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CONTROL OF SPY ROBOT BY VOICE AND COMPUTER COMMANDS

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Abstract − This paper proposed a method for controlling a spy robot either through voice commands or computer commands and also composed with camera. Study of human-robot communication is one of the most important research areas. The voice communication is significant in human robot interaction among various communication media. The voice commands are used to control the robot and visual feedback is used to provide the precision control to the robot. This robot is also build up with obstacle detection module that generates the signal as the obstacle detects. The proposed system is capable of positioning the robot at tedious work space as instructed through command to get the actual visual feedback. This proposed system is controlled either by voice commands or by computer commands as per user convenience.

Keywords - Robot, Voice Control, Computer Control, Obstacle detection, Visual Feedback.

I. INTRODUCTION

The security is the very important factor for every country and technology plays very important roll in the security. So we are developing such a robot for the spying purpose which can used for various security purposes. For securing human life or body, robots can replace humans from some unsafe or difficult work. Robots can work in all types of environment like poisonous,chemical as well as nuclear etc. They can work in environments so hazardous that an unprotected human would quickly die.

As the new trends arrives in the technology we should adopt it like that we are using the Zigbee technology instead of RF-id technology which provides the larger range.

Robot works in dual mode as follows

1) PC Mode

Spy robot is controlled in dual mode one is PC mode in which we control the robot by using keyboard keys. We control it like forward, backward ,left, right & stop, We can also get a visual feedback from the robot with the help of wireless camera.

2) Through voice commands

Another operating mode for spy robot is through voice commands by using mic. We store voice commands in the IC which is used for voice recognition, i.e. HM2007. Robot is controlled by commands like Run, Left, Right, Back, Stop etc.

Special feature of the robot is wireless camera on it. Camera captures the video send visual feedback at the receiver side. Feedback recorder is also available in receiver module.

II. RELATED WORK

PROBLEM DESCRIPTION

Robotic abetment through the voice provides a more natural way of establishing the man-machine Interaction, which is why this paper presents a graphical interface wireless control of a robot through voice commands. Among the advantages possessed by the use of a voice navigation system, is the possibility to reach a greater number and type of users of these systems, taking into consideration that there are people who have less understanding and are limited in commanding manual systems.

With the implementation of this project it is pretended to wirelessly control a robot , through voice commands delivered to a control terminal. To operate the robot through the spoken information, the following commands are implemented for voice recognition: forward, reverse, right, left and stop, each representing one share for the robot motion control.

When we say voice control, the first term to be considered is voice perception i.e. making the system to understand human voice. Voice recognition is a technology where the system percepts the words (not its meaning) given through voice.

Speech is a standard method for robot handling and articulation. The voice recognition circuit we will outline, from the robot's main intelligence [central processing unit (CPU)]. This is a good thing because it doesn't take any of the robot's main CPU processing power for word recognition. The CPU must check if a command has been issued to the robot. We can enhance upon this by

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connecting the recognition line to one of the robot's CPU interrupt lines. By this, a percept word would cause an interrupt, letting the CPU know a familiar word had been spoken. The advantage of using an disrupt is that polling the circuit's identification line occasionally would no longer be required, supplementary reducing any CPU visual projection.

You can program and train the speech recognition circuit to identify the unique words you want acknowledge. The voice recognition can be easily interfaced to the robot.

➢ **Components used**

1) ATmega8
2) ATmega16
3) Zigbee (Transmitter & Receiver)
4) Voice Recognition Toolkit

1) ATmega8

The ATmega8 is a low power CMOS 8-bit microcontroller based on the AVR RISC architecture. By executing commanding instructions in a single clock cycle the ATmega8 achieve throughput impending 1 MIPS per MHz, allowing the system designed to optimize power utilization versus processing speed.

ATmega8 provides following features
1) In-System Programmable Flash with Read-while write capabilities of 8K bytes.
2)512 bytes of EPROM
3)1K byte of SRAM
4)23 general purpose I/O lines
5)32 general purpose working registers
6)Internal & external interrupt
7)A seial programmable USART

It is manufactured using Atmel's high density non-volatile memory technology. The ATmega8 AVR is supported with a full suite of program & system development tools, including C compiler, macro assembler, program debuggers/simulators In-circuit Emulators and evaluation kits.

2) ATmega16

The ATmega16 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, theATmega16 achieves
throughputs approaching 1 MIPS per MHz and to optimize power consumption versus processing speed.

Special Features of ATmega16

1) Programmable Flash Program Memory with read capabilities of 16K bytes
2)512 bytes of EEPROM
3)1K byte SRAM
4)32 general purpose working registers
5)JTAG interface for boundary-scan
6)On-chip Debugging support & programming

The ATmega16 AVR is supported program & system development tools, including C compiler, macro assemblers as well as program debuggers/simulators In-circuit E emulators and an devaluation kits.

3) Zigbee(Transmitter & Receiver)

ZigBee technology works on low data rate. It requires low power consumption. Zigbee having low cost.
ZigBee provides low cost and low power connectivity for equipment that needs battery life as long as several months to several years but does not require data transfer rates as high as by Bluetooth. ZigBee can be implement in mesh networks larger than is possible with Bluetooth. ZigBee compliant wireless devices are expected to transmit 10-75 meters, depending on the RF environment and the power output consumption required for a given application, and will operate in the unlicensed RF worldwide(2.4GHz global, 915MHz Americas or 868 MHz Europe). The data rate is 250kbps at 2.4GHz, 40kbps at 915MHz and 20kbps at 868MHz.

