International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 11 Issue: 04 | Apr 2024 www.irjet.net p-ISSN: 2395-0072

DESIGN OF INTRUDER ALERTING SYSTEM USING LASER AND LDR

Bibhu Prasad[1], Amit Kumar Harichandan[2], Srujal Kumar Patra[2], Rajeswari Pati[2], Kajol Sahu[2]

[1]Assistant Professor, ECE department, GIETU, Gunupur, Odisha, India
[2]UG Scholar, ECE department, GIETU, Gunupur, Odisha, India

Abstract - *In today's rapidly evolving technological landscape, ensuring the security of both physical and digital assets is of paramount importance. Laser light security systems represent a state-of-the-art solution for safeguarding restricted areas and detecting unauthorized access. This paper provides an overview of the concept and functionality of laser light security systems and highlights their potential applications and advantages. Laser light security systems operate on the principle of utilizing laser beams to create a protective perimeter around an area or object. These systems consist of a laser source emitting a high-intensity beam of light, often invisible or in the infrared spectrum, which is then detected by specialized receivers. While laser light security systems offer numerous benefits, they also come with challenges, such as false alarms due to environmental factors like dust or insects, and the need for precise alignment during installation. Despite these challenges, ongoing advancements in technology continue to improve the accuracy and reliability of these systems.*

Key Words: Spotlight Sensor, Rechargeable Accumulator, NMOS.

1.INTRODUCTION

In an era marked by rapid technological advancements and an ever-growing need for security, the Laser Light Security System emerges as a pioneering and innovative endeavor. This paper represents a significant leap in the realm of security and intrusion detection, leveraging the power of laser technology to safeguard physical spaces, assets, and sensitive areas. This introduction provides an overview of the Laser Light Security System, its objectives, relevance, and the potential impact it can have on enhancing security measures. Security has always been a paramount concern across various domains, including residential, commercial, industrial, and governmental. Conventional security measures have served their purpose, but the evolving tactics of intruders and the increasing complexity of threats demand more advanced and proactive solutions [1,2]. This System responds to this evolving landscape by harnessing laser technology to create an intelligent and efficient security system [3]. As technology continues to advance, the Laser Light Security System is poised to play an increasingly vital role in meeting the evolving security challenges of our world [4]. This introduction sets the stage for a deeper exploration of this innovative security solution. A security system utilizing a laser, Arduino UNO board, ESP Wi-Fi module, buzzer and LDR sensor has been proposed by Paramitha Mondal and Madhusree Mondal. Should an intruder be detected within the premises of the protected area, a loud alarm will sound while their photo is taken using a spy camera which then sends it as credible evidence to a registered email address [5]. Harshal Hemane and Debarati Sen have designed a security system for homes that employs lasers, where mirrors are utilized to reflect the laser beams in every direction of the house. In case any object or person obstructs these emitted rays, it results in an alarm signaled by a connected buzzer [6]. Another paper was developed by A.B.N.V. Prasad, K.Ravi Raj(et al.) with a focus on voltage drops across LDR's as a means of turning transistors On/Off based on high (On) or low (Off). The result of the triggered response are alert beeps generated through accompanying buzzers when appropriately activated [7]. Debarati Dutta suggests utilizing circuitry such as IC555 and incorporating components like LDRs to detect unauthorized indoor entry, triggering alerts [8]. Arigela Sai Kalyan (et al.) investigate door locks primarily used in laboratories where students access to sensitive areas may need monitoring while simultaneously capturing attendance through QR codes integrated with Raspberry Pi infrastructure for successful outcomes recognized as the most satisfactory among comparable systems. Enabling authorized personnel complete control over pass points enhances active data monitoring experience firsthand auditability ease at minimal overhead costs enough reason to adopt this idea deemed best today due to its potentiality of yielding augmented amplified levels already accomplished by stake holders further benefits presented justify it fairly [9].

1.1 Design And Simulation

Our model's aim is to alert the person's if anyone passes nearby it. In order to create a circuit that functions, several crucial components are necessary. Firstly, there should be an on/off switch connected in series with a 9V DC battery. The battery needs to be linked to two resistors named R1 and R2 which sit side by side within the parallel system. Next up is an LED; this must have resistor R2 attached while being located next door both buzzer and NMOS - all of these reside together inside the electrically-parallel arrangement for this setup.

