

IoT Trained Merciless BSF

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Abstract— The military organization now takes robots for the help to carry out many risky jobs of the soldier that cannot be done. The robots are usually employed with the integrated system which are used in military, video screens, sensors, gripper and cameras are also included. The military robots according to the purposes of each robot also have different shapes. Here to trace out the intruders the new system is proposed with the help of low power IoT wireless sensor network and automatically the robot will take the necessary action. Thus the proposed system, IoT saves human lives and reduces manual error in defense side using an Intelligent Unmanned Robot. To save human life and protect the country from enemies this is specially designed robotic system. The robots are specially design for human to make our life easier. Robots are design for various purposes like military purpose, industry, for home based application. At border different tanks, missile, guns etc are used by enemy. This cause problem and harm our force or soldiers. For this a robot is design and developed for military purpose application to protect the army. Robots used to detect its obstacle which is found in its path. If it finds any obstacle in its path then using gun mechanism it will able to shoot that obstacle. For making it multifunctional robot all the actions perform by user, same actions perform by robot using stretch sensor. All these mechanisms are embedded on the propeller.

Keywords— Intelligent Unmanned Robot (IUR): IoT Wireless Network: Military Robot.

I. INTRODUCTION

The Kargil war also known as the Kargil conflict, between India and Pakistan it was an armed conflict that took place in the Kargil district of Kashmir between May and July 1999 and elsewhere along the Line of Control (LoC). This conflict is referred to as Operation Vijay it was also the name of the Indian operation to clean the Kargil sector.

The war cause was the infiltration of Pakistani soldiers and the Kashmiri militants into positions on the LoC of the Indian side, which serves between the two states as the de-facto border. During the initial stages of the war, independent Kashmiri insurgents were blamed for the fighting entirely by Pakistan, but the documents that left behind by casualties and involvement of Pakistani paramilitary forces, led by General Ashraf Rashid were proved by later statements by Pakistan's Prime Minister and Chief of Army Staff showed. The Indian Army, recaptured a majority of the positions on the Indian side of the LoC infiltrated by the Pakistani troops and militants later on supported by the Indian Air Force. The Pakistani forces withdrew from the remaining Indian positions along the LoC with the help of international diplomatic opposition.

Now a days the surveillance in military areas is required but the quality of that surveillance is not up to the level of expectation. This is resulting in the increasing ratio of lives of the soldier in danger. So as to improve the quality of surveillance there should be system which is able to mobile anywhere with effective surveillance. The surveillance can be made effective with the help of high quality video transmission. The quality of video is improvised in the proposed system.

The robot detects the intruders and poisonous gases with the help of sensors and takes a clear picture and video of the incident with the help of a camera. The movement is controlled with the help of a smartphone, which interacts with the robot through wireless communication in the form of Bluetooth.

II. LITERATURE SURVEY

A thorough survey of approaches for hardware deployment for the project has been done. They distinguish between hardware and software, element-level and structure-level, and language-based and constraint-based matchers for hardware.

Design and Construction of mini Robot for Military purpose using mobile devices[1]:

Robots are specially design for human to make our life easier. Robots are design for various purposes like military purpose, industry, for home based application. At border different types of tanks, missiles and guns are used by the enemy. This causes problems and will harm our force or soldiers. To address the above problem a robot is designed and developed for military purpose application to protect our army. The method involves a biped walking robot using parallel leg mechanism i.e. PLM which includes different functions like capturing real world data using digital image processing used to detect its obstacle which is found in its path.

Touch Screen Controlled Defence Robot [6]:

The robot system can be built with the existing economic conditions that can be used for different sophisticated robotic applications. The control system consists of Touch screen, object tracking and ZigBee modules, a microcontroller that controls the robot. The system provides continuous visual monitoring through the wireless camera attached to the robot and sends continuous data to the control unit. A multifunctional Robot is been designed according to the specifications made above which uses ZigBee Technology. ZigBee cannot be used to cover very long distance, it can only deal with low complexities and is very slow.

Design and Development of Wireless Multifunctional Robot for Military applications[7]:

The project is presenting an IOT Based Wireless multifunctional robot for military application with

SST89E516RD2 microcontroller using MQTT protocol and it is done by integrating various sensors, Cameras, Grippers and actuators into web application using MQTT and HTTP protocol. The system uses ARDUINO controller.

