

# Security Operations in the Protected Area or LOC with Wireless Secured Communication and Tracking Device for Soldiers

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**Abstract:** In the past decade, robotic systems have been used with increased popularity for bomb detection and it is possible to fight with enemy in war fields. Advances in robotic technology have made it possible for robots to perform functions previously only possible by human army to defend the enemy force.

This project is based on Robotic systems that have been used with increased popularity for bomb detection and it is possible to fight with enemy in war fields. Although far from perfected, these robots are saving lives. This is used to find enemies automatically and firing against them to kill the enemies without the need for direct human contact reliable robotic platform. The system is controlled by the android application which will give commands to robot to move front back right and left. The IR sensors are used to detect the enemies and laser gun is used to fire against them a stepper motor is used to rotate the gun and GSM is used to send notification to base station when the bombs are detected, thereby saving the lives of both law enforcement personnel and civilians.

**Keywords:** IoT

## 1. Introduction

In this Project, we are going to have an IR Sensor which senses any intruders / trespassers and will activate the alarm as well as switch on the guns in that particular place. Robots can be controlled using wireless technology like bluetooth technology. It will also activate the Camera, which will start capture the live video and transmit the same to the receiver end, the smart phone. In the same time it will start gives alarm and the data will transferred through the RF Transmitter & Receiver to the mobile device. The primary advantage to using robotic systems for explosive bomb detection and to fight with enemy is the reduced risk to humans. Currently, robots are able to traverse a variety of terrain, collect and destroy enemy force and provide improved reconnaissance capabilities to law enforcement and military agencies. This project is based on IOT and wireless communication.

## 2. Application of IoT

Applications for IOT include:

- Military application
- Forest application
- Agriculture and mining

• Tracking: people, inventory and logistic  
Advantages include:

- It does not get blocked by common materials.
- It is not sensitive to light.
- It is not sensitive to environment.
- High performance.
- Less human losses.



Fig. 1. Applications of IoT

## 3. Existing System

There are many existing systems available nowadays for the surveillance and security purposes. But they either require human intervention to detect intrusion or needs to go through lots of tedious work for the installation. This robot is controlled by a RF remote. This can be moved forward and reverse direction using DC motors. Also this robot can take sharp turnings towards left and right directions. This project uses AT89S52 as its controller. A high sensitive induction type metal detector is designed using colpitts oscillator principle and fixed to this robot. When the robot is moving on a surface, the system produces a beep sound when metal is detected. The RF modules used here are Transmitter, Receiver, RF Encoder and RF. Decoder. The four switches are interfaced to the RF transmitter through RF Encoder. The encoder continuously reads the status of the switches, passes the data to the RF transmitter and it transmits the data. At the receiver end RF decoder takes the data bit wise and moves the robot accordingly.

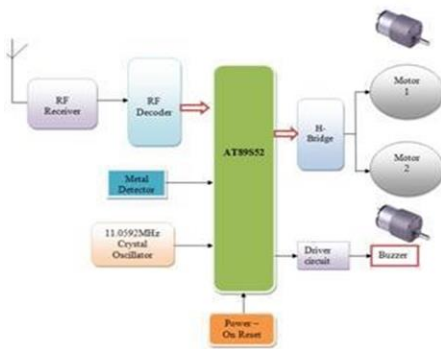


Fig. 1. Transmitter block diagram in existing system

**Drawback:**

Transmitter part is an extra hardware module which increases the cost.

**4. Proposed System**

Considering all the weak security measures exists to detect or prevent the intrusion, we propose a method to develop a security operation in LoC area with wireless secured communication tracking system for soldiers.

- It includes video / audio color security camera – wireless and we can use this Video Color Security Camera with Audio in the application.
- It has the Smallest Camera with Transmitter & Receiver and Video Surveillance for Security and also High Resolution - Color Wireless & Cordless Camera with Clear Audio Output.
- Easy Start Process, Continuous Monitoring, Excellent Resolution.
- Can Gather Sensitive Information while Handling Materials, Fire Fighting, Night Time Operations
- To Transmit Live Video

