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IMPLEMENTATION OF VOICE CONTROLLED ROBOT FOR BOMB DETECTION WITH BLUETOOTH AND AURDINO

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ABSTRACT: Most of Artificial Intelligence will eventually lead to robotics. Most neural networking, natural language processing, image recognition, speech recognition/synthesis research aims at eventually incorporating their technology into the epitome of robotics - the creation of a fully humanoid robot. The field of robotics has been around nearly as long as Artificial Intelligence - but the field has made little progress. This is only natural, since the field not only attempts to conquer intelligence, but also the body that embodies it - a formidable task. Robotics, though, is not just about humanoid robots; but also about their commercial applications in manufacturing, safety and hundreds of other fields. It is only relatively recently that robots have started to employ a degree of Artificial Intelligence in their work - many robots required human operators, or precise guidance throughout their missions. Slowly, robots are becoming more and more autonomous. Robotics is an absolutely fascinating field that interests most people. Robot is a system that contains sensors, control systems, manipulators, power supplies and software all working together to perform a task. Robot should have Sensing, Movement, Energy and Intelligence characteristics.

KEYWORDS: Bomb detecting sensor, RF module and intelligent robot, Embedded Systems, Speech Recognition , Human/Robot Interface; Android.

1. INTRODUCTION

The technical improvement together with the need for high performance robots created faster, more accurate and more intelligent robots using new robots control devices, new drives and advanced control algorithms. The presented robot control system can be used for different sophisticated robot applications. This spy and bomb detecting robot was fully controlled by the remote and the commands from the remote via RF transmitter were received by the Arduino. So this spy and bomb detecting robot can be used in military applications. Most of the military organization now takes the help of robots to carry out many risky jobs that cannot be done by the soldier. These spy robots used in military are usually employed with the integrated system including gripper and cameras, video screens, sensors. The military robots also have different shapes according to the purposes of each robot. Thus the proposed system, an Intelligent Robot using RF module saves human lives and reduces manual error in defense side. This is specially designed spy and bomb detecting robot system to save human life and protect the country from enemies. One of the most important things about these robots is that they have the capability to perform missions remotely in the field, without any actual danger to human lives.It has always been a dream of human being to create machines that behave like humans. Recognizing the speech and responding accordingly is an important part of this dream. With the improvements of the technology

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and researches on artificial intelligent, this dream comes true relatively. In this project, it is aimed to make a contribution to this dream. Controlling the machines and environment with speech makes human life easier and more comfortable. This project is a simple implementation of this approach. A robot is controlled by voice commands. Voice command is taken through a microphone, processed in computer and sent to the robot and finally the robot acts accordingly. Speech is the most used way of communication for people. We born with the skills of speaking learn it easily during our early childhood and mostly communicate with each other with speech throughout our lives. By the developments of communication technologies in the last era, speech starts to be an important interface for many systems. Instead of using complex different interfaces, speech is easier to communicate with computers.

2. LITERATURE SURVEY

1. Dr. B. Subrahmanyeswara Rao, C.Soumya, G. Shamala Siresha, M. Sushma, N. Sai Priyanka [1] presented paper on "PC Controlled Bomb Detection and Diffusion Robot". Paper describes the detail study ofWar field robot which is capable of detecting bombs land mines in its path and which is wirelessly controlled through PC using Zigbee technology.

2. Saurabh Nalwade [2] Presented paper on "Robots for surveillance in military applications". In this paper, provide a possible solution or example of such unique use of robots in military surveillance and espionage. With the help of technologies like zigbee it is possible to develop long range robots which can be controlled from remote locations. In this way we can reduce the human interference and also save some lives.

3. Ankita Patel, Kinjal Chaudhari, Dattukumar Patel [3] presented paper on "Touch screen controlled multipurpose spy robot using zigbee".In this paper, spy robot was fully controlled by the TOUCH SCREEN and the commands from the TOUCH SCREEN via Zigbee transmitter were received by the microcontroller. So this spy robot can be used in military applications.

4. Sagar Randive, Neha Lokhande, Apoorva Kamat , Shubhrojit Chakraborty, Vishal Pande [4] presented paper on "Hand Gesture Recognition Bomb Diffusing Surveillance Robot".In this paper,This is an interesting robot that can be controlled by hand gestures and by a RF remote. The hand gesture recognition technology uses potentiometers fitted inside a glove and uses the phenomena of change in resistance for the corresponding motion of the robot.

