

Security System by Motion Detection and Light Mechanism

Lipika Shah
MCA, VESIT
Chembur, Mumbai
lipika.shah@ves.ac.in

Heena Sayyed
MCA, VESIT
Chembur, Mumbai
heena.sayyed@ves.ac.in

Rohini Temkar
(Project Guide)
MCA, VESIT
Chembur, Mumbai
rohini.temkar@ves.ac.in

Abstract— Nowadays security system becomes a best solution to overcome intrusion problem when the user is not available. As we know there are many types of security system which are too expensive and difficult to use, for that reason, an effective security system at a low cost can be build where the user can also program security system on their own. This work proposes a mechanism for practical and beneficial using motion detection and light mechanism.

Keywords—Security; Homes; burglary; motion detection; light detection; darkness; light; alarm system; arduino programming ; microcontroller; notification.

I. INTRODUCTION

Security is undeniably important to current world. Whether you are away or inside the property, the common question is your property safe?

Security System by Motion Detection and Light Mechanism is one of the main key to protect your property against potential breaking.

For example: Place of residence, commercial organization or in vehicle

Nowadays security plays an important role and it should be taken into consideration. Those simple locks which have been in the market traditionally are no longer useful as time passes on. In order to keep your premises secure you need a proper alarm system which cannot be tampered easily.

This system consists of two parts:

- Hardware Development
- Software Programming.

The first part is concerned with the hardware development where all the electronic components are connected via circuit design.

The hardware components which can be used are:

1. Microcontroller ATmega-368P
2. Infrared Motion Detector.
3. LDR (Light Dependent Register).
4. Buzzer.

5. LED Lights.
6. LCD Display.
7. DC Motor.
8. Bread Board

The components are controlled by a controller circuit.

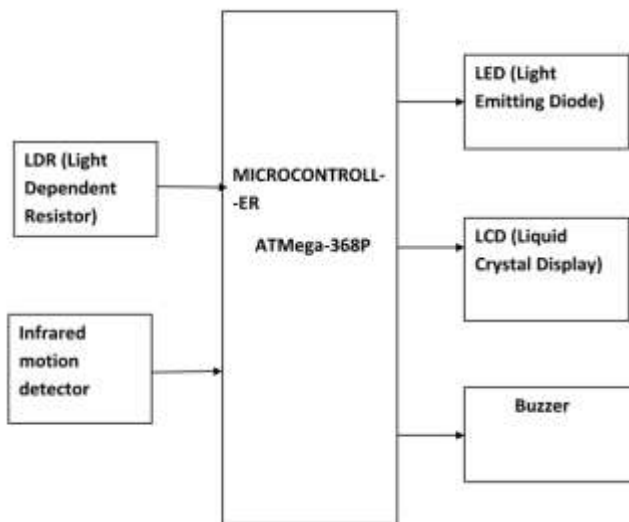
The Second part is based on the software Programming to operate the hardware Structures. Program for security system are assembled to get a unique binary file, which is loaded into external memory of the hardware structures.

Softwares:

OS-Windows XP (for flashing MCU).
Arduino 1.0.3 (Object Oriented Programming).

In order to achieve best security systems, more detectors and sensors can be connected, where it can be reprogrammed by a user using personal computer at home. As a result motion detectors and LDRs are capable to control the whole operation of security system.

Block Diagram:



Block Diagram As Per Input And Output

II. CURRENT SCENARIO OF SECURITY MECHANISM

At present, burglar alarm system mostly used these days usually works by automatically sending reports to police once the sensor detects presence of unwanted people at or near the entrances of a house (or office), police will then usually arrive in a short time. For towns or villages that are far away from big cities (downtown), since police cannot arrive at the victim’s home immediately, more should be done to halt any burglaries in progress before the police have arrived, and one way is to seek for helps from neighbors.