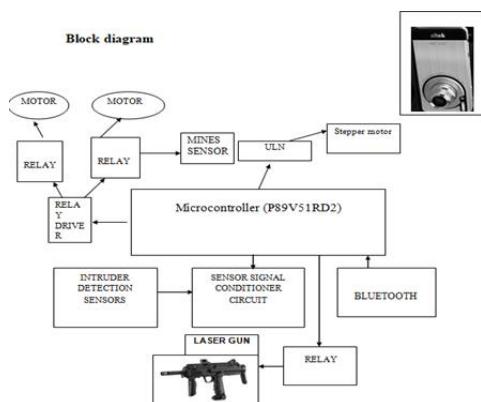


Fig. 3. Block diagram of proposed system

This Project is a IR & camera based security system for protected areas & borders, which senses the Intruders, trespassers and transfer video to other end. For confirmation in this Project, we are going to have an IR Sensor which senses any intruders / trespassers and will activate the alarm as well as

switch on the guns in that particular place. In this project we will shoot the intruder when he cross the border, the bullet is equipped with a gps facility if the intruder escapes then we can track him with the help of ARM 11 devices or smartphone.

It will also activate the Camera, which will start capture the live video and transmit the same to the receiver end, the smart phone. In the same time it will start gives alarm and the data will transferred through the RF Transmitter & Receiver to the mobile device.

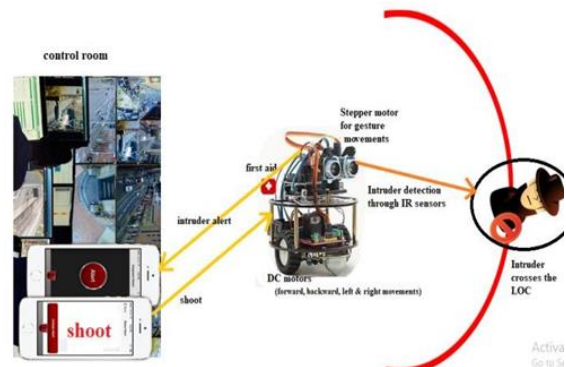


Fig. 4. Proposed model

**5. Implementation**

**A. Software Requirements**

**1) Eclipse**

Eclipse is an integrated development environment used in computer programming, and is the most widely used Java IDE. It contains a base workspace and an extensible plug-in system for customizing the environment. Here in our system, eclipse is used to write embedded JAVA and to build Android applications.

**2) Flash Magic Burner Software**

Flash Magic is a PC burner tool for programming flash memory based microcontroller using serial or Ethernet protocol built by NXP. This tool helps the developer to easily burn the hex file generated by the embedded software like Keil µvision for 8051 and ARM microcontrollers.

**3) Android SDK**

A software development kit that enables developers to create applications for the Android platform. The Android SDK includes sample projects with source code, development tools, an emulator, and required libraries to build Android applications. Our system need Android SDK 1.5 or above to run the system.

**B. Hardware Requirements**

**1) Camera**

Night vision is the ability to see in a dark environment. Whether by biological or technological means, night vision is made possible by a combination of two approaches: sufficient spectral range, and sufficient intensity range. Humans have poor night vision compared to many animals, in part because the human eye lacks a tapetum lucidum.

The list below shows some of the features,

- Color camera CMOS.
- Power requirement 50mw.
- Receiver A/V fine tuning type.
- System output NTSC
- Transmitting Frequency 2.4GHz

#### 2) DC Motor Driver

The L298 is a popular motor driver IC that is usable from 6 to 50V, at up to 4A total output current. By itself, the IC is somewhat difficult to wire and use, but the Compact L298 Motor Driver makes it much more convenient to use.

#### 3) Micro controller - P89V51RD

The P89V51RD2 is an 80C51 microcontroller with 64 kB Flash and 1024 bytes of data RAM. A key feature of the P89V51RD2 is its X2 mode option. The design engineer can choose to run the application with the conventional 80C51 clock rate (12 clocks per machine cycle) or select the X2 mode (6 clocks per machine cycle) to achieve twice the throughput at the same clock frequency. Another way to benefit from this feature is to keep the same performance by reducing the clock frequency by half, thus

- Dramatically reducing the EMI.
- The Flash program memory supports both parallel programming and in serial In-System Programming (ISP). Parallel programming mode offers gang- programming at high speed, reducing programming costs and time to market. ISP allows a device to be reprogrammed in the end product under software control. The capability to field/update the application firmware makes a wide range of applications possible.
- The P89V51RD2 is also In-Application Programmable (IAP), allowing the Flash program memory to be reconfigured even while the application is running.