5. Prof. Y. M. Naik, Chiranjivi, M. Deshpande, Ravija.R. Shah, Rashmi. R. Kulkarni [5] presented paper on "ANDROID CONTROLLED SPY-ROBOT". In this paper,Android programming is done in java which makes it very attractive to program because of familiarity to java. They have built in GPS compasses and cameras, Bluetooth and high end processors running at an average of 500Mhz.Hence the project establishes a bridge between the processor Android in the Smartphone and the microcontroller in the robot. The external inter face is totally controlled by means of the mobile phone.

3. BLOCK DIAGRAM OF TRANSMITTER

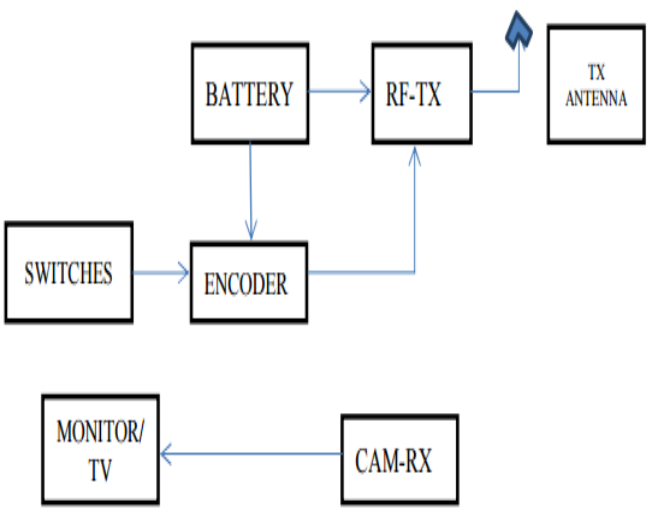

Fig- Block Diagram of Transmitter

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1. POWER SUPPLY: Transmitter circuit requires 9V for radio frequency transmitter and serial to parallel decoder Also,priority encoder. This power supply can be provided 9V battery can be chargeable or use and throw.

2. CONTROL PANEL: The circuit required total four movement or controls hence 4 switches connected to the keyboard of transmitter. Four switches for controlling movement forward, backward, left turn and right turn, depending upon our programming conditions we can manage particular switch for particular operation.

3. PARALLEL TO SERIAL ENCODER: Input is 4-bit parallel BCD number (connected with switches). It cannot transmit over long distance directly, hence converted in to serial using parallel to serial encoder circuit. The serially converted 4-bit BCD is transmitted by using radio frequency module. It can transmit data up to 250 meter in open space.

4. RF FREQUENCY MODULES: There are various types of RF modules available in market like 315MHz, 433MHz; 668MHz from free frequency band, having maximum communication distance is 250mtrs. We can use any of them.

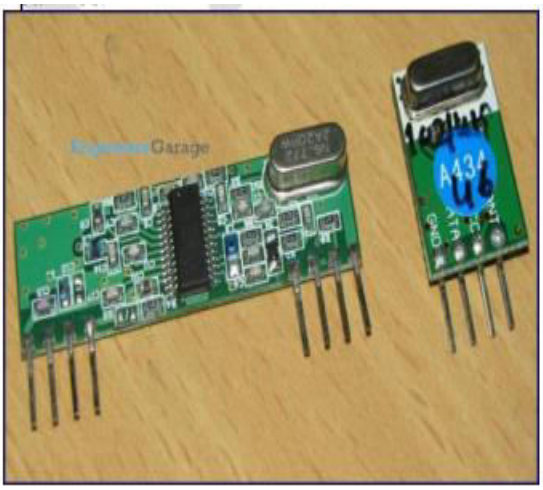
5. CAMERA RX: We used here camera receiver to receive transmitted video by camera on robot. The receiver required 9V DC and canbe connected to TV directly. For monitor TV tuner card required to convert the video signals in to monitor.

6. POWER SUPPLY: Here Arduino Uno board, battery, motor driver required 12V power supply connected with BATTERY, RF RECEIVER, LED indicators, sensors and control circuit operates with DC 5V. AC ripples reducer circuit provides to obtain pure DC from pulsating DC.

4. BLOCK DIAGRAM OF RECEIVER

1. RF RECEIVER

We required using same frequency receiver module as used in transmitter remote(it can be 433MHz/ 315MHz/ 668MHz). The received signal is decoded by RF module itself and gives serial output for the serial to parallel decoder circuit. This circuit can decode serial data in to parallel format (original format as in transmitter). Now that output is given to the Arduino, depends upon programming conditions, Arduino board drives motor driver and motor driver to the motors.



