iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** IV **Month of publication:** April 2023

DOI: https://doi.org/10.22214/ijraset.2023.51008

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue IV Apr 2023- Available at www.ijraset.com

Advanced Alerting System by Motion Detection

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Abstract: Human technological advances have marked the emergence of alarm systems. The man began shouting a message to inform others of terrible information. Then people adopted new techniques to develop alarm systems to replace them. Security has always been a great concern in this developing nation. Security always plays a vital role in safeguarding and protecting property. In this internet age there is a new paradigm of technology that is clearly assisting the major concerns of security, i.e., 'Internet of things' and we thereby come with an Espressif Systems based microcontroller board alert system. The paper offers a camera module and microcontroller-based development platform that acts as a sophisticated alert indicator system embedded with passive infra-red sensor to detect the intruder motion. The designed prototype is configured with required functionality and obtained accurate results.

I. INTRODUCTION

An advanced alert indication system that can identify various types of invaders and notify their respective owners to take the necessary actions is formulated in this report. Additionally, an ESP32 camera and passive infrared sensor are incorporated into the design. After determining the movements of the intruder, the PIR sensor informs the ESP32 camera to take a picture of the movement for future analysis. Both the indoor and outdoor security mechanisms were the focus of this paper. Real-time notifications of security breaches or other occurrences that may require immediate attention are the goal of advanced alerting systems. Security and surveillance, fire detection, and environmental monitoring are just a few of the many uses for these systems. The system was made to use a PIR (passive infrared) sensor to detect motion and use a buzzer and the Telegram messaging app to send an alert. Using an ESP32-CAM (Espressif Systems Programmable System-on-Chip) module, the system was also able to take pictures and send them to a specific Telegram account.

We used motion detection and a variety of electronic components to create an advanced alerting system for this project. The framework was intended to recognize movement utilizing a PIR (inactive infrared) sensor and trigger a caution through a ringer and the Wire informing application.

Using an ESP32-CAM (Espressif Systems Programmable System-on-Chip) module, the system was also able to take pictures and send them to a specific Telegram account. The ESP32-CAM module consolidates a camera and a microcontroller in a solitary board and is fit for catching pictures and sending them over the web. By detecting the infrared radiation emitted by objects in its field of view, the PIR sensor detects motion. When an electrical signal is applied, the buzzer emits an audible alarm. Users can send and receive messages, photos, and other media over the internet with the messaging app Telegram. The Arduino Coordinated Improvement Climate (IDE) was utilized to program the ESP32-CAM module and control different parts of the framework. The ESP32-CAM module was able to capture and send clear images, and the advanced alerting system was successful in detecting motion and triggering an alert through the buzzer and Telegram. This framework has likely applications in security and observation, as well as different fields where continuous alarms are required.

II. OBJECTIVE OF THE SYTEM

By incorporating cutting-edge technologies like the Internet of Things (IoT), we aim to modernize the conventional security systems that are currently in use. Closed-circuit cameras are the only security system that has been widely used up until this point. The aforementioned security measures are used by relevant authorities to solve crimes and are regarded as electronic evidence.

It is possible to develop and incorporate the proposed mechanism into an improved alert mechanism that can be used to directly replace the closed-circuit cameras that are currently used in conventional security systems. The system was designed to detect motion using a PIR (passive infrared) sensor and trigger an alert through a buzzer and the Telegram messaging app. The system was also able to capture images using an ESP32-CAM (Espressif Systems Programmable System-on-Chip) module and transmit them to a designated Telegram account. The design of the system makes crime investigation authorities save a lot of time.

