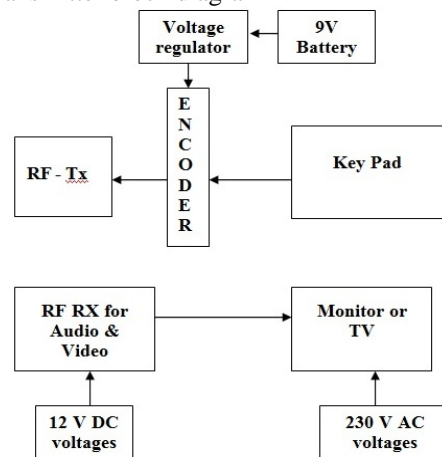
2.1 Transmitter block diagram

Fig.2.1.transmitter Block

The aim of this project is to control the robot direction from remote areas, so wireless communication is required to fulfill our application. There are different wirelesses communications exist. For this application we prefer modules as RF.

2.1.1.Encoder HT640
The 2^{16} encoders are a series of CMOS LSIs (large scale integrated circuits) for remote control system applications. They are capable of encoding information which consists of N address bits and 16_N data bits. Each address/data input can be set to one of the two logic states. The programmed addresses/data are transmitted together with the header bits via an RF or an infrared transmission
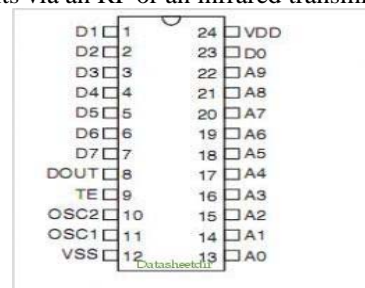

Fig 2.2: Pin diagram of HT 640E

Medium upon receipt of a trigger signal. The capability to select a TE trigger on the HT640E.
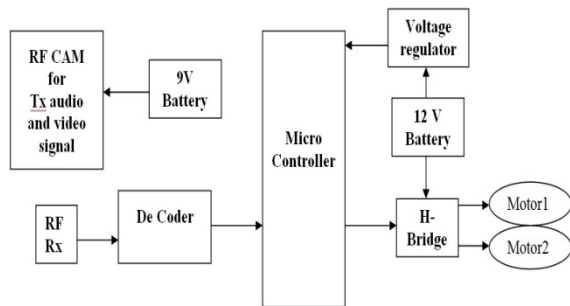
2.2 Receiver block diagram

Fig 2.3: receiver Block

2.2.1 Microcontroller:

Microcontrollers as the name suggests are small controllers. They are like single chip computers that are often embedded into other systems to function as processing/controlling unit. For example the remote control you are using probably has microcontrollers inside that do decoding and other controlling functions. They are also used in automobiles, washing machines, microwave ovens, toys etc, where automations needed.

As we know that there so many types of micro controller families that are available in the market. Those are

1) 8051 Family
2) AVR microcontroller Family
3) PIC microcontroller Family
4) ARM Family Basic 8051 family is enough for our application.

In order to fulfill our application basic that is AT89C51 controller is enough. But still we selected AT89S52 controller because of inbuilt ISP (in system programmer) option. There are minimum six requirements for proper operation of microcontroller. Those are:
1) Power supply section.
2) Pull-ups for ports (it is must for PORT0)
3) Reset circuit
4) Crystal circuit
5) ISP circuit (for program dumping)
6) EA/VPP pin is connected to Vcc.
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2.2.2 Selection of robot:
Here in this project we designed one robot which has two motors. Two motors are connected to two wheels which is connected to wireless camera for rotating the webcam. And we are placing one flexible wheel in the front side of the robot.

2.2.3 Selection of driver:
When the motors of robot is rotating they will produce back EMF. Due to that back EMF high

current is produced. If we connect these motors directly to the microcontroller the microcontroller may damage because of that current that's why wear selected H-bridge.

2.2.4 Decoder HT648D
HT648D is having 2^126 decoders are a series of CMOS LSIs (large scale integrated circuits) for remote control system applications. It is an 24 Pin DIP/20 SOP package. They are paired with Hotlink's 2 16 series of encoders (refer to the encoder/decoder cross reference table). For proper operation, a pair of encoder/decoder with the same number of addresses and data format should be chosen. The decoders receive serial addresses and data from a programmed 2^16 series of encoders that are transmitted by a carrier using an RF or an IR transmission medium. They compare the serial input data three times continuously with their local addresses. If no error or unmatched codes are found, the input data codes are decoded and then transferred to the output pins. The VT pin also goes high to indicate a valid transmission. The 2^16 series of decoders are capable of decoding information that consist of N bits of address and 16_N bits of data. Of this series, the HT648L is arranged to provide 8 address bits and 8 data bits, and HT648F is used to decode 16 bits of address information.
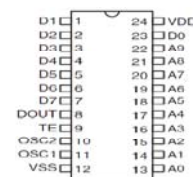

Fig 2.4: Pin diagram of HT 68D.

2.2.5 Motors:
DC-motors are very easy to use, but like most other motors their usefulness for robotics is very dependent on the gearing available. DC-motors are made much more effective if they have an efficient gear ratio for a particular task. If your priority is to have a fast spinning motor and torque is of little concern a low gearing or even no gearing may be what you need; however, most motors used in robots need torque over top speed so a motor with a high gear ratio could be more useful.

