

Development of an Intruder Detection Technique Using LDR

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Abstract— Burglary is one of the biggest issues in today's life. To resolve this issue a circuit has been implemented using LDR (Light Dependent Resistor) and few resistances. Many incidents of theft and burglary took place in Kolkata and many other cities. As a solution of this problem the circuit is implemented. Whenever an intruder will break into the house the buzzer alarm will alert the neighbours.

Index Terms— Intruder, LDR, light intensity, BC547, Constant current source, Open loop comparator, LM741, LED, Buzzer

1 INTRODUCTION

OUR aim is to propose an automated system which will reduce the burglary incidents in number. It works on a simple system the whenever an intruder will break into a house an audio visual alarm will alert the neighbours.

To implement this system we have used LDR (Light Dependent Resistor) whenever it will detect obstacle the LED will glow and a buzzer will alert the neighbours. LDR is designed using photoconductive cells by Cadmium Sulphide (CdS). The resistance of the LDR is decreased if the intensity of the incident light on the surface of the LDR is increased. Just a few resistances some batteries and LDR will make this system very efficient and user friendly cost effective and affordable.

This system makes sure that whenever anybody will break into an empty house it will alert the neighbourhood by the audio visual alarm. The detailed explanation about the working of the system will be provided in the following sections.

2 BLOCK DIAGRAM

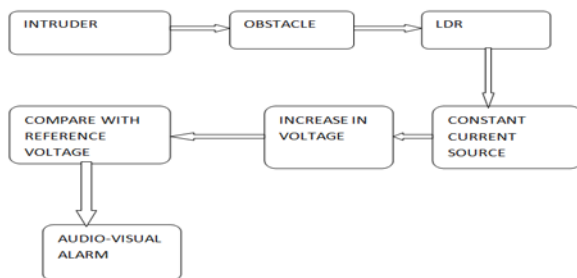


Fig. 1. Block diagram of the project

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3 EXPLANATION OF BLICK DIAGRAM

Whenever an intruder will break into the house he/she will create an obstacle in front of the LDR. A suitable circuit has been designed to generate constant current. The voltage will be increased as a result of that obstacle. The increased voltage will be compared to the reference voltage and an audio visual alarm will be activated to alert the neighbourhood.

4 CIRCUIT DIAGRAM

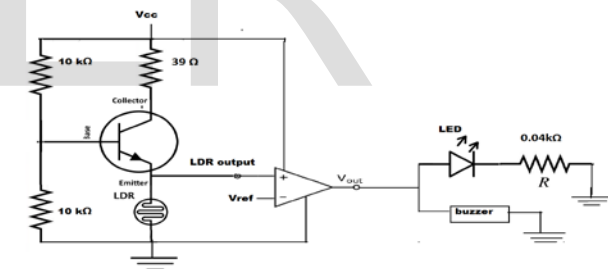


Fig. 2. Circuit diagram of the project

5 DESCRIPTION OF THE CIRCUIT DIAGRAM

An npn BC547 transistor is used to provide constant current to the LDR. In consequence of that, any decrement in light intensity subsequently increases the voltage across the LDR. This voltage has been compared with a pre determined reference voltage. An open loop comparator circuit has been designed using LM741. LM741 is a general purpose operational amplifier. The reference voltage is calibrated between two potentials.

The potentials are:

- 1) Potential obtained from LDR under low-light condition
- 2) Potential obtained from LDR under high-intensity condition (given from a cell phone torch).

So, at the output of the comparator goes high if the light inten-

sity is decreased. An audio-visual indicator has been implemented using LED and buzzer. This arrangement will alert the neighbours about any possible burglary.

6 OBSERVATION TABLE

Light Intensity Category	LDR output (volt)
Complete Darkness	4.2
Ambient light	3.6
Light from Torch	3
Reference voltage chosen	3.58



Fig. 3. Snapshot of the circuit

7 ADVANTAGES OF THE CIRCUIT

There are lots of advantages of the system. They are mentioned below.

- i) Usually LDR is very cheap and easily available in market. They are also available in different shapes and sizes.
- ii) This is a very user friendly system.
- iii) The circuit consumes very small voltage and power for their operations.
- iv) The selection of threshold is flexible depending on the ambient light.

8 DISADVANTAGES OF THE CIRCUIT

- i) Highly inaccurate with a response time of about tens or hundreds of milliseconds.
- ii) LDR is mainly used with visible light. So the problem of external light will affect the LDR.

8 FUTURE SCOPES

- i) Using Arduino Uno programming and GSM SIM900A suitable alert message can be sent to the owner of the house as well as local police.
- ii) The same circuit can also be used to implemented for automatic Street light application.

REFERENCES

- [1] Derci Felix da Silva and Daniel Acosta-Avalos, "Light Dependent Resistance as a Sensor in Spectroscopy Setups Using Pulsed Light and Compared with Electret Microphones", *Sensors*, vol. 6, pp. 514-525, 2006.
- [2] Isah Abdulazeez Watson, Oshomah Abdulai Braimah, Alexander Omoregie, "Design and Implementation of an Automatic Street Light Control System" *International Journal of Emerging Technology and Advanced Engineering*, Vol. 5, Issue 3, pp. 336-340, March 2015.
- [3] C. Gouthami. C, C. Santosh, A. Pavan Kumar, A. Karthik, K. R. Ramya, "Design and Implementation of Automatic Street Light Control System using Light Dependent Resistor", *International Journal of Engineering Trends and Technology (IJETT)*, Vol. 35, Number 10, PP.465-470. May 2016.
- [4] A.A. Nippun Kumar, G. Kiran, T.S.B. Sudarshan, "Intelligent Lighting System Using Wireless Sensor Networks", *International Journal of Ad hoc, Sensor & Ubiquitous Computing (IJASUC)*, Vol. 1, No. 4, pp. 17-27, December 2010.
- [5] N.A. Iromini, A.S. Nafiu, A.O. Ajao, "Automatd Light Control System for Offices", *International Journal of Engineering Sciences & Emerging Technologies*, Vol. 7, No. 4, pp. 701-706, Jan. 2015
- [6] LM741 datasheet from Texas Instruments.
- [7] Electronics Fundamentals and Applications by P.C. Rakshit and D. Chattopadhyay.
- [8] Sensors and Transducers by D. Patranabis.
- [9] Microelectronic Circuits by A.S. Sedra and K.C. Smith.