

Floor Guard : IOT Based Jewellery security system.

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Abstract -The Floor Guard IoT-Based Jewellery Security System is an intelligent surveillance solution designed to enhance security in jewellery shops by monitoring unauthorized access or suspicious activity near high-value display areas. This system utilizes the ESP32-CAM module, which combines a camera with Wi-Fi connectivity, allowing real-time image capture and remote monitoring. The ESP32-CAM continuously scans the designated floor area and captures images or streams video when motion is detected. These images are then transmitted over Wi-Fi to a cloud platform or mobile application, alerting shop owners or security personnel immediately.

Key Words: ESP32-CAM module, IoT, Wi-Fi, Telegram Bot

1. INTRODUCTION

In the modern era, the protection of valuable assets especially in high-value commercial spaces like jewelry showrooms has become a top priority. As incidents of theft and burglary become more sophisticated, conventional security systems such as CCTVs and manual alarms are often inadequate. These traditional methods are largely reactive, providing evidence after an incident has occurred rather than actively preventing it. Moreover, human monitoring is prone to fatigue and delay, making it essential to implement a smart, autonomous, and real-time security mechanism.

2. Body of Paper

Floor Guard : IOT Based Jewellery Security System.

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System, aims to utilize IoT components such as ESP32 microcontrollers, piezoelectric sensors, and Wi-Fi-based communication to create a proactive security solution. This system focuses on detecting unusual vibrations or pressure on the floor (such as those caused by tampering or unauthorized movement), monitoring entry points through magnetic door sensors, and sending realtime alerts and images to the owner or security personnel using a Telegram chatbot. In addition, the system includes a buzzer alarm to act as an immediate local deterrent. This project demonstrates how embedded systems and IoT can be practically applied to real world security challenges, especially in environments where even a minor breach can result in substantial financial loss. With its modular design and flexible integration, the Floor Guard system represents a forward thinking approach to physical security management.

Jewellery showrooms, banks, and high-value storage facilities are often prime targets for theft due to the sheer worth and portability of the items they contain. Despite the presence of CCTV cameras and traditional alarm systems, incidents of theft continue to rise, often due to the limitations of outdated or reactive security systems. In this context, modern technology, particularly the Internet of Things (IoT), has emerged as a revolutionary force in creating proactive, smart, and real-time security solutions.

The objective of this project is to build an efficient and cost-effective IoT-enabled security system for jewellery stores.

- The Floor Guard project is guided by the following key objectives:

1. Develop a multi-layered intrusion detection system that uses piezoelectric sensors to identify abnormal pressure or vibration on the showroom floor, indicating possible tampering or unauthorized movement.

2. Implement a door monitoring mechanism using magnetic sensors to detect forced or unauthorized door openings, even during working hours.

3. Enable real-time alerting capabilities by integrating the system with a Telegram chatbot, which instantly notifies the owner or security personnel about the detected threat.

4. Incorporate visual verification by using an ESP32-CAM module to capture and transmit images of

the intruder or affected area, adding a valuable layer of context to each alert.

5. Include an on-site deterrent system using a buzzer that activates in response to suspicious activity, immediately drawing attention and potentially discouraging the intruder.

• **Technical Objectives**

1. **Real-Time Intrusion Detection:**

Use the ESP32-CAM module to continuously monitor the area (floor, display cases, etc.). Automatically capture images or stream live video when motion is detected.

2. **Motion Sensing & Triggering:**

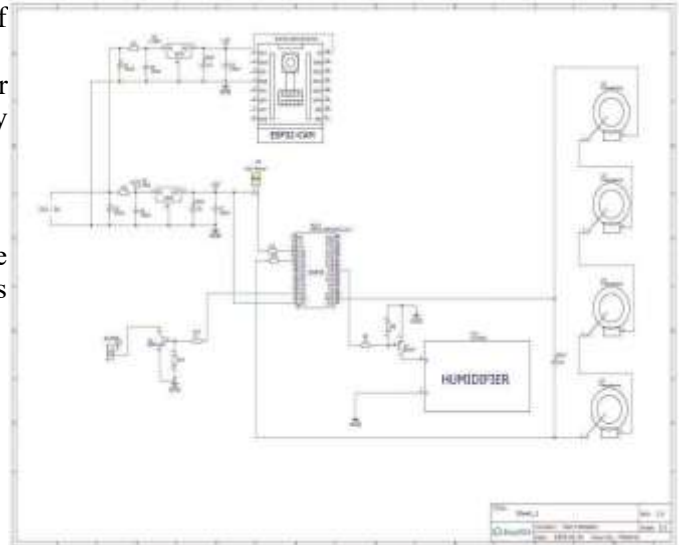
Integrate PIR (Passive Infrared) sensor or similar sensor with ESP32-CAM to detect movement. Trigger the camera and alert system only when motion is detected to save power and data.