2 .MOTOR DRIVER

Arduino board/ Microcontroller has very low current output it cannot drive current consuming sources, such like motor hence separate motor driver circuit requires. We can implement this circuit using related motor driver module or IC. Notification LED can directly drive with current limiting resistor.LED indicators connected to which operation is working now, as like LED 1 for forward, LED 2 for reverse and so on. As our programming conditions system requires providing data by transmitter circuit and received at receiver end can operate the robot.

3. SENSOR

Here we are using metal detector operates with metal detection from maximum 3-4 inch distance, connected with analog input pins of Arduino Uno board, according to programming Arduino peeps the buzzer. For RF received signal robot operate forward, reverse, left turn, right turn movements according to programming conditions.

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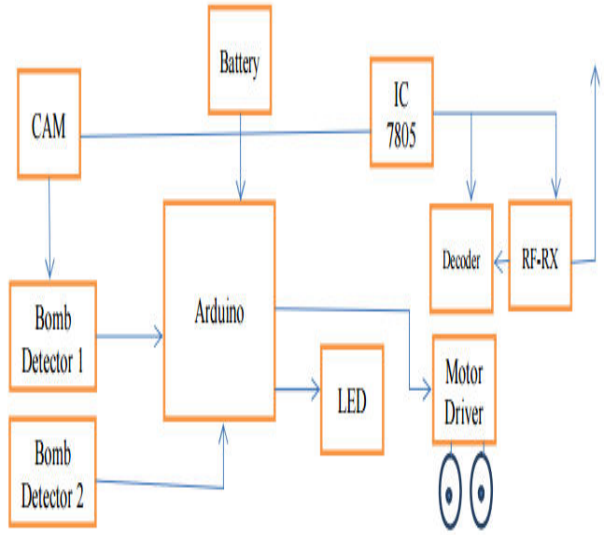

Fig-Block dia. Of Receiver

4. ARDUINO

The ATmega328/P provides the following features: 32Kbytes of In-System Programmable Flash with ReadWhile-Write capabilities, 1Kbytes EEPROM, 2Kbytes SRAM, 23 general purpose I/O lines, 32 general purpose working registers, Real Time Counter (RTC), three flexible Timer/Counters with compare modes and PWM, 1 serial programmable USARTs , 1 byte-oriented 2-wire Serial Interface (I2C), a 6- channel 10-bit ADC (8 channels in TQFP and QFN/MLF packages) , a programmable Watchdog Timer with internal Oscillator, an SPI serial port, and six software selectable power saving modes.

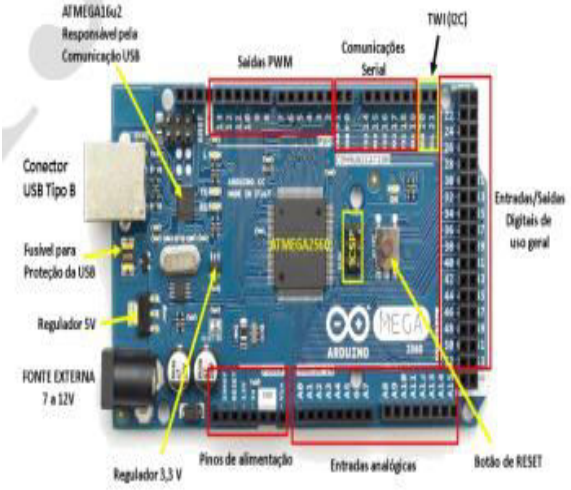

Fig : Arduino Board

5. VOICE RECOGNITION MODULE

The module could recognize your voice. It receives configuration commands or responds through serial port interface. With this module, we can control the car or other electrical devices by voice. This module can store 15 pieces of voice instruction. Those 15 pieces are divided into 3 groups, with 5 in one group. First we should record the voice instructions group by group. After that, we should import one group by serial command before it could recognize the 5 voice instructions within that group. If we need to implement instructions in other groups, we should import the group first. This module is speaker independent. If your friend speaks the voice instruction instead of you, it may not identify the instruction. Please note that speaker independence requires strictly good MIC. The MIC we supply is not good enough for it to be speaker-independent.

Fig : Voice Recognition Module.

5. CONCLUSION

It detects the RF data send by transmitter and according to that control robot in Forward, backward, left turn, right turn movements. Metal/Bomb detector can detect the metals and alert with LED to notify the Metal/Bomb .Because, we can't detect the actual bomb we don't have that much authority .The camera

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detects the exact location of the robot. In this manner our project plays a crucial role in Military as well as in our police department. In this project, we have introduces a new application using two techniques i.e. spying and bomb detection implemented by using Arduino kit .In future, we can also implement bomb diffusion technique in this project. It can be used in radar detection systems to detect objects by implementing other hardware.

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