IOT BASED CCTV FOOTAGE SECURITY SYSTEM WITH SMS ALERT

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Abstract:
A Closed-Circuit TV (CCTV) system is one of the technologies in the surveillance field, aiming to solve the problems of detection and monitoring. CCTV is designed to help prevent and detect crime. The system allows motion to be detected. The system allows the camera to go into standby mode if no motion detected. The system allows SMS to be send to the set phone numbers immediately after motion detected. In this project including monitoring, add extra features such as SMS-based notifications, sent to up to 2 phones. The audio and video data are stored on the memory card, with a capacity of up to 8GB. To design a Smart Security System for House or Industries using AVR Microcontroller, GSM Modem and CCTV Camera as key components. This controller is interfaced with Door Sensor (Contains a Thin Copper Wire) and Proximity Sensor (for movement Detection). If any of the Sensors is activated, then Buzzer sound is produced, and SMS alert is sent to the preregistered mobile phone numbers. LCD Module is used to display important notification. CCTV Camera is used to generate live video feedback that can be accessed using video application like Zeb Home and internet connectivity. The power supply setup of the system contains a step- down transformer. This Project will be implemented using Embedded C Programming Language.

I. INTRODUCTION

In the realm of surveillance technology, Closed- Circuit TV (CCTV) systems play a crucial role in addressing detection and monitoring challenges,offering additional functionalities like SMS, as well as motion detection capabilities. However, the complexity of integrating the main program with external APIs can complicate the process of detecting and alerting administrators in CCTV systems. Novel strategies have been devised to address these obstacles. For example, Embedded C programming language was used to implement a CCTV system with SMS alert (CMDSA) that was developed utilizing evolutionary prototyping process. The core modules of CMDSA include motion detection, videocapturing and processing, image processing, and Short Message Service (SMS) alert functions. By optimizing processing time, enhancing detection speed, and minimizing memory consumption, this system ensures prompt alerts to system administrators.

Similarly, a Home Security System with SMS, utilizing human body motion detection and a GSM module, offers enhanced security measures. It incorporates infrared movement detectors and magnetic sensors to identify intruders via doors, with an embedded microprocessor unit enabling GSM module activation,alarm system triggering, and SMS alert transmission tohomeowners.

While providing advantages like remote vigilance and cost- effectiveness, this system lacks streaming video coverage essential for intruder identification. To address this limitation, a design featuring

proximity and sensor-based security, GSM alerts, and CCTV monitoring offers enhanced surveillance capabilities, enabling users to monitor their surroundings globally.

II. LITERATURE SURVEY

A PIR sensor-based security system was proposed by Gopal Chandra Nepal et al. [1]. Here, the security camera and relay are linked to the PIR sensor. The audio alone occurs when motion is sensed inside the PIR detecting range. The camera is connected to the relay's output, which is activated by the PIR sensor. In this case, less storage is needed to preserve the surveillance film because recording only happens if an intruder is discovered. This kind of security system isn't equipped to notify the user when an intrusion is discovered. A GSM module can be attached to this system to enable the sending of a message as soon as an intrusion is discovered.

To reduce power waste, Maslekar et al. [2] designed a method that uses a Raspberry Pi and a PIR sensor. Here, the Raspberry Pi serves as a monitoring tool to regulate the load switching in response to motion detection. In addition, the system is not as secure as it could be and costs more money because it uses a Raspberry Pi instead of an Arduino, which would have made it a more affordable solution.

Researchers are currently focusing on developing various encryption and authentication mechanisms to ensure data confidentiality, authentication, and privacy among users and IoT devices. However, it's noted that many IoT devices have been designed without adequately considering fundamental security requirements [3].

Intruders can exploit compromised nodes to gain access to security details, potentially launching multiple internal attacks. To bolster IoT security, Intrusion Detection Systems (IDS)[4] serve as an additional layer of defense.

Anthea Mayzaud et al. [5] categorized attacks on the Routing Protocol for Low Power Lossy Networks (RPL) into three types: topology attacks, resource attacks, and traffic attacks. Each type poses unique risks to RPL-based IoT networks, impacting network functionality and security.

Intrusion Detection involves monitoring and potentially preventing malicious activities by intruders. IDS serves as a network security tool, comprising software, hardware, or a combination thereof, to protect traditional networks [6].

It monitors network activities and alerts administrators to any suspicious behavior, logs attacks for forensic analysis, and may isolate compromised components to prevent further damage. Overall, IDS plays a critical role in enhancing the security posture of IoT ecosystems [7].

OVERVIEW OF EXISTING SYSTEM

The previous system was based solely on motion alerts without any automation or additional features such as audio alerts for burglar detection and SMS notifications for the user. This meant that if motion was detected in the homeowner's absence, the system did not inform the user in real time. Consequently, despite the presence of CCTV cameras, a thief could still carry out their actions without immediate deterrence or user notification.

III. PROPOSED SYSTEM

In this proposed system, we have addressed the limitations of the existing system by adding several key features. A motion-based SMS alert is sent to the user if any motion is detected, along with a buzzer- based audio alert to deter the intruder. Additionally, the room lights will automatically switch on when motion is detected. CCTV cameras are integrated into the system, allowing the user to open a camera application upon receiving the notification, view the room status, and capture images of the intruder.

ADVANTAGES
*   Immediate SMS notifications keep the user informed of any detected motion, enhancing security.