Multifunctional Robot for Border security Applications[8]:

The system presents a modern approach for surveillance at remote and border areas using multifunctional robot based on current 3G technology used in defense and military applications. The robotic vehicle has ability to substitute the soldier at border areas to provide surveillance. The robotic vehicle works both as autonomous and manually controlled vehicle using internet as communication medium.

Design and implementation of e- surveillance robot [10]:

The proposed security solution hinges on the novel integration of camera on Raspberry Pi. Raspberry Pi operates and controls video camera for surveillance and records video for future playback. The SST89E516RD2 is a member of the Flash Flex family of 8-bit microcontroller products designed and manufactured with patented and proprietary Super Flash CMOS semiconductor process technology. This microcontroller is better than Raspberry Pi

III. BASIC COMPONENTS AND CONTROL PRINCIPLE

A robotic system that can combat in wars and other military purposes is the main aim of project. This system is looking at revamping the infantry soldier's gear, first of several such programs. It has basically two modes. One mode is called the automatic mode and the other mode is called as user control mode. The automatic mode basically combat intruders using face recognition technique. The control comes to user who can control the operations of the robot in certain unavoidable circumstances from remote location using a computer. One of the main advantages, the mode switching can be done very fast without any delay of our system. It also helps needy to provide medical aid.

A. Microcontroller

The SST89E516RD2 is a member of the Flash Flex family of 8-bit microcontroller products designed and manufactured with patented and proprietary Super Flash semiconductor process technology called CMOS. The cell design is of split-gate and tunnelling injector of thick-oxide offer significant reliability and cost benefits for SST customers. 8051 instruction set and is pin-for-pin is used for the compatible with 8051 standard microcontroller devices.

B. GSM

GSM is a mobile communication modem. GSM uses time division multiple access technique system which was developed for communication purpose as a digital system. A GSM reduces and digitizes the data, then sends with two different streams of client data down through a channel, each with its own particular time slot. The digital system carry 64 kbps to 120 Mbps of data rates this is its ability.

C. DC Motor

An electric motor or DC motor is all about the magnets and magnetism. A motor to create motion uses magnets. Opposites attract and likes repel. The north end of one magnet will attract with the south end of the other magnet. On the other hand, the north end of magnet will repel with the north end and similarly, south will repel to south. Within an electric motor, these attracting and repelling forces creates rotational motion.

D. Stepper Motor

A stepper motor is a DC electric motor but brushless that divides a full rotation into a number of equal steps. The motor's position without any position sensor for feedback can then be commanded to move and hold at one of these steps, as long as motor is carefully sized to the application in respect to torque and speed.

E. IR Sensor

IR Sensors work by to detect a select light wavelength in the Infra-Red spectrum using a specific light sensor. By using an LED as what the sensor is looking for, produces light at the same wavelength, one can look at the received light for the intensity. When an object is close to sensor, the light into the light sensor from the LED bounced off the object.

F. PIR Sensor

The term PIR is the short form of the Passive Infra-Red. The term passive indicates that the sensor does not actively take part in the process, which means, it does not emit the referred IR signals itself, rather passively detects the IR radiations coming from the human body from the surrounding.

G. Gas Sensor

The Gas Sensor module is used to find for gas leakage detecting. It can detect LPG, i-butane, methane, alcohol, Hydrogen, smoke and so on. Measurements can be taken on its fast response time as soon as possible. Also the sensitivity can be adjusted by the potentiometer.

H. LCD Display

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals for the display. Liquid crystals do not emit light independently, instead using a reflector to produce images in colour.

I. Relay

A relay is an electrically operated switch for on and off. Current flowing through the coil of the relay attracts a lever and changes the switch contacts through a magnetic field. The coil current can be on or off so, relays have two switch positions and are double throw switches.

IV. WORKING PRINCIPLE

Internet of things (IoT) embedded with electronics, software, sensors, actuators, and network connectivity is network of physical devices, vehicles, home appliances and other items which enables these objects to connect and

exchange data. Embedded computing system uniquely identifies each thing but is able to inter-operate within the existing Internet infrastructure.