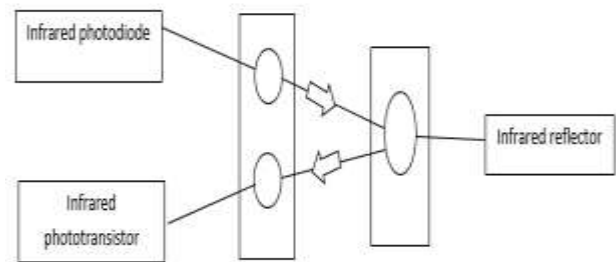
Most of the other security systems are assembled in such a way that output component such as alarm, lights are placed in the restricted area itself. This is one of the major disadvantages because the burglar realizes that the alarm system has turn alert and he tries to escape after burglary. Most of the burglars have succeeded in escaping just because the come to know that the alarm system is alert. To overcome the above disadvantage, security system by motion detection and light mechanism has arrived with a solution. This security system has the alarm system and lights outside the restricted area, so that the burglar is unaware that it is an alert status.

III New System Mechanism

Motion detection is an action of sensing physical movement in any area. Motion can be detected by measuring change in speed or vector of an object in the field of viewing. It uses automatic light switches and security system turn on the light or to activate some other form of alarm or warning indicator when the person enters the monitored area.

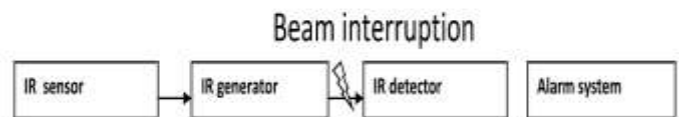
Each sensor consists of 2 housings. The first housing contains an infrared-emitting diode and an infrared-sensitive phototransistor as an infrared detector. The other housing contains an infrared reflector to reflect the infrared signal.

When positioned in the front of an entrance to the protected area, the 2 housing establish an invisible beam.



A person who enters the area will interrupt the beam causing an alarm to be triggered. For this type, it uses the basic concept of infrared motion detector. An interruption in the signal modulated pulsating beam is transmitted by an infrared diode while received by an infrared detector will set “on” or “off” the alarm of the security system.

The project also focuses on detecting the darkness or shadow of the object both in darkness as well as in light.



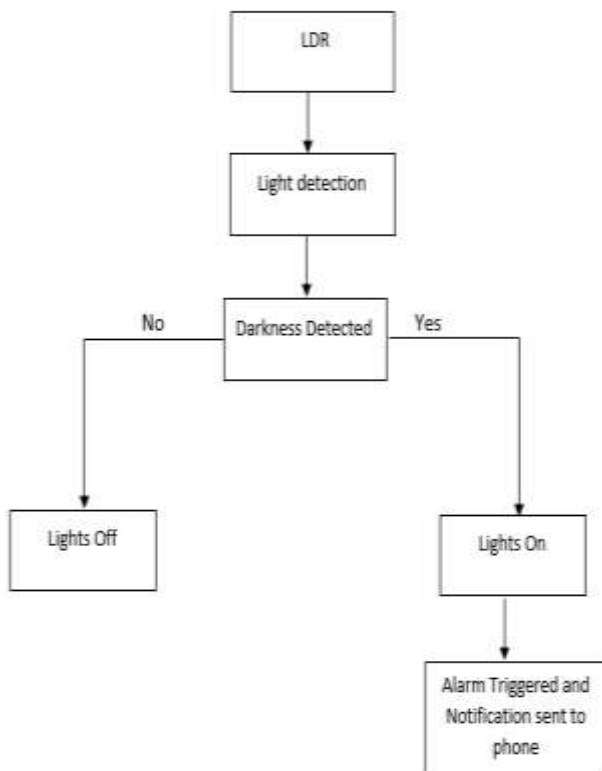
➤ **In Light**

LDR detects the presence of level of light. LDR are very useful especially in light /dark sensor circuits. Here, lights are arranged in such a way that the LED light falls on LDR. Due to this mechanism, the shadow of the object is detected. If any object comes nearby, the value of LDR varies. Due to this variation of values, detection takes place and motion is also detected together thereby triggering alarm and lights are on.

