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RF Controlled Terrorist Fighting Robot

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ABSTRACT

We cannot forget 26/11 when 101 people including nine foreigners and 14 policemen have lost their lives while about 300 people were injured in the worst terror attack seen in the country in which desperate men fired indiscriminately at people. Hence the objective of project is to minimize human casualties in terrorist attack. It has got two barrel turret through Bullet can be fired; radio camera in synchronization with the turret can rotate up and down, left and right up to a safe firing limit. Turret and camera mechanism has been installed on my previous spy robot vehicle, which has all the function like tank, turing to any angle on its axis, moving forward and reverse turning left and right, running instantly into reverse direction. This robot is radio operated, self powered, and has all the controls like a normal car. A pair of laser gun has been installed on it, so that it can fire on enemy remotely when required, this is not possible until a wireless camera is installed. Wireless camera will send real time video and audio signals which could be seen on a remote monitor and action can be taken accordingly. It can silently enter into enemy area and send us all the information through its' tiny Camera eyes. It is designed for, fighting as well as suicide attack.

1. INTRODUCTION

The global focus on terrorism and security may have geared up following the 9/11 attacks in the USA. The risk of terrorist attack can perhaps never be eliminated, but sensible steps can be taken to reduce the risk. The issue here is how seriously do the governments take the threat of terrorism…Post-Limburg, we cannot continue to hope for the best and ignore the lessons. Our Prime Minister Manmohan Singh also mentioned in a speech last year that Indian soldiers will soon have robots assisting them to counter terrorist attack. We are yet to hear more on that thought.

The word "robot" was first used in a 1921 play titled R.U.R.: Rossum's Universal Robots, by Czechoslovakian writer Karel Capek. Robot is a Czech word meaning "worker."

Merriam-Webster defines robot as "a machine that looks like a human being and perform various complex acts; a device that automatically performs complicated, often repetitive tasks; a mechanism guided by automatic controls."

ISO describes a robot as "an automatically controlled reprogrammable, multipurpose manipulator programmable in three or more axes, which may be either fixed in place or mobile for use in industrial automation applications. "

Yet, all these definition do give us a rough idea about what comprises a robot, which needs to sense the outside world and act accordingly. There are motors, pulleys, gears, gearbox, levers, chains, and many more mechanical systems, enabling locomotion. There are sound, light, magnetic field and other sensors that help the robot collect information about its environment. There are microcontrollers powered by powerful software that help the robot make sense environmental data captured and tell it what to do next. There are microphones, speakers, displays, etc that help the robot interact with humans.

2. PREVIOUS WORK IN INDEPENDENT ROBOTIC WARRIORS

Smart military robots controlled by humans are currently deployed in Pakistan to combat Taliban. Some like QinetiQ's MAARS are armed with weapons to shoot insurgents, appendages to disarm bombs and surveillance equipment to search buildings. No matter where the robots are deployed, however, there is always a human involved in directing where a robot should fly and what munitions the robot should use if it encounters resistance.

What if humans are taken out of loop, and robots are left to decide who to kill or what to bomb on their own? Ronald Arekin, a Georgia Tech computer science professor, is developing an ethical governor –a package of software and hardware that tells robots when and what to fire. He argues not only can robots be programmed to behave more ethically on the battlefield, they may actually be able to make wiser decisions than human.

Arkin is translating codified, written military law into terms that robots can understand and interpret

themselves. One possible scenario for Arkin's ethical governor is an enemy sniper posted in a building next to an important cultural setting, like a mosque. A wheeled military robot emerges from cover and the sniper fires on it. The robot finds the sniper and has to choose between using a grenade launcher or its own sniper rifle to bring down the fighter. Using geographical data on surrounding buildings, the robot would decide to use the sniper to minimize any potential damage to the surrounding buildings.