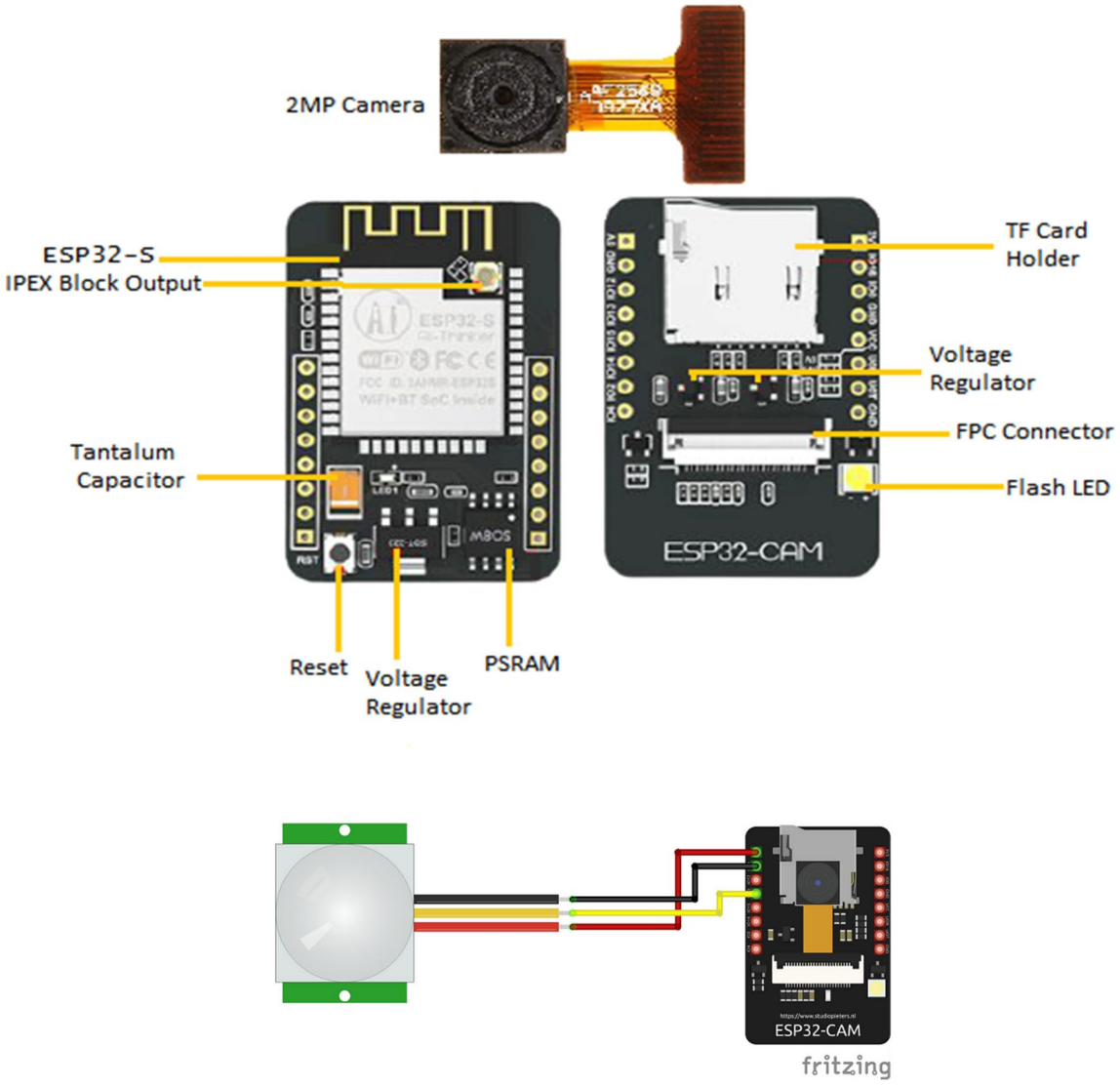
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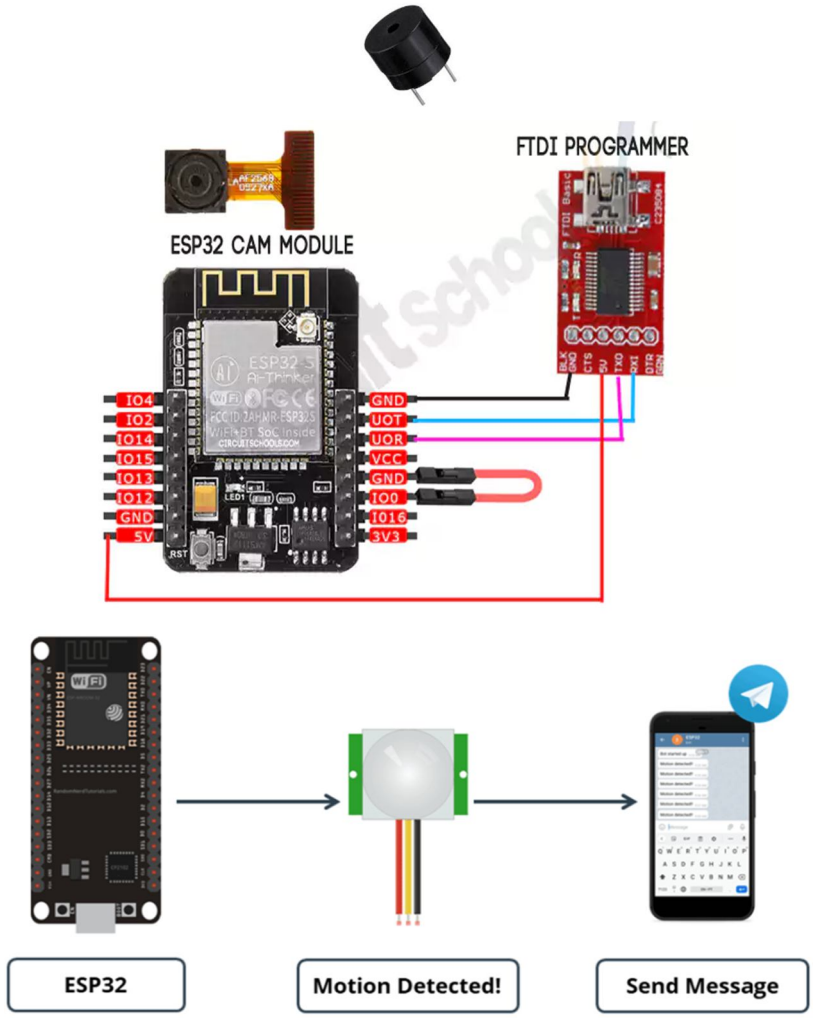
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III. IMPLEMENTATION