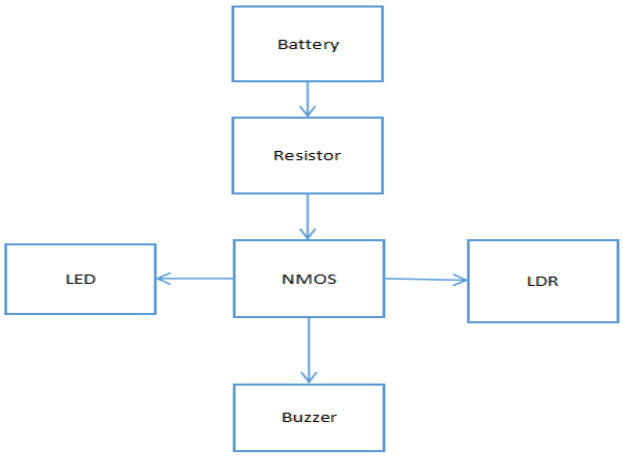

Figure 1. ***BLOCK DIAGRAM OF INTRUDER ALERTING SYSTEM***

Furthermore, at one end of said configuration lies LDR which has its own connection through resistor R1 thereby incorporating into N-MOSFET output present on opposite sides hence intertwining every constituent part resulting in stable grounding against sudden voltage surges from external sources – ensuring added safety precautions throughout usage periods thereafter for optimal efficiency levels .(shown in Figure 2.)

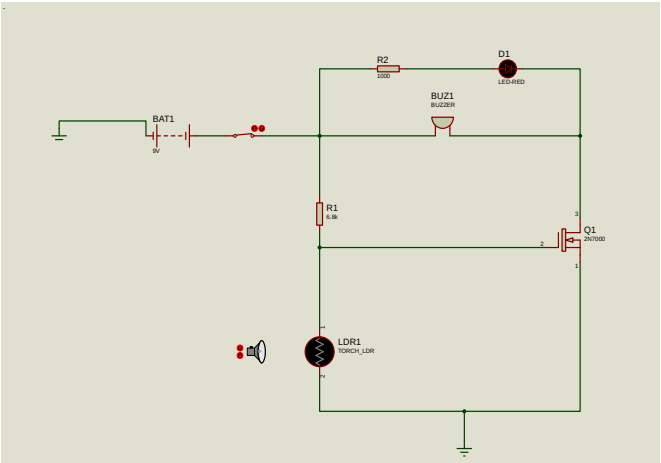

Figure 2. SIMULATION DIAGRAM DONE IN PROTEUS SOFTWARE

So to construct this model we need some major components to do it.

1.2 SIMULATION PARAMETERS

SL NO.	COMPONENT	VALUE
1.	LDR	
2.	2N7000NMOS	
3.	RESISTORS	100OHM,6.8K
4.	BUZZER	
5.	LASER LIGHT	
6.	BATTERY	9VOLT
7.	SWITCH	
8.	PCB	

Table 1: SIMULATION PARAMETERS

The LDR is utilized in this undertaking as a light-sensitive apparatus that adjusts its resistance when the illumination level fluctuates. The implementation of laser technology along with the LDR allows for effective utilization as both a beacon and receiver to obtain optimal performance results .The LED emits an outstanding shine that is perceptible across all wavelengths upon receiving electric power. Its abilities are hinged on semiconductors and produce a solitary color. This transistor utilizes a dependable silicon-gate production technique and features a vertical DMOS configuration .The printed circuit board (PCB) performs two main functions. Firstly, it offers mechanical reinforcement to the electrical components and secondly, enables electrical connectivity through carved copper layers equipped with conductive tracks, pads along with other supplementary attributes.