The robot works in dual mode, which means that, the robot can be controlled in both manual mode and automatic mode. This is the distinguishing factor while compared to the other kind of robots, as the most of the bots work in manual mode. The automatic mode robot is programmed within the embedded chip and it makes the robot to act as human beings. The second distinguishing factor from the other robots is that, the proposed robot is capable of sensing humans, who are trapped inside the coal mines. This is done with the help of sensor PIR which help in detecting obstacles

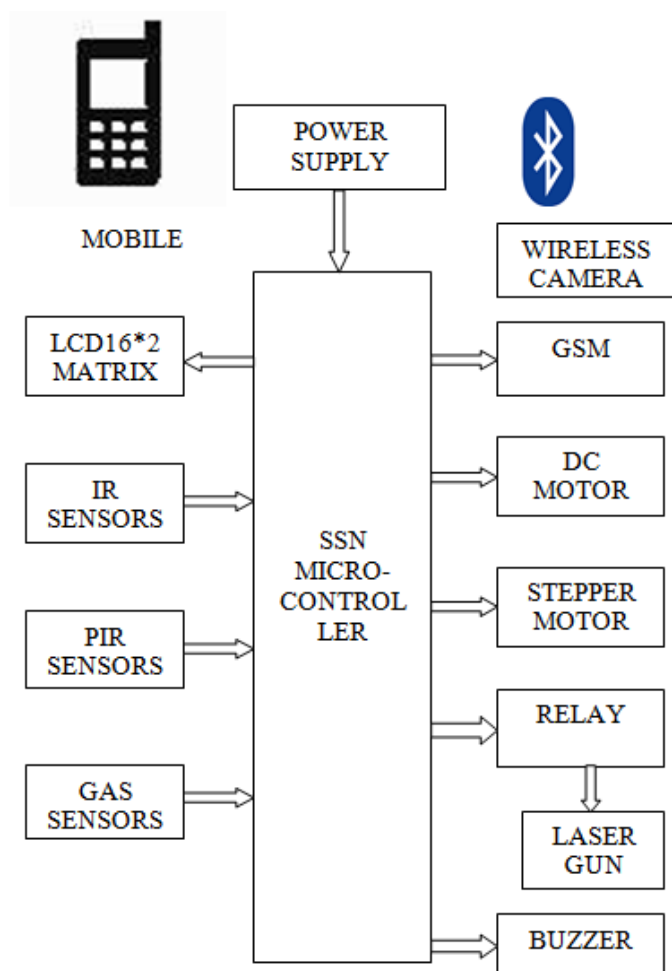


Fig. 1. Block diagram of how system circuit works.

The Fig. 1 block diagram gives an idea of how the robot works. It shows how the system circuit works. The wireless communication used is Bluetooth which helps in transferring the data and messages. In the proposed system, the system circuit can be implemented with the help of a block diagram which includes the sensors, modules of Bluetooth, camera, buzzer unit and the power supply. These devices are interfaced by SS T89E516RD2 microcontroller. All of these sensors are directly connected to the micro-controller which have their own default program according to their use.

The robot 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, the IR Sensor senses any intruders or trespassers and will activate the alarm as well as switch on the guns in that particular place. The robot will shoot the intruders when they cross the border.

V. PATH PLANNING ALGORITHM

This section describes path planning algorithm to search collision free path. The main issue to design an autonomous robot is navigation, in which path planning is an essential aspect of autonomous robot. So, path planning techniques are used to minimize the distance, chance of collision and energy consumption.

The following steps to taken to control the movement and functionality of robot shown in Fig. 2.

- The military robot initiates in automatic mode by default.
- The movements of the robot are controlled by user through smartphone.
- During autonomous operation if passive infrared sensor and infrared sensor detects any object in movement, it rotates to that particular side and place the gun.
- The alert messages are sent to user via GSM module after the activation of any sensor.
- The IR sensor senses any object which are treated as obstacles and sends the message to the user.
- The PIR sensor senses any objects which are in motion and sends the message to the user.
- As soon as the sensor senses the intruders or any movements of enemies, they are shot through laser gun.
- The laser gun in controlled through relay.
- Not only intruders but any poisonous gas is also detected through the gas sensor.
- As soon as the gas is sensed it is informed to user through microcontroller by sending messages.
- If any enemies use any of the dead soldiers to defend themselves then the video and pictures of them are taken through wireless camera.
- The mobile camera can be used as wireless camera and send videos to the user so they can become alert.
- The laser gun can be rotated in all 360⁰ direction so that it can shoot the enemies spotted anywhere.

This is how, flow of the working of the robot is carried out.

VI. IMPLEMENTATION



Fig. 3. Proposed system of the merciless BSF.

Bluetooth is used for sending videos, and pictures. Fig. 3 shows the robot has been ready with all features in it. It can go anywhere in war fields where human access is not feasible. The robot is mounted with wireless camera so user can spy every movement of enemies through video in 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. Without moving from current place user can watch a real time video on screen. Also if any intruders are detected or any poisonous gas is detected by sensors then messages are sent to user and the robot will shoot the intruders spotted anywhere though laser gun. For poisonous gas alert message will be displayed and buzzer makes sound.