In this project, we developed an advanced alerting system using motion detection and various electronic components. The system was designed to detect motion using a PIR (passive infrared) sensor and trigger an alert through a buzzer and the Telegram messaging app. The system was also able to capture images using an ESP32-CAM (Espressif Systems Programmable System-on-Chip) module and transmit them to a designated Telegram account. The ESP32-CAM module combines a camera and a microcontroller in a single board and is capable of capturing images and sending them over the internet. The PIR sensor detects motion by sensing the infrared radiation emitted by objects in its field of view. The buzzer produces an audible alarm when triggered by an electrical signal. Telegram is a messaging app that allows users to send and receive messages, photos, and other media over the internet. The Arduino Integrated Development Environment (IDE) was used to program the ESP32-CAM module and control the other components of the system. The advanced alerting system was able to successfully detect motion and trigger an alert through the buzzer and Telegram, and the ESP32-CAM module was able to capture and transmit clear images. The buzzer is activated to produce an audible alarm. The alarm can be triggered through a variety of means, such as voltage, current, or frequency. The user receives the alert and the captured image through the Telegram app. The user can also receive additional information, such as the time, date, and location, if available.This system has potential applications in security and surveillance, as well as other fields where real-time alerts are required.

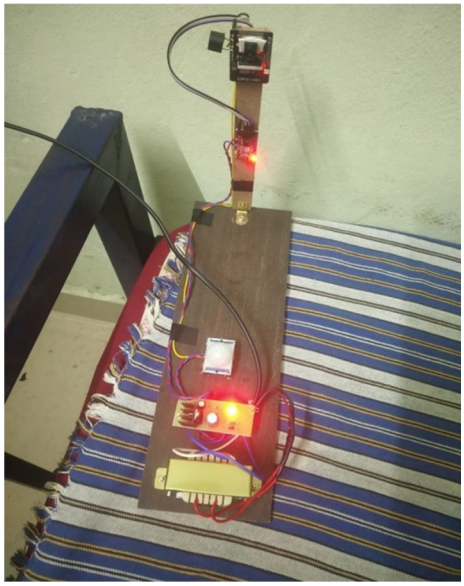
IV. SYSTEM ARCHITECTURE

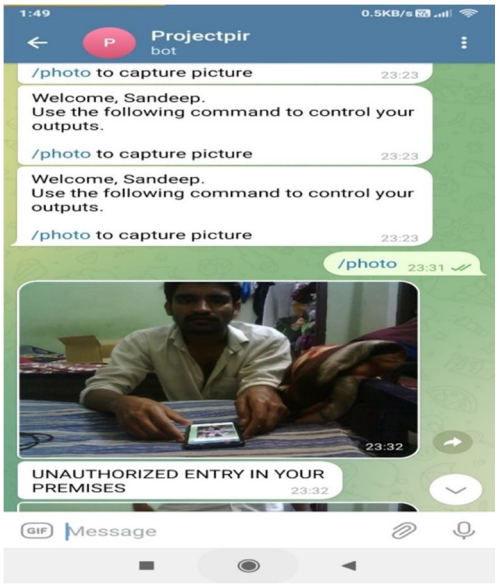




V. RESULT

A. *Demonstration*





VI. CONCLUSION

The project advanced alert indication system using ESP32 is illustrated with appropriate results that are evident in the paper. The concerted effort of the design is to enhance the current security systems. There is a greater demand to security of humans and property in the present scenario, proposed system has a Lion's share in reducing insecure things to happen and take necessary actions before incurring a huge loss.