2. Result Analysis

The Security System comprises a laser diode and an LDR that face each other. The laser emits light onto the LDR unhindered, thus making no noise from the buzzer in operation. In case any object blocks this direct path between both elements, it activates an alarm instead.(as shown in Figure 3)

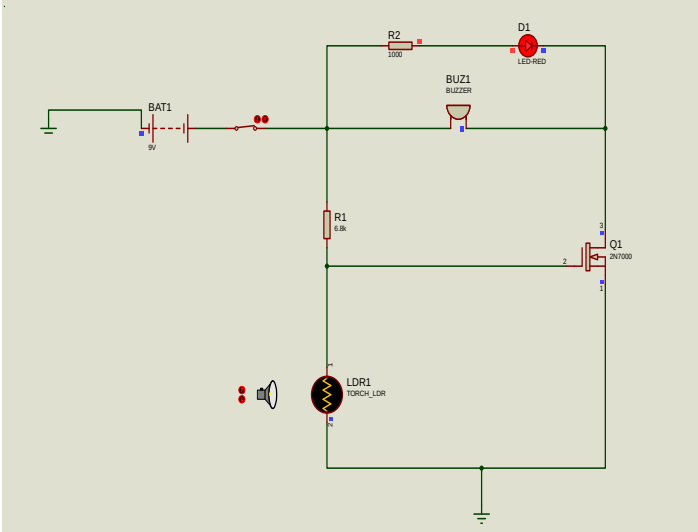

Figure 3. SIMULATION WHEN SECURITY BREACH

3. CONCLUSIONS

In conclusion, a laser light security system represents a sophisticated and highly effective means of protecting sensitive areas and detecting intruders. This system's design, simulation, and result analysis collectively underscore its significance in the realm of security technology. In summary, a laser light security system, when designed, simulated, and analyzed meticulously, represents a powerful tool for safeguarding assets and locations. Its ability to provide reliable security, adapt to changing conditions, and maintain safety makes it an indispensable asset in the realm of modern security technology.

REFERENCES

[1] A. Rai, M. Rai, N. Jogi, B. Rai, S. Rai and D. Rasaily, "Low Cost Laser Light Security System in Smart Home "International Conference on Innovative Sustainable Computational Technologies (CISCT), Dehradun, India, 2019.

[2] Wen Chen, Bahram Javidi, and Xudong Chen, "Advances in optical security systems," *Adv. Opt. Photon*.

[3] Proceedings of the 48th International Scientific Conference on "Experimentalni Analyza Napeti 2010 Experimental Stress Analysis". 2010.

[4] N. Skorin-Kapov, M. Furdek, S. Zsigmond and L. Wosinska, "Physical-layer security in evolving optical networks," *in* IEEE Communications Magazine, Volume 54, no. 8, pp. 110-117, August 2016.

[5] .Parmitha Mondal, Madhusree Mondal, "Laser Based Security System Using Arduino UNO", Volume 8, Issue-6, June-2018.

[6] Harshal Hemane, Debarati Sen, "Laser Based Security System for Home", Volume 5, Issue-1, January-2018.

[7] A.B.N.V.Prasad, K.Ravi Raj, K.Siva Ganesh, M.Lithin Siva swamy Naidu, N.Phaneendra, "laser security alarm system", Volume 7, Iss-2, Apr-2020.

[8] Debarati Dutta, "Laser Security System", Volume 7, Issue-4, April-2016.

[9] Arigela Sai Kalyan, Balibineni Bharat Teja Raju, Mudraboina Venkatesh, "Door Lock Security Using Raspberry Pi and QR Code", Volume-8, Issue-3, March 2021.

[10] Olarewaju .I. K, Ayodele,O. E, Michael. F. O, Alaba. E. S, Abiodun. R. O, 2017. "Design and Construction of an Automatic Home Security System Based on GSM Technology and Embedded Microcontroller Unit", *American Journal of Electrical and Computer Engineering,* Volume 1,No. 1, pp.25-32, Doi:10.11648/j.ajece.20170101.14

[11] Zungeru. A. M, Kolo. J. G, Olumide. I, September 2012. "A Simple and Reliable Touch Sensitive Security System", *International Journal of Network Security & Its Applications, ISSN 0975-2307,* Volume 4; Issue: 5; pp. 149-165, DOI: 10.5121/ijnsa.2012.4512

[12] Mohd. Saifuzzaman, Ashraf Hossain Khan, Nazmun Nessa Moon, Fernaz Narin Nur, "Smart Security for an Organization based on IoT", *International Journal of Computer Applications,* Volume 165 –No.10, May 2017

[13] Suresh.S, J.Bhavya, S.Sakshi, K.Varun and G.Debarshi, "Home Monitoring and Security System", *ICT in Business Industry & Government (ICTBIG)*

[14] https://www.electronicshub.org/laser-security-system/

[15] Low Cost Laser Light Security System in Smart Home | IEEE Conference Publication | IEEE Xplore