#### 4) Power supply 5v DC – 7805

7805 is a three terminal linear voltage regulator IC with a fixed output voltage of 5V.

#### 5) Liquid crystal display

LCD (liquid crystal display) is the technology used for displays in notebook and other smaller computers. Like light-emitting diode (LED) and gas-plasma technologies, LCDs allow displays to be much thinner than cathode ray tube (CRT) technology.

#### 6) GSM Modem

The GSM (Global System for Mobile communication) module consists of GSM modem. It is a standard developed by the European telecommunication standard institute to describe protocols for digital cellular networks used by mobile phones. It accepts SIM cards, and operates over a subscription to a mobile operator, just like mobile phones.

#### 7) Serial Communication-MAX 232

In Telecommunication and data transmission, serial communication is the process of sending data one bit at a time, sequentially, over a communication channel or computer bus. This is in contrast to parallel communication, where several bits are sent as a whole, on a link with several parallel channels.

MAX 232 is an integrated circuit which converts the signals from the RS232 serial port to the proper signal which are used in the TTL compatible digital logic circuits. It can convert the signals like RX, TX, CTS, and RTS and it is a dual driver/receiver.

#### 8) GPS Receiver

A GPS navigation device, GPS receiver, or simply GPS is a device that is capable of receiving information from GPS satellites and then to calculate the device's geographical position. Using suitable software, the device may display the position on a map, and it may offer directions.

#### 9) Stepper motor (60rpm)

A stepper motor or step motor or stepping motor is a brushless DC electric motor that divides a full rotation into a number of equal steps.

#### 10) Buzzer

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

#### 11) DC motor

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.

#### 12) Sensors: IR sensor

An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive IR sensor.

#### 13) PIR

A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR- based motion detectors. PIR sensors are commonly used in security alarms and automatic lighting applications. PIR sensors detect general movement, but do not give information on who or what moved. For that purpose, an active IR sensor is required.

#### 14) Smoke detector

A smoke detector is a device that senses smoke, typically as an indicator of fire. Commercial security devices issue a signal to a fire alarm control panel as part of a fire alarm system, while household smoke detectors, also known as smoke alarms, generally issue a local audible or visual alarm from the detector itself.

#### 15) Bomb Detector

For bomb detection, a metal detector is used. A metal detector is an electronic instrument which detects the presence of metal nearby. Metal detectors are useful for finding metal inclusions hidden within objects, or metal objects buried

underground. They often consist of a handheld unit with a sensor probe which can be swept over the ground or other objects. If the sensor comes near a piece of metal this is indicated by a changing tone in earphones, or a needle moving on an indicator. Usually the device gives some indication of distance; the closer the metal is, the higher the tone in the earphone or the higher the needle goes.

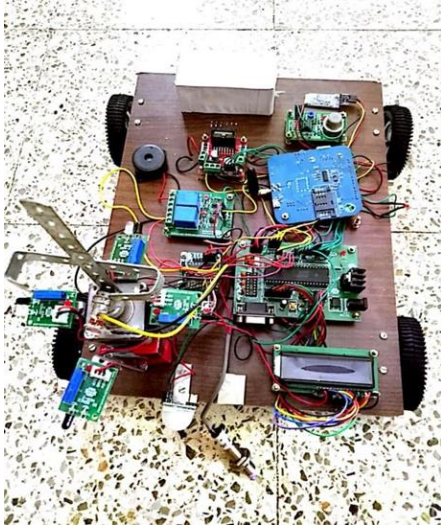


Fig. 5. Working model

## 6. Conclusion

This paper discusses the perspectives, challenges and opportunities behind a future Internet that fully supports the “things”, as well as how the things can help in the design of a more synergistic future Internet. Things having identities and virtual personalities operating in smart spaces using intelligent interfaces to connect and communicate within social, environmental, and user contexts.

In this project, algorithm is been used in order to develop a robotic system to perform security operations such as gesture moments using the stepper motor and the movement of the robot backward, forward, left and right through DC motor. It also helps us to construct a simple autonomous robot to help in the detection of the bomb or the intruder.

Also gives video feedback to us that is to receiver end and hence effective handling of robot can be possible.

It includes the descriptions related to the local, global and social sensing detection of the intruder through infrared radiation.

## 7. Future enhancement

Our system is designed only to send the displayed messages on the LCD screen to the control room. One can also use this system for communication of soldier to the control room. Also bring the more efficiency to the system.

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