Laser Based Security System

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Abstract: Security is most important factor in this digital world. With the advancement of technology, the criminals are trying to find new ways to perform the criminal activities. The technology advancement has led the world to another level, so the crime has also become more tech-oriented. In order to overcome this problem, we are proposing a laser-based security system and the intruder is unaware of the fact that a security system is installed in the entry positions like doors or windows. Laser based security system acts as an additional security layer which includes ESP32 CAM, LDR Module, Laser Module, Blynk Application to view the capture image of the intruder. Since laser light goes through long distance without scattering effects and the ray is almost invisible. When somebody crossover the laser ray the circuit senses the discontinuity and sends the captured image of the intruder along with notification alert to Wi-Fi connected device through Blynk Application.

Keywords: ESP32 CAM, Blynk Application, LDR, Security System, image capture, notification alert.

I. INTRODUCTION

Rapid advancement in the field of technology, plays an important role in wide range of criminal activities. It opens more opportunities for crime and draws people into committing crime leading to an unpreceded growth in the crime rate. This system helps us to protect our home, offices, banks, lockers from intrusion and unauthorized access. There are many types of security system that are currently used by most people like CCTV but these security systems are visible to naked eyes that will alert the intruder, to avoid this we are proposing a project on Laser based security system. This security system helps us to prevent incidence like robbery, stealing and this system can be implemented both indoor and outdoor. If the intruder is detected ESP32 CAM starts capturing the image and it gives notification alert with image of the intruder to Wi-Fi connected device.

II. LITERATURE SURVEY

[1] Laser based security system using Arduino UNO by Paramitha Mondal, Madhusree Mondal. The proposed system contains sensor, Arduino UNO, ESP Wi-Fi module, buzzer, LDR module. In this system once security system detects the intruder buzzer starts buzzing very loudly, spy camera takes the photo of the intruder and sends it to the registered email address for valid proof.

[2] Laser based security system for home by Harshal Hemane, Debarati Sen. In this proposed system mirrors are used to reflect the laser rays to cover the region surrounding home in all direction. When laser light is incident on a mirror, it gets reflected from one mirror to another and falls on LDR. If any of the laser ray is blocked the buzzer produces beep sound.

[3] Laser security alarm system by A.B.N.V. Prasad, K. Ravi Raj, K. Siva Ganesh, M. Lithin Siva swamy Naidu, N. Phaneendra. In this project based on the voltage drop across the LDR is considered to turn On and Off the transistor. If the voltage drop across the LDR is low transistor is turned Off, if the voltage across the LDR is high transistor is said to be turned On. Once the transistor is turned on buzzer produces beep sound.

[4] Laser security system by Debarati Dutta. The proposed system contains LDR, IC555, transistor, buzzer which gives alert that the intruder has entered the monitored entrance through beep sound.

[5] Door lock security using Raspberry Pi and QR Code by Arigela Sai Kalyan, Balibineni Bharat Teja Raju, Mudraboina Venkatesh. In this project the study is aimed to develop a web-based security door using QR code system for the laboratory where at the same time the authorized person can perform access monitoring the student's attendance.

III. METHODOLOGY

Keeping everyone's security in mind. Laser based security system is proposed which consists of sensors, alert system namely Blynk Application, UART TTL Module used to burn the code on the microcontroller (ESP32 CAM), ESP32 CAM is used to take photo of the intruder. If the intruder tries to enter the monitored entrance the system detects the intruder by making use of LDR and Laser Module. When the laser light is incident on LDR is blocked resistance of the LDR increases. Once the resistance of the LDR increases it triggers ESP32 CAM to take photo of the intruder. ESP32 CAM takes photo of the intruder and along with notification alert sends it to Wi-Fi connected device through Blynk