A unique feature of ZigBee network layer is **communication redundancy** eliminate "single
point of failure" in mesh networks. PHY include energy and link quality detection, clear channel measurement for **improved coexistence with other wireless networks**.

4) Voice Recognition Module

The voice recognition system is a completely assembled and easy to use programmable speech recognition circuit. Programmable, means you instruct the words (or vocal utterances) you want
the circuit to recognize. This board allows you to experiment with many facets of speech recognition technology. It has 8 bit data out which can be interfaced with any microcontroller for further development. Some of interfacing applications which can be made are controlling, robotics movements, household appliances, voice Assisted technologies, Voice to text translation, and many more.

FEATURES

1) Self-contained stand alone speech recognition circuit
2) User programmable
3) Up to 20 word vocabulary of duration two second each
4) Multi-lingual
5) Non-volatile memory back up with 3V battery onboard. Will keep the speech recognition data in memory even after power off.
6) Easily interfaced to control external circuits & appliances

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III. PROPOSED ARCHITECTURE

Up til now we had just seen the problem description and new emerging technology robotic components and features. Now we will see the proposed architecture which is divided in the two modules

1) Transmission Module
2) Receiver Module

Block diagram of the transmission module is as follows .

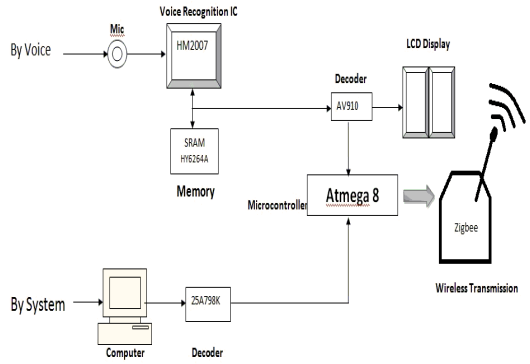

Fig. Transmission Module

As we operate the robot in dual mode i.e. by computer and by voice. Voice commands will be transferred through mic to the Voice Recognition module which contains the HM2007 IC for processing the voice and matching the received voice signal with the stored voice . Voice commands are stored by SRAM which is connected to the HM2007 IC.

Voice Recognition module provides the decoders to decode the voice signals and forwards the decoded signals to the transmission microcontroller ATmega8. ATmega8 microcontroller processes the decoded signal and passes it to the Zigbee transmitter. Zigbee transmitter transmits the signal to the robot.

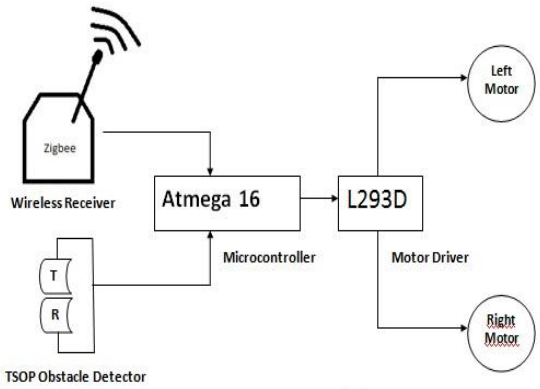

Fig. Receiving Module

At the robot side Zigbee receiver receives the signals from the Transmission module. It provides the signals to the Atmega16 microcontroller . ATmega16 decodes the signals received from the Zigbee and processes these signals to input to the L293D Motor Driver and robot moves according signal received.

As a spy robot we will mount a web camera on the robot as well as we can provide hands for various type of works like bomb diffusing etc. Another special feature of robot is obstacle detection means obstacle detector circuit always checks for the obstacles in the route if any obstacle occurs it will automatically stops.

IV. CONCLUSION

In this way, we have studied robotic problems and new advance technologies to overcome these problems.

V.REFERENCES

1.WWW.SUNROM.COM//"HM2007 Speech Recognition System" .
2. C. E. Strangio , "Microprocessor instruction in the engineering laboratory," *IEEE Transactions on Education*, vol.31, no. 3, pp. 172-176, Aug., 1988..
3. N. Yamasaki and Y. Anzai, "Active interface for Human-Robot interaction," *Proceedings of the 1995 IEEE International Conference on Robotics and Automation*, Nagoya, Japan, pp. 3103-3109, May, 19954.
4.www.imagesco.com/articles/hm2007/SpeechRecognitionTutorial01.html
5. www.migi.com for selecting motors and other robotic concepts.
6.www.migindia.com/modules.php?name= News&file=article&sid=22
7. www.datasheetcatalog.com
8. www.alldatasheet4u.com
9. http://arts.ucsc.edu/ems/music/tech_background/ TE-20/teces_20.html#I. For microphones types and properties.
10.www.Howstuffworks.com for understanding microphone concepts, rf radio working and other related concepts.

Book:

• The 8051 microcontroller –Kenneth Ayala, 3rd reprint, 2005; Thomson Asia Ltd.,Singapore; Chapter 3,6,7&8.For programming 89S51
• Modern Digital Electronics –RP Jain, 3rd edition; Tata Mcgraw Hill; Chapter 6&10. For A/D converter and 7 segment display connection.