3. OBJECTIVE

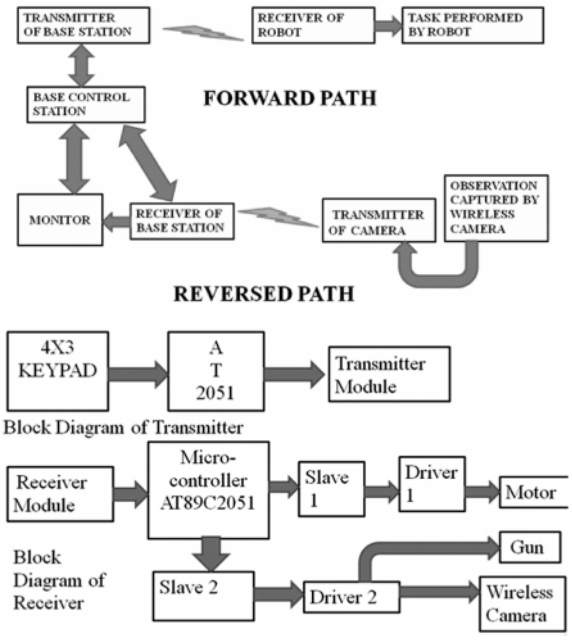
1. *Where man dares not venture:* Robots have traditionally been put to use in environments that are too hazardous for man.
2. *To rescue, pronto!:* Robots also work under precarious conditions, for search and rescue after disasters. A host of robots built by the University of South Florida's Centre for robot assisted search and rescue were in action at the world trade centre site within hours after the disaster to delve into the rubble and rescue survivors. Similarly, robots are also put to work in underground mines.

   A lot of research today is focused on improving rescue functions of robots. One notable development is the invention of new locomotion system for robots developed at Virginia tech can propel themselves using their outer surface. Since they do not have unwieldy wheels or legs sticking out of their structure, these robots can easily move in narrow space or low cavities under debris, etc.
3. *We even make them go to war:* The faithful bots do not hesitate to tread even the dreaded terrain of battlefields. Their use in Afghanistan and Iraq wars make us wonder if robots have indeed become intelligent! Battle bots of various shapes and sizes were deployed to defuse landmines, search for criminals hiding in caves, search for bombs under cars and in building, for espionage and what not! To describe their work is master enough for another article, but the role they played is obvious from that these bots were even awarded medals! These robots were controlled by humans. But following the war, a contest was launched in Singapore to design autonomous urban warriors that can search buildings, detect and defuse bombs, etc autonomously even in crowded urban localities. Singapore's Defence and Technology Agency (DSTA) have offered one million Singapore dollars as prize money foe whoever can develop such a robot.
4. We aim to develop a model which will be efficiently used to minimize terrorist causality.

4. PROPOSED PATH OF IMPLEMENTATION

Being able to achieve reliable long distance communication is an important open area of research to robotics as well as other technology areas. As interest in robotics continues to grow, robots are increasingly being integrated into everyday life. The results of this integration are end-users possessing less and less technical knowledge of the technology. For example, consider the application of mobile robots in the health care industry, where the intended end users are patients themselves. In this case, the need for simplified, reliable, and user-friendly robot designs is of utmost importance.

Currently, the primary mode for robot communication uses RF (radio frequency). RF is an obvious choice for communication since it allows more information to be transferred at high speed and over long distance. However, creating RF network of long range for many simple applications is an impractical solution. This project explores the use of readymade RF networks for communication and device control. This eliminates the need of a new infrastructure and detailed technical research. Proposed path of implementation of our project is shown below:



Heart of our robot is Intel' most power family of microcontroller 8051,we are using at89c2051 microcontrollers is first microcontroller which acts as master controller, decodes all the commands received from the transmitter and give commands to slave microcontroller. Slave microcontrollers are responsible for executing all the commands received from the master and also generating pwm pulses for the speed control.

Ld293 motor driver IC which drives two motors m1 and m2.These two motors are vehicle driver motors. Slave microcontroller controls the gun and camera movements in up/down, left or right direction. Another driver IC which drives gun and camera Motors in two angles.

DTMF

The dual-tone multi frequency (DTMF) signal was originally developed just over 25 years ago. This was before the U.S. government forced Bell Telephone to break up, allowing the company to expand into other markets. DTMF is commonly known as touch-tone dialing. The standard DTMF signal is composed of two audio tones generated from a group of eight possible tone frequencies. The eight frequencies are divided into two equal groups, a low-frequency group and a high-frequency group. The DTMF signal is an algebraic sum of two tone frequencies, one tone from each frequency group. If we do the math, we see that there are 4 x 4 =16 possible combinations. The low frequencies (R1 to R4) are referred to as the *row group*. The high frequencies (C1 to C4) are referred to as the *column group*.