VII. FUTURE SCOPE

User can use this system for military applications installing suitable sensors. Just by changing the robotic unit design user can use it in hospitals for patient monitoring. Using chemical sensors user can detect harmful gas leakage in the chamber the time delay which happens in the execution of commands can be reduced and thus user can have more real time access to the robot. With reduced time delay user can have quick response and faster operation to any illegal activities in the monitored area. Also it can be used as a spy robot. The robot is very economical.

VIII. CONCLUSION

Merciless BSF is the current area of research where lots of scope exists. The type of communication technique enhance security operation, where the user can control the machine from any part of world by getting live video feedback, IoT and smartphone video camera makes it cost effective combat robot. This robotic vehicle with different features widely be used as surveillance robot for emergency rescue operations where human and user will be able to alert prior to intruder.

The proposed system gives an exposure to design a multifunctional defense robot. This robot has a widespread industrial, defense applications. The laser gun attached to the robot is an excellent substitute for the weapons carried by the soldiers. The laser gun can be triggered with the help of

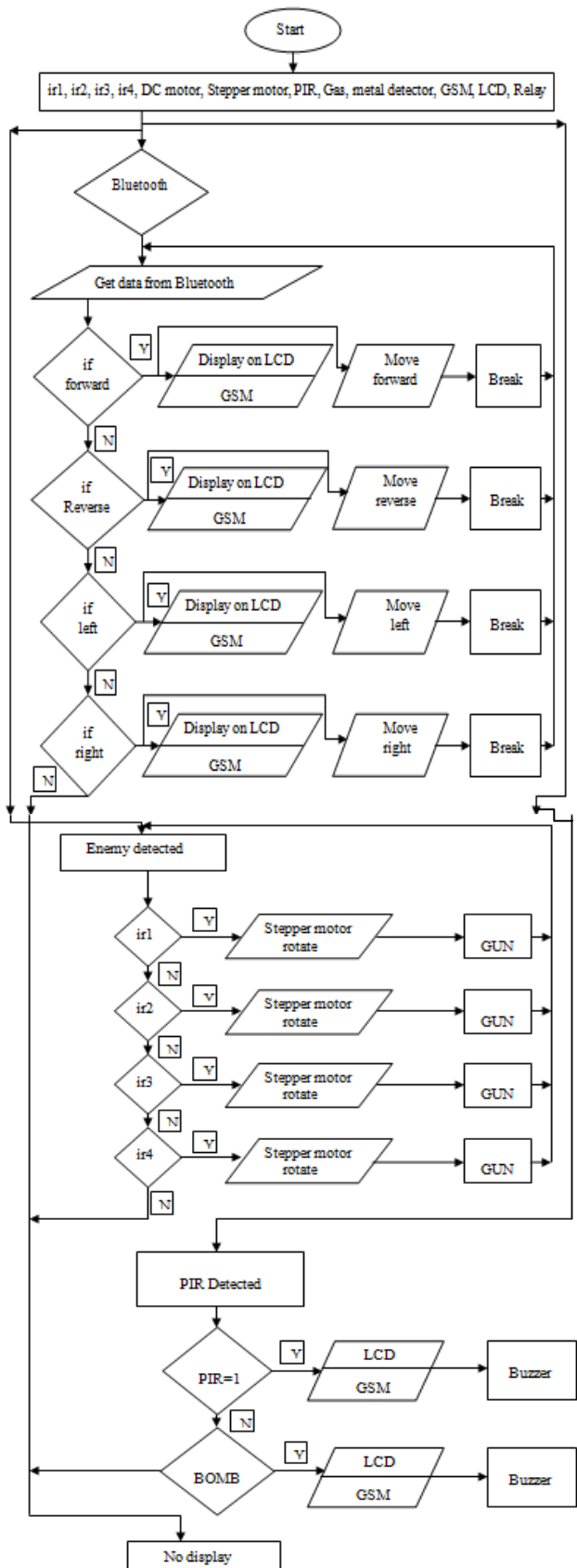


Fig. 2. Flowchart of entire design.

wireless camera. It can be used in a hostage situation to pinpoint the exact Location of terrorists with the help of wireless camera, saving many lives during rescue mission. Another application is border security system to sense movement of intruder through PIR sensor. The current range of operations is up to 10m and can be made more sophisticated. Laser gun found to be very accurate in pointing to the target.

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