Application. The security system should be successfully connected to the Blynk server using the authentication token and Blynk libraries. From Wi-Fi connected device one can see the captured image of the intruder and can take more photos from anywhere around the world. The user will get notification alert irrespective of whether the smart phone is locked or unlocked or even if any app is opened at that moment.
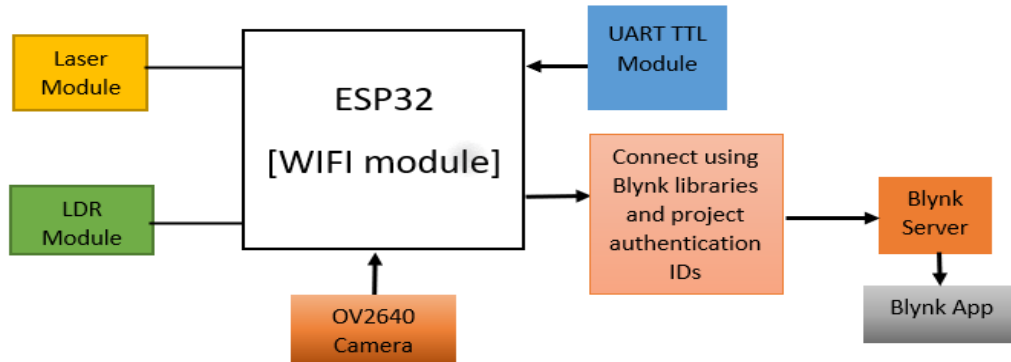
BLOCK DIAGRAM:

Fig. 1 Block Diagram

COMPOMENTS REQUIRED:

1.   ESP32 CAM

Fig. 2 ESP32 CAM

The ESP32 CAM is a full-featured microcontroller that also has an integrated video camera and microSD card socket. It's inexpensive and easy to use, and is perfect for IoT devices requiring a camera with advanced functions like image tracking and recognition. The ESP32 CAM s a small size, low power consumption camera module based on ESP32. It comes with an OV2640 camera. ESP integrates Wi-Fi, traditional Bluetooth and BLE Beacon, with 2 high-performance 32-bit LX6 CPUs, 7-stage pipeline architecture. It is suited for home smart devices, industrial wireless control, wireless monitoring, QR wireless identification, wireless positioning system signals and other IoT applications. It is an ideal solution for IoT applications.

2.   LDR Module

Fig. 3 LDR Module

The LDR Sensor Module is used to detect the presence of light/ measuring the intensity of light. The output of the module goes high in the presence of light and it becomes low in the absence of light. The sensitivity of the signal detection can be adjusted using potentiometer. LDR Module works on the principle of "Photo Conductivity". It is associated with both analog output pin and digital output pin labelled as AO and DO respectively on the board Light intensity reach the set

threshold, DO port output high, when the external ambient light intensity exceeds a set threshold, the module DO output low.

3.   Laser Module

Laser module are used in a variety of applications that requires small sizes in addition to low power consumption with long operating lifetimes. Laser Module is a breadboard friendly, low cost having a wavelength of 650nm, operating voltage of 5V. The laser head is composed of a light-emitting tube, condenser lens, and adjustable copper sleeve and it is assembled when delivered, the focal length of the lens is adjusted glued by a strong glue stick, which can work directly connecting to a 5V DC power supply.

Fig.4 Laser Module

4.   UART TTL Module

Fig. 5 UART TTL Module

The FTDI USB to TTL serial converter module is a UART board used for TTL serial communication. It is a breakout board for the FTDI FT232R chip with USB interface, can use 3.3V or 5 V and has Tx/Rx and other breakout points.FTDI USB to TTL serial converter modules are used for communication to and from microcontroller development boards such as ESP32 CAM, which do not have USB interfaces.

IV. CONCLUSION

The proposed system helps in avoiding robbery, thefts and crime. It also introduces a smart approach to detect the intruder. Avoiding thieves results in the safety of our financial assets and thereby this system provides us protection against all. This system is low cost and robust. This security system can be used in different commercial buildings mainly banks. This highly reactive approach has low computational requirement; therefore, it is well suited to surveillance, industrial application and smart environment. This system hopefully will be the helping hand for society.

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