The control of a DC motor can be split into two parts: speed and direction.
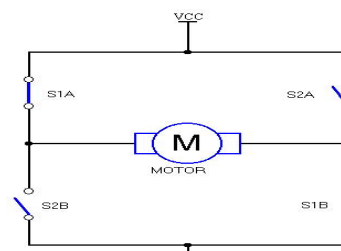

Fig 2.5: Construction of DC Motor

Changing which direction a DC-motor turns is very simple: simply reverse the polarity.[3]

Both pairs of switches ((S1A,S1B) and (S2A, S2B))-see the picture on the right- will always switch together. This circuit is called an H-bridge. In a real design the switches can be several different components (Relays, transistors, FETs) or the whole circuit (without the motor) could be an IC (integrated circuit. use sugarcan relays.

2.2.6 Camera
RF camera was a 35 mm rangefinder camera sold by. It was introduced to the market on 13 October 1999. The RF camera uses a viewfinder combined with a lens coupled "split image and double image range finder" with illuminated, parallax corrected, bright line frame lines. As such it is very similar to the viewfinder/rangefinder of Leica M mount cameras (if, perhaps, not as bright).

The bright line frame lines that show in the viewfinder are selected from one of three frame line pairings, depending on the lens (or lens adapter) mounted on the camera: [4],[12]
- 50 mm and 75 mm
- 28 mm and 90 mm
- 35 mm and 135 mm
- 10-bit quality, end-to-end digital video processing
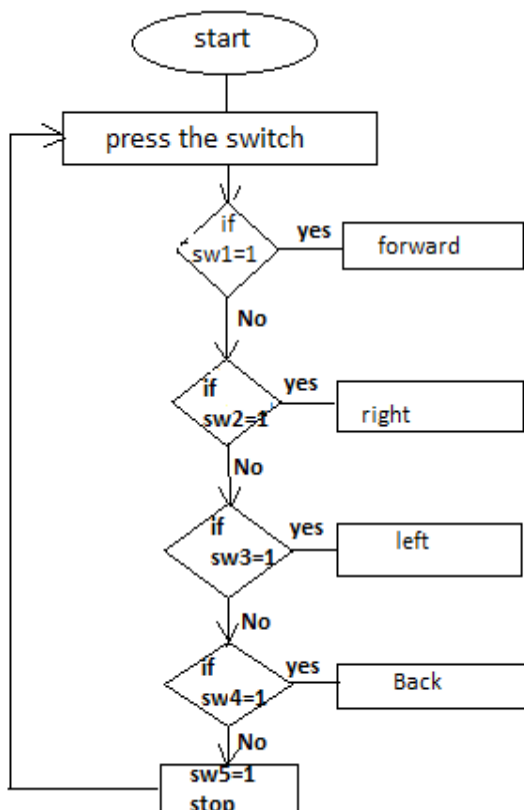
2.2.7 Soft ware implementation flow chart

Fig 2.6: program chart

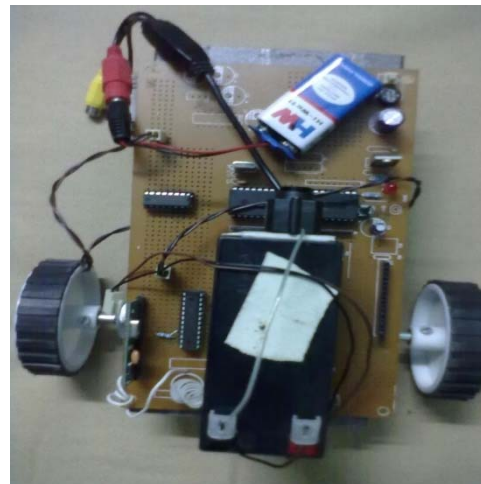## 3. RESULT & ANALYSIS:

fig.2.7: result analysis

4. FUTURE SCOPE

A robot is an "apparently human automation, intelligent and obedient but impersonal machine". Basically, a robot is a machine designed to do a human job (excluding research robots) that is tedious, slow or hazardous. In future, we use this project is to design and develop an intelligence robot to detect dangerous Gas/Smoke by using an 8 bit microcontroller In our project, the robot is designed to move automatically. The robot acts according to the command given by the program. It will move all the direction like forward, reverse, right and left. The Smoke sensing unit is available in robot mechanism. If particular Smoke is detected, robot will switch ON the Alarm Unit.

The video and audio are monitored at the control unit. For transmitting audio and video, RF camera has been used.

5. CONCLUSION

In our project, the robot is designed to move by our command.. The robot acts according to the command given by the program. It will move all the direction like forward, reverse, right and left. The video and audio are monitored at the control unit. In this prototype project, we design in such a way that this robot can be moved anywhere and it can get the information of particular place. This project is very

much useful in the places where a human cannot go in to the places like ground canals, Smoke oriented caves, etc., and this project is very much useful in such situations. If particular directions we will give according to that only our robot will move and that movement will be seen by using camera. So that it's easy to detect any faults or dangerous in the industry. It leads very easy process without interaction of human.

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