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BORDER SECURITY SYSTEM USING AUTONOMOUS DEFENCE ROBOT

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Abstract:An Autonomous Defense Robot is actively being developed for both civilian and military use to mainly perform in dangerous activities. Predominantly these vehicles are used to replace human in hazardous. Lately ADR are the focus of many research projects for military and civilian applications like military, surveillance, security service, riot control, hostage situation, police, law enforcement, border patrol, etc. ADRs in varying sizes to meet mission capability requirements are today saving lives and providing critical supporting capabilities in military operations worldwide. During surveillance operation many army men wounded and shot dead in borders by the attack of terrorist and army of opponent country, so to protect the precious life of army men and women. We are implementing sensor based robotic technology for border surveillance and guard the border from enemy. Motion detection also plays a key role in security applications installed at banks, offices, borders and vulnerable areas. An efficient motion detection system has been developed using embedded microcontroller interface. The robot has an automatic gun mounted on the top of an all-terrain mobile platform. The proposed system can also be set into an autonomous mode of operation, in which the system tracks and engages targets without any human intervention. Aside from autonomous mode, there is also a manual over-ride mode.

1. INTRODUCTION

Motion detection plays a key role in security applications installed at banks, offices, borders and vulnerable areas. An efficient motion detection system has been developed using embedded microcontroller interface. The robot has an automatic gun mounted on the top of an all-terrain mobile platform. The proposed system can also be set into an autonomous mode of operation, in which the system tracks and engages targets without any human intervention. Aside from autonomous mode, there is also a manual over-ride mode. The hardware employed in the proposed system is based on easily accessible materials

This paper presents a modern approach for surveillance at remote and border areas using autonomous defense robot based on current 3G technology used in defense and military applications. This robotic vehicle has ability to substitute the solider at border areas to provide surveillance. This multisensory robot used to detect human, at remote and war field areas. Conventionally, wireless security robot obsoletes due to limited frequency range and limited manual control. An autonomous operation is controlled by ultrasonic sensor and proximity sensors. The sensors used for target tracking are low cost infrared proximity sensors. The robot can be set into an autonomous sentry mode, in which it can track targets and fire at them automatically, or a controlled mode, for driving the turret to a new location. This design uses much more cost effective and readily available hardware and materials, and also provides an improved tracking mechanism.

2.LITERATURE SURVEY

In this the author Applied engineering example of using microprocessor/microcontroller in various controls of the senior project designs in Electricity, Electronics, and Computer Technology (EECT) concentration in Industrial Technology curricula, but also of interest in industry

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applications [1]. The objective of this paper is to minimize human casualties in terrorist attack such as 26/11. The combat robot has been designed to tackle such a cruel terror attacks. This robot is radio operated, self- powered, and has all the controls like a normal car. A wireless camera has been installed on it, so that it can monitor enemy remotely when required. It can silently enter into enemy area and send us all the information through its' tiny Camera eyes [2]. Surveillance using Global positioning system (GPS) which provides dynamic location of fishing vessel in water and microcontroller which competes on GPS and predefined boundary locations to determine whether the boat have crossed the border or not [3]. Automatic system for controlling and dominating building gate based on digital image processing. The system begins with a digital camera, which captures a picture for that vehicle which intends to enter the building, then sends the picture to the computer [4]. Possibilities which offers up-to-date technology especially in area of applying unmanned aerial and surface vehicles as well as seismic intrusion detectors, and other types of sensors applicable for border control and safety [5].

3.SEMI-AUTONOMOUS SENTRY ROBOT

The robot has an automatic gun mounted on the top of an all-terrain mobile platform. The sensors used for target tracking are low cost infrared proximity sensors.

ERRORS IDENTIFIED:

- The sensors placed in front of the robot so 360 captures are not available in this system
- It is one directional robot

4.AUTOMATED GUN SECURITY SYSTEM

This is used to detect, track and destroy the target for surveillance operations. The system can be operated in two modes, in which the target can be tracked automatically by using microcontroller based system. On other hand, the system can also be controlled manually in which the user has right to select the target and performs shooting if necessary.

ERRORS IDENTIFIED:

- In this project the wall mounted gun is used so it not capable to move.

5.PROPOSED SYSTEM

PROBLEMS RECTIFIED:

- 360 degree surveillance
- Position tracking
- Video capturing

6.DESCRIPTION

In the proposed system we have implemented a new technique to for overcoming the human loss. We have planned of implementing a Robot in the place of humans. It means that the military is not fully replaced by the robot. Only in the borders we will replace the Robots We use camera, DC motor, laser, sensors, RF transmitter &receiver, Laptop, Robot. Proposed systems (fig 4.1.1). We are concentrating to secure our place from intruders first and sometimes used as an attacking those intruders. Now days the intruders have a chance to enter our place easily or by using some techniques to enter easily, so we will place the camera along with the robots.. The sensors will detect the enemy the dc motor turned on and gun is released to shoot the enemy. At when the gun is acted the RF will gets activated and it sends the direction of the enemy where is shot by the use of the proximity. If the robot gets malfunctioned or we want to turn off the robot the remote control will used to turn on and off functions.