3. **Instant Alert Notification:**

Automatically send captured images or alert messages via the Telegram Bot API to authorized users' smartphones in real time.

4. **Remote Monitoring & Control:**

Allow users to remotely request a live image or video by sending commands to the Telegram chatbot.

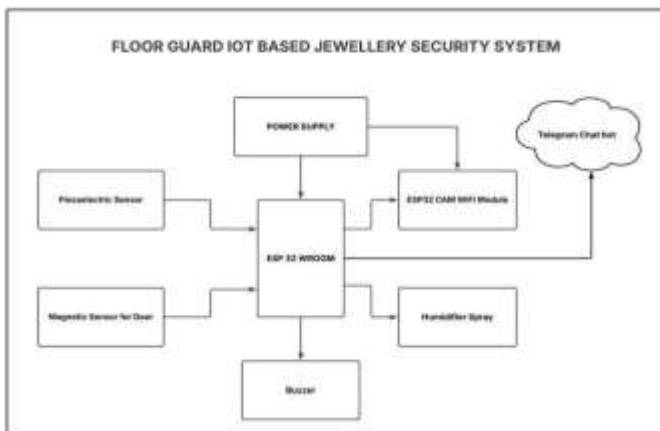


2.1 Testing and Validation

Multiple use cases were tested:

- Human movement with normal vibration
- Intruder simulation with heavy floor tampering
- Door access simulation

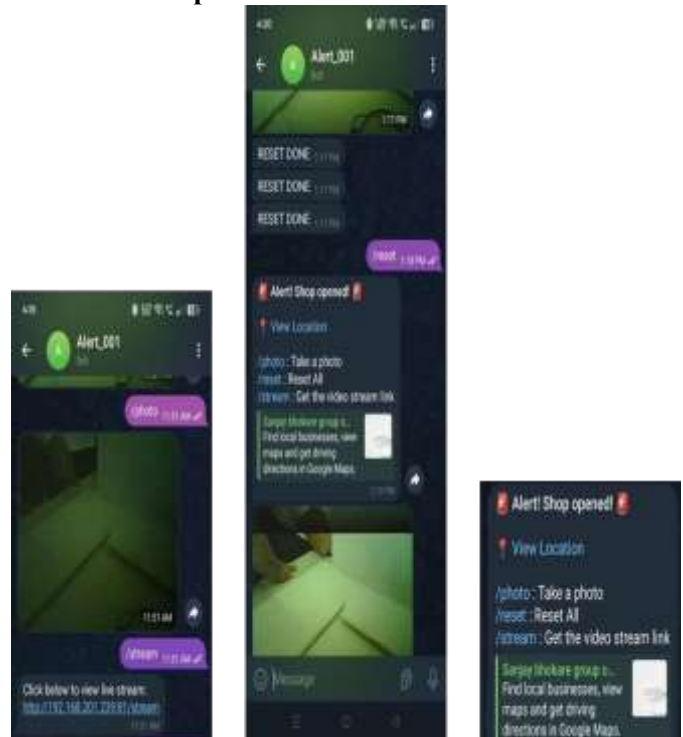
Block Diagram -1:



ISJEM sample model format ,Define acronyms and acronyms the first spell they are used in the writing, even after they have been well-defined in the abstract. Shortenings such as IEEE, SI, MKS, CGS, sc, dc, and rem do not have to be demarcated. Do not use condensations in the title or bonces without they are unavoidable.

Performance was evaluated based on:

- **Accuracy:** 96%
- **False Positives:** Below 5%
- **Response Time:** Less than 1 second



3. CONCLUSIONS

The Floor Guard IoT-Based Jewellery Security System presents an innovative and effective approach to enhancing the security of high-value areas like jewellery showrooms. By integrating smart sensors, real-time alerting mechanisms, and camera-based verification, the system provides both preventive and responsive security measures.

The use of ESP32, piezoelectric and magnetic sensors, along with Telegram integration, enables the system to function autonomously, send alerts, and provide visual evidence with minimal cost and complexity. With a modular and scalable design, this system can be expanded to cover multiple rooms or locations and be adapted for use in banks, museums, or private homes.

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