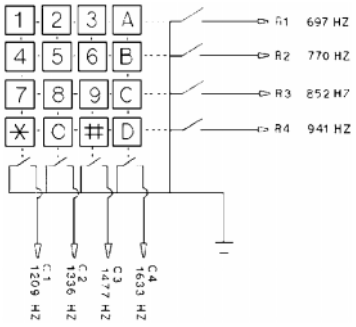


Fig: 4 × 4 Keypad Matrix Showing Individual DTMF Frequency

Transmitter Circuit Explanation

Twelve keys are connected in four by three matrixes to the microcontroller AT2051. Key data is transmitted through the 433mhz transmitter module through its pin no 3 of the microcontroller which is Tx pin of the inbuilt uart of the microcontroller and works on 1200bits/sec. X1 along with c4 and c5 gives the required clock input to the microcontroller c 1 and r1 forms the reset circuitry connected to pin no 1 of the microcontroller. Key pressed value is transmitted through antenna.

Receiver Circuit Operation

RF433-RX is 433mhz radio receiver which receives the transmitted codes from the remote place transmitted by the transmitter these codes are converted to digital format and output is available to the pin no 2 of the master micro-controller, this is the Rx pin of inbuilt UART of the microcontroller. We are using uart to receive our codes at 1200 baud rate. Based on the input codes master will give command to slave microcontroller ic3 and robot will behave as follows:

- Moves in forward direction.
- Moves in reverse direction.
- Speed controls in both the direction.
- It can even turn left or right while moving forward or in reverse direction.
- On the spot left or right turn to pass through the narrow space.

Microcontroller At89c2051

The AT89C2051 is a low-voltage, high-performance CMOS 8-bit microcomputer with 2K bytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard MCS-51 instruction set. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C2051 is a powerful microcomputer which provides a highly-flexible and cost-effective solution to many embedded control applications. *The AT89C2051 provides the following standard features: 2K bytes of Flash, 128 bytes of RAM, 15 I/O lines, two 16-bit timer/counters, a five vector two-level interrupt architecture, a full duplex serial port, a precision analog comparator, on-chip oscillator and clock circuitry*. In addition, the AT89C2051 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port and interrupt system to continue functioning. The power-down mode saves the RAM contents but freezes the oscillator disabling all other chip functions until the next hardware reset.

Motor Driver

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when required; this is not possible until a wireless camera is installed. Wireless camera will send real time video and audio signals which could be seen on a remote monitor and action can be taken accordingly. It can silently enter into enemy area and send us all the information through its' tiny camera eyes.

DC Motors

DC motors can be applied to movement and locomotion Specifications of most DC motors show high revolutions per minute (rpm) and low torque. Robotics need low rpm and high torque. Gearboxes can be attached to motors to increase their torque while reducing the rpm. The gearbox usually specifies a ratio that describes the rpm in to the rpm out. For instance, a DC motor with an rpm of 8000 is connected to a 1000:1 gearbox. What is the output rpm? 8000 rpm/1000 _ 8 rpm. The torque of the motor is substantially increased. You could estimate that the torque will increase by the same value the rpm decreased. In reality, no conversion is 100 percent efficient; there always will be efficiency losses. Some DC motors, called *gear head motors,* are built with a gearbox.

Applications

- It will be used as a fighting robot with terrorist hidden inside the building.
- It can be used as a suicide attack bomb if it is going to be caught by enemies.
- To minimize the casualties in terrorist attack.
- Security Purpose.
- Partially may be used in military.

Advantages:

- It can be altered to suit the needs of the user.
- It is fast and robust.
- It can be controlled remotely.
- It has video feedback.
- It has its own power supply.
- Save human life from terrorist risk

Limitations:

- It doesn't have artificial intelligence.
- It doesn't have explosive detection & disposal ability.
- Power Supply.

5. CONCLUSION

In order to strengthen the security and defense of our country we desperately require robotic system which will forearm our defense system. In the recent past our world has witnessed plethora of terrorist activities and in them we had encountered tragic loss of life and property. Such humongous loss would have been avoided if we would have strong life saving robotic system in place. Hence in order to make this world a beautiful place to live we desperately require robot which will assist us in our endeavour.

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