

AN AUTOAIMING AND TRIGGERING ROBOT FOR SURVEILLANCE IN DEFENSE ENVIRONMENT

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ABSTRACT

Current weaponized robotic system are too expensive for the use by law enforcement agencies and yet are been demanded more and more by these agencies to augmented existing human teams and to help expedite dangerous machine. This project is developed low-cost robotics device capable of accurately and safety, firing and variety of semi-automatic at stationary targets.

Keywords-ARM7 microcontroller, IR sensor, MEMS sensor, U-V sensor, Relay.

I. INTRODUCTION

Security system is an innovative idea to secure our frontiers smartly without the intervention of human. It gives not only safeguard to our country but also saves energy and resource at the same time. Even to protect the country from outside attackers it monitors the boarder constantly. It involves lots of manpower and resources. By looking the importance of securing the border, implementation of smart border monitoring system is very essential. It as well as design approaches are described and the overall design process is documented. The design results are well documented and relevant design information is contained within the appendix. Suggestions for future work on the project are outlined and discussed, and overall conclusions are drawn from the project as a whole. Current weaponized robotic systems are too expensive for use by law enforcement agencies and yet are being demanded more and more by these agencies to augment existing human teams and to help expedite dangerous missions. In conjunction with Black-I Robotics Inc., this project developed a low-cost robotic device capable of accurately and safely firing a variety of semi-automatic weapons at stationary targets.

II. LITERATURE SURVEY

“ The Human Motion Detection Using Passive Infrared Sensor”

K Sravani, Md Parvez Ahmed, N Chandra Sekhar, G Sirisha,V Prasad.International journal of research in computer application and information vol2,issue-2,march-april,2014.The objective of this project is to develop a motion sensor alarm based on a Passive Infrared (PIR) sensor module1. In this project, microcontroller

continuously monitors the output from the sensor module and turns a buzzer on when it goes active. The application areas of this project are: All outdoor lights, Lift lobby, Multi apartment complexes, common staircases, for basement or covered parking area, shopping malls, for garden light.

“Border Surveillance using sensor”

Information networking(ICOIN). The primary objective of the deployment research is to find the deployment strategy using the minimum number of each. The primary objective of the deployment research is to find the deployment strategy using the minimum number of each.

“Advanced Border Intrusion Detection and Surveillance Using Wireless Sensor Network Technology”.

This paper surveys the literature for experimenting work done in border surveillance and intrusion detection using the technology of WSN the main purpose of the project of the project is to enhance the border security electronically with automation and with that to reduce the work load and responsibility of the soldiers that continuously take a look on border 24*7.

III. OBJECTIVES

- Reduce the man power in Boarder.
- It is working 24/7 if the battery as reached its lifetime then the energy can be recovered by using solar panel.
- It measures the distance of the intruder.
- It detects the fire when the fire take place in the sensor.
- It detects the harmful gases which was present in the border.
- It also detects the intruder is the obstacles are present when triggering.

IV. PROPOSED SYSTEM

Proposed system consists of ARM which moves upward and downward,180-degree rotational direction, according to head movement of the soldier using MEMS technology, when the object is near to the system the ultrasonic sensor measure the distance of the object from the system, detect or detects the object direction according to the signal as soon the object is near to system that can be triggered automatically, system can be triggered manually by using the switch button as well.

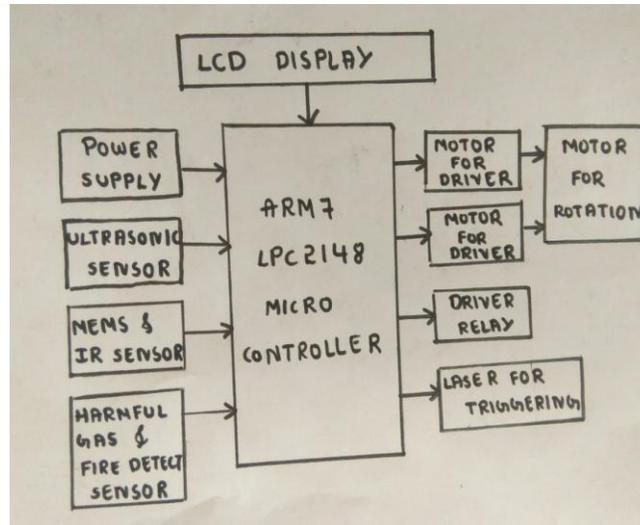


Figure 1: Block Diagram

V WORKING

The system is operated in manual mode and automated mode. Switch is used to operate in manual or automated mode by pressing the switch.

In manual mode it is operated by using MEMS sensor through the mechanical movement of the MEMS sensor. Depending on the movement the robot will rotate. During this rotation if the intruder is present means it will be detected by IR sensor and alarm will sound indicating that intruder is crossing and at the same time laser is also triggering and the distance of the intruder is displayed in LCD display.

In automated mode as the mane says it automatically detected the intruder using IR sensor and alarm will sound indicating that intruder is crossing and at the same time laser is also triggering and the distance of the intruder is displayed in LCD display. The Robot will rotate 180-degree rotation with the help of DC motor.

To operate all these operations the ARM-7 LPC2148 Microcontroller is used and also it consumes low power supply i.e. 3.3V but for the motor rotation we need more power supply for this reason we are using relay to covert 3.3V to 12V such that the motor will rotate. Hence it provides the security for frontiers in the border.

VI SYSTEM IMPLEMENTATION

The System implemented using following hardware components,

A. ARM7 Microcontroller



Figure:2: ARM7 Microcontroller

The ARM7 microcontroller is a 32-bit and most popular microcontroller in the digital embedded system world and most of the industries prefer only ARM microcontrollers since it consists of enormous features to implement products with an advanced appearance and more applications. The ARM7 microcontrollers are cost sensitive and high performance devices which are used in a wide range of application such as industrial instrument control systems, wireless networking and sensors and automotive body system etc.