There are many possibilities for expanding or improving upon the project in the future. For example, you could integrate it with other smart home devices, use machine learning algorithms to improve motion detection accuracy, or add advanced video analysis capabilities. You could also integrate the project with other IoT devices or systems to expand its capabilities and allow it to interact with a wider range of devices. The project can be configured to send alerts to a chat or channel on Telegram, allowing you to stay informed about what is happening even when you are not physically present. Overall, the project has the potential to be a useful and versatile tool for a variety of applications.

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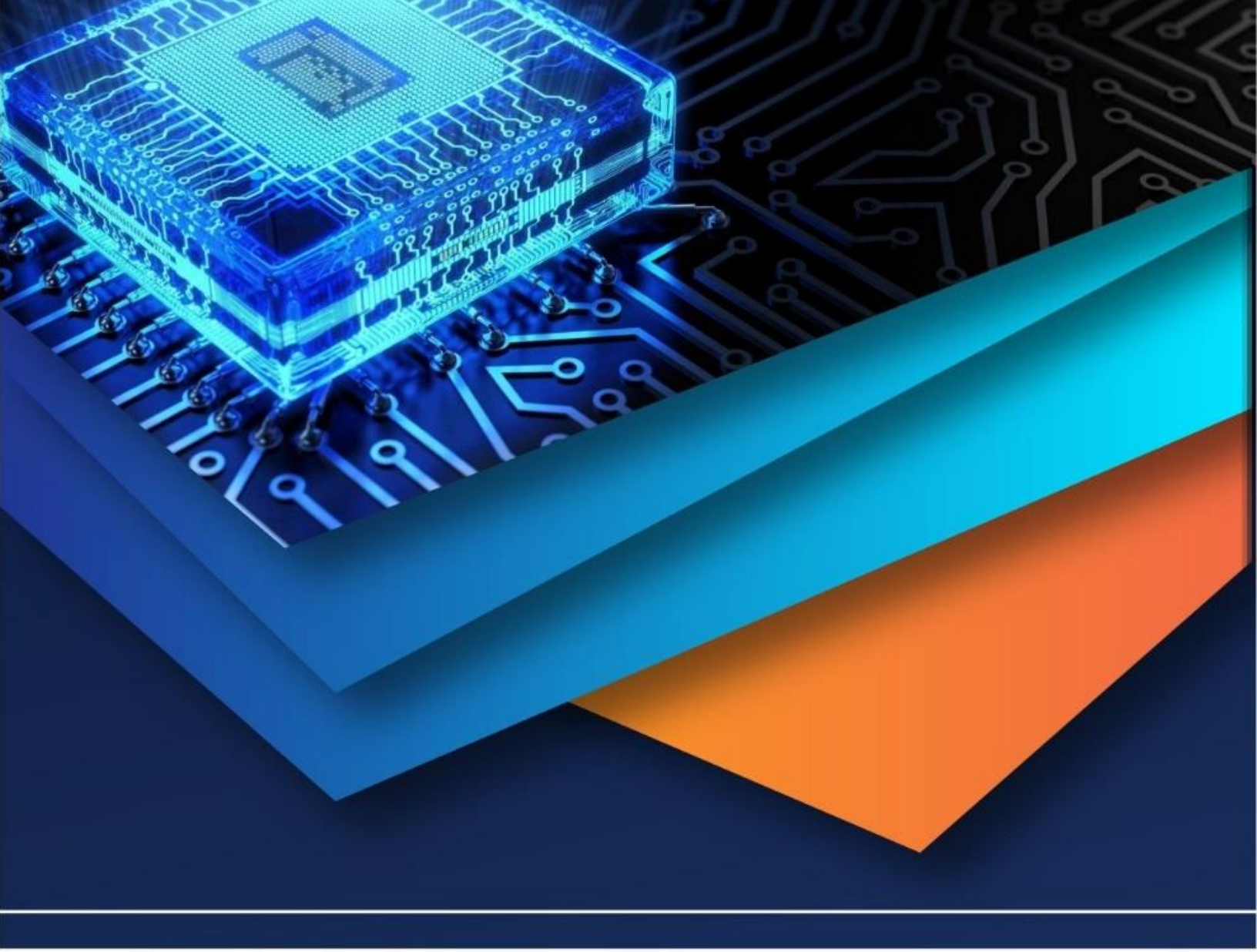
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