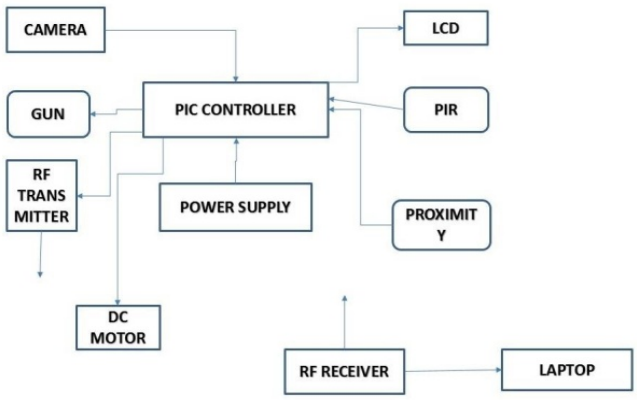

Fig 1 Block diagram

COMPONENTS USED:

- Dc motor
- LCD display
- Pic16f887 microcontroller
- Proximity sensor
- Relay
- RF receiver
- RF transmitter

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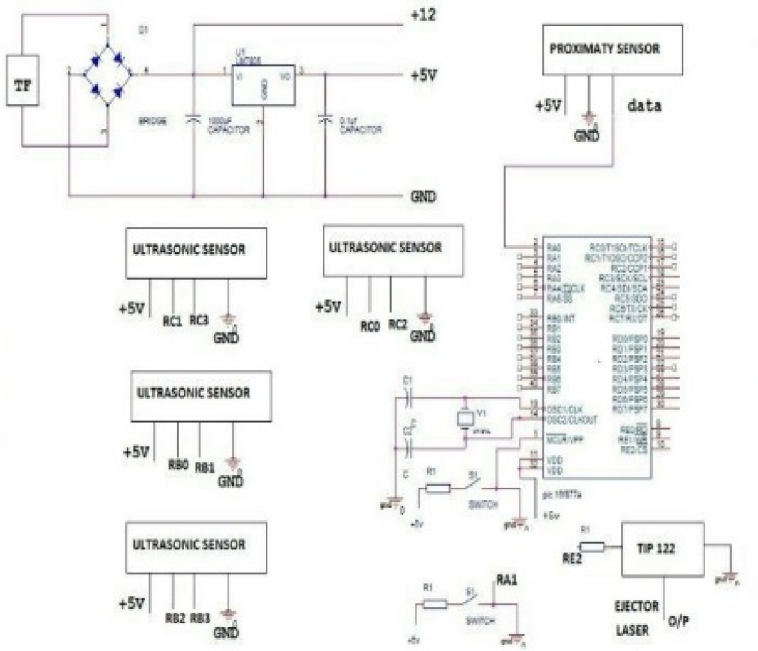

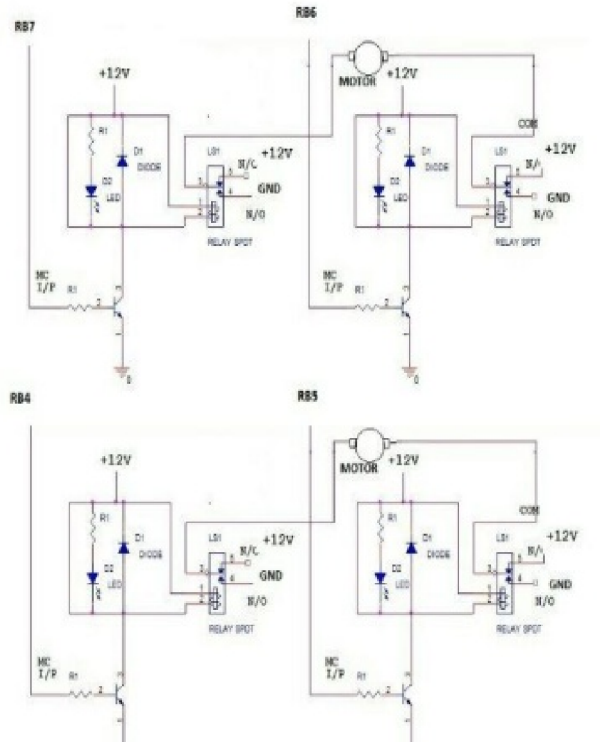

- Ultrasonic sensor
- Power supply

7.PROJECT DESCRIPTION:

The autonomous defence robot design consists of four ultrasonic sensors placed in all four directions in the x-axis. During initial implementation of the robot, it initializes all variables of movement as zero and also initializes its gun to the zeroth position. Then it starts to detect any interrupt in all directions. It then checks the condition of detection. If it detects any object, then it executes the function for corresponding direction. The robot stops its movement and shoots in the detected direction. The proximity sensor mounted to the gun detects the metal on the mounting platform of the gun. The laser and trigger signals are passed on to the gun which enables the gun to shoot. It also consists of RF transmitter/receiver. The direction of detection is passed on to the control center which can be viewed on a monitor display. If the condition for detection is false, it means that no object is detected so the robot continuous to move in its predefined path. The values will be once again initialized and the programme is run continuously again. The robot will be inspected by technicians from time to time for repairs after turning it off remotely.

6.ADVANTAGE & APPLICATION

ADVANTAGE:

1. Autonomous robot
2. Decision making time is less
3. Real time monitoring
4. Works under all-weather condition

Fig: Project Setup

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APPLICATION:

1. Border & Bank surveillance
2. Home security

7.SCOPE OF FUTURE WORK

In future using image processing for tracking targets instead of the ultrasonic sensor, this does not eliminate the need for the sensor. The sensor can be used to detect targets instead of tracking them. When a possible target is located, it can send a signal to the ARM processor board to wake up, and begin tracking the target using image processing. The face detection also can be implemented in this project by using image processing.

8.CONCLUSION

This paper presents the design and development of a robotic gun for security applications requiring detection as well as engagement of a target. The hardware of the proposed system including both the mechanical structure and the embedded system is based on very easily accessible materials, making it a feasible option for low-budget applications. In conclusion this design performs better than other low cost designs using similar hardware, but grants performance comparable to designs using expensive hardware and sensors.

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