ARM is computer processor-based RISC architecture. A RISC based computer design approach means ARM Processor required significantly fewer transistors than typical processors in average computers. This approach reduces costs, heat and power use. The low power consumption of ARM Processors made them very popular. Main features of LPC2148 Microcontroller

- 16 bits/32-bit ARM7TDMI-S Microcontroller in a tiny LQFP64.
- 8KB to 40 kb of on chip static RAM and 32kb to 512kb of on-chip flash memory; 128bit wide interface/accelerator enables high speed 60MHz operation.
- USB 2.0 Full speed compliant device controller with 2Kb of endpoint RAM.
- LPC2148 provides 10-bit ADC and a total of 6/14 analogy inputs, with conversion of time as low as 2.44 ms per channel.
- Single 10-bit DAC provides variable analog output (LPC2148 only).
- Low power Real-Time Clock (RTC) with independent power and 32kHz clock input.

B. MEMS Sensor

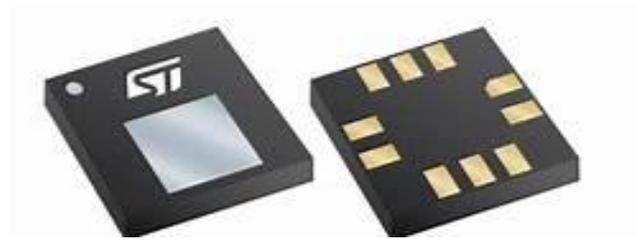


Figure:3: MEMS Sensor

Microelectromechanical systems (MEMS, also written as micromechanical, Micro Electro Mechanical or micro electronic and microelectromechanical systems and the related micro mechatronics) is the technology of microscopic devices, particularly those with moving parts. It merges at the Nano-scale into nanoelectromechanical systems (NEMS) and nanotechnologies sensor is used for operating manually through the mechanical movement of the mechanical movement of MEMS sensor.

C. Ultrasonic sensor



Figure:4: Ultrasonic sensor

As the name indicates, ultrasonic sensors measure distance by using the ultrasonic wave the sensor head emits an ultrasonic wave and receive the wave reflected back from the target. Ultrasonic sensor measures the distance to the target by measuring the time between the emission and reception. An optical sensor has a transmitter and receiver, whereas an ultrasonic sensor uses a single ultrasonic element for both emission and reception. In a reflective model ultrasonic sensor, a single oscillator emits and receives ultrasonic waves alternately. This enables miniaturization of the sensor head.

D. IR Sensor



Figure:5: IR Sensor

An infrared sensor is an electronic instrument that is used to sense certain characteristics of its surroundings. It does this by either emitting or detecting infrared radiation. Infrared sensors are also capable of measuring the heat being emitted by an object and detecting motion. Infrared technology is found not just in industry, but also in every-day life. Televisions, for example, use an infrared detector to interpret the signals sent from a remote control. Passive Infrared sensors are used for motion detection systems, and LDR sensors are used for outdoor lighting systems.

E. Relay



Figure:6: Relay

A relay is an electrically operated switch in which many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid state relays. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal.

F. Liquid Crystal Display(LCD)

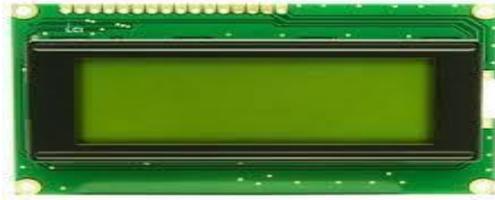


Figure:7: LCD

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. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in colour or monochrome. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and seven-segment displays, as in a digital clock.

G. Dc Motor

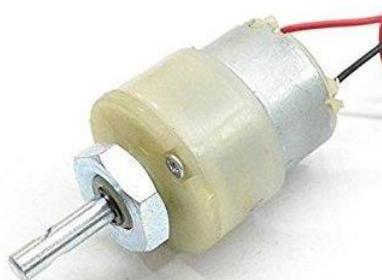


Figure:8: DC motor

A DC motor designed specifically with an integral (not separable) gear reducer (gear head). The end shield on the drive end of the motor is designed to provide a dual function. The side facing the motor provides the armature/rotor bearing support and a sealing provision through which the integral rotor or armature shaft pinion passes. Based on the programming it makes the things to rotate.

VII ADVANTAGES

- The automatic targeting system is feasible for highly secure area such as border the system consist of microcontroller unit.
- This system helps produce the responsibility and efforts of soldier in border security.
- Easy in operation.
- The proposed system uses a low cost sensor which is easily available. It is impossible for an individual to visit the border. So, in such situations, the proposed system can be useful.

VIII APPLICATIONS

- Army.
- In the Research centres, IT Sector and restricted areas where the security is necessary it will be used.
- Security purpose

IX CONCLUSIONS

Thus, the automatic gun targeting system is feasible for highly secure area such as border the system consist of microcontroller unit, RF module targeting gun. The system is economical. The automatic gun targeting system is not taking full responsibility of security. The automatic gun targeting system can be easily implemented for the home security also. This system shows better result in highly secured region. The purpose of the proposed system is to provide a cost-effective system for rescue of human in border. The purpose of the proposed is to provide a cost-effective for rescue of human in border. The proposed system uses a low-cost sensor which is easily available.it is impossible for an individual to visit the border. So, in such situation, the proposed system can be useful.

X FUTURE SCOPE

This system can further implement by using the Bluetooth technology and face recognition system.

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