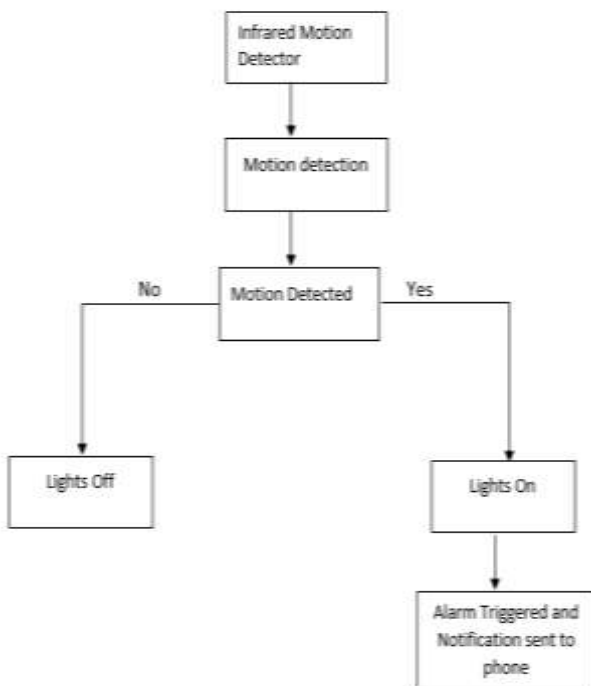
➤ **In Darkness**

It detects the presence of an object in darkness also. The project focuses saying when in darkness, it detects the shadow of the object. Usually thefts take place at night time. LDR senses the darkness of shadow and the infrared sensor or detector detects the motion or movement of object. The detection of both sensors together triggers alarm and Led lights are on. If the thief thinks that he is smart enough to break the led bulbs thinking that his shadow is not detected, but still he uses a torch or any light to do his work and that light detects his shadow and motion is itself detected making the alarm ring and he is caught. This system can prevent thefts taking place.

Work Flow Diagram:



Light Detection



Motion Detection

The arduino Uno is a micro controller based on Atmega328. It contains everything needed to support the microcontroller; simply can be connected it to a computer with a USB cable or power it with a AC-to- DC adapter or battery to get started. Infrared sensor and LDR can be connected so that it detects motion and light respectively. It captures the motion and shadow and the value varies showing in LCD display. DC motor converts electrical energy to mechanical energy. The understanding of the electrical structure for the hardware development is needed for the design circuit process of the motion detector, light mechanism and the basic security circuit. Using breadboards, circuits are tested. Jump wires are connected from small analog and digital circuits to complete central processing units(CPUs). The LCD displaying values varies making buzzer to ring and related led lights to switch on.

IV Notification

As soon as the alarm is triggered, the notification message is sent to the owner of the restricted area alerting him about the intruder.

This is an advantage about this system if the owner is not present .

Advantages:

- Increased security control.
- It is convenient and portable.
- It is relatively inexpensive.
- Provides reliable and efficient results.
- Easier to install.
- accuracy in identifying the correct alarm outputs to assure quick and correct responses and the unit’s accuracy in communicating with the security service provider.

Conclusions:

- [1] Our security system is practical. It is used in home as well as business environment.
- [2] The result of the design can meet our expectations, in which the sensor is working and will sound a specific alarm when the system goes into alert status.
- [3] The LCD also offer great interface and users can be familiar with our system in less than few seconds.
- [4] It prevents thefts taking place at various organizations.
- [5] Arduino is proposed and can be implemented as it is easy to understand.
- [6] By implementing this, we face more security and is flexible and reliable.
- [7] When a system fails on either of these functions, it fails the homeowner.
- [8] Homeowners need to be diligent in testing their alarm systems and securing the needed repairs.

Future Scope:

The scope can be expanded to many other areas too except homes. It can be made more flexible using other technologies. It can also add a feature of capturing the image of the burglar. The system can be made more powerful by locking the doors as soon as alarm is triggered, so that the burglar cannot escape from the restricted area.

References:

- [1] <http://www.engpaper.net/security-system.htm>
- [2] http://www.academia.edu/11786482/PIR_SENSOR_BASED_SECURITY_SYSTEM
- [3] <http://www.sensinova.in/pir-motion-sensor.php?gclid=CP6X3pvL9tMCFcIWaAodxLgJaw>
- [4] <https://www.elprocus.com/motion-detector-circuit-with-working-description-and-its-applications/>
- [5] Deepali Javale, Mohd. Mohsen, Shreerang Nandewar, Mayur Shingate, "Home Automation and Security using Android ADK", March, 2013.
- [6] <http://www.arduino.cc>
 - a. Official Home page for Arduino
 - b. microcontroller to know about Arduino kit
- [7] <http://www.edgefxkits.com/blog/light-dependent-resistor-ldr-with-applications/>
- [8] <http://www.makeuseof.com/tag/>
- [9] https://en.wikipedia.org/wiki/Motion_detector