- The buzzer-based audio alert can scare off intruders, preventing potential theft.
- Automatic switching on of lights upon motion detection can further deter intruders and provide better visibility for CCTV footage.
- Integration with CCTV allows the user to remotely view the room's status and capture images of the intruder, providing valuable evidence.
- Combining multiple alert mechanisms (SMS, audio, and lighting) offers a more comprehensive security solution compared to motion alerts alone.

IV.   METHODOLOGY

Select appropriate sensors for motion detection, a GSM module for sending SMS alerts, a buzzer for audio alerts, smart lighting systems for automated light control, and CCTV cameras compatible with the system. Program motion sensors to trigger SMS alerts, audio alerts, and lighting systems. Develop a software application to manage communication between sensors, the GSM module, and CCTV cameras. Ensure the CCTV system can stream video to a user's mobile device upon receiving an alert. Test the motion detection sensors for accurate movement detection. Validate the SMS alert system to confirm prompt notifications. Test the audio alert to ensure activation upon motion detection. Verify the automated lighting system for proper functionality. Test the CCTV system for real-time streaming and image capture capabilities. Deploy the integrated system in the designated location. Conduct final testing in the actual environment to ensure all components function together seamlessly. Provide user training on operating and monitoring the system. Regularly maintain the system components for optimal performance. Update the software as needed to enhance functionality or address any issues. This methodology ensures a comprehensive and reliable security system that addresses the limitations of the previous setup and provides enhanced protection for the user. Embedded C Language is used Program this system. AVR Studio Compiler with usb programmer is used to upload the code on the Atmega controller. GSM modem 800is used to send SMS. LCD Module is connected to 2,3,4,5,6,7. GSM Modem is connected to Serial Pins 8,9. Sensors are connected to Analog Pins of Arduino.

The system's power supply configuration includes a 230/12V step-down transformer, which lowers the voltage to 12VAC. A bridge rectifier is utilized to convert it to DC. The 7805-voltage regulator regulates 12V Dc to +5V, which is necessary for the operation of microcontrollers and other components. Filter capacitors are used to eliminate DC voltage ripples.

APPLICATIONS
- Residential Security
- Commercial Security
- Industrial Security
- Remote Monitoring
- Property Management
- Public Buildings
- Warehouses and Storage Facilities
- Retail Stores
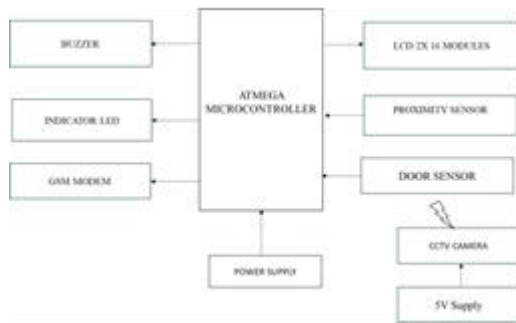- Educational Institutions
- Healthcare Facilities

Fig 1: Proposed Block Diagram   **Fig 2: Hardware Kit**

The block diagram of IoT Based CCTV Footage Security System with SMS Alert is as shown in the Fig.1 Atmega Microcontroller is the heart of the circuit, it controls all the components connected to it. We have used two sensors for monitoring the motion detection. Finally, we will see the data in LCD display as well as in mobile phone. Here we have designed an Efficient and Unique Smart Security System for House or Industries using AVR Microcontroller, GSM Modem and CCTV Camera as main key components. This controller is interfaced with Door Sensor (Contains a Thin Copper Wire) and Proximity Sensor (for movement Detection). If any of the Sensors is activated than Buzzer sound is produced and SMS alert is sent to the preregistered mobile phone number. LCD Module is used to display important notification. CCTV Camera is used to generate live video feed back than can be accessed using mobile phone Application and internet connectivity.

V. RESULTS AND DISCUSSIONS

The implementation of the CCTV footage security system has been completed. The status of the CCTV footage can be continuously monitored from anywhere using the Zeb Home mobile application, as it is an IoT-based CCTV camera system. When any sensor, such as a door sensor or proximity sensor, is activated, it triggers a buzzer sound. Additionally, through the GSM module, an SMS alert is sent to the pre-registered mobile phone. Users can then open the Zeb Home mobile application to view live video broadcasts from anywhere. Once the power source is provided, the system is prepared to monitor the security system, as seen in figure.

The results are not only displayed in the LCD dis- play but also in the smart phone through SMS Alert. CCTV cameras connected to a mobile app through ZEB HOME. This project is for monitoring and securing places like homes, offices, or stores. This is helpful to avoid robberies.

Fig 3: Before Motion Detection in LCD Display
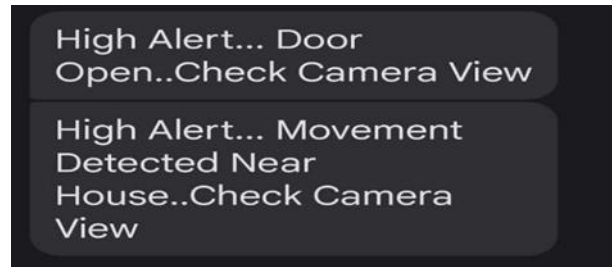

Fig 4: After Motion Detection in LCD Display

Fig 5: SMS Alert in Mobile Phone

Fig 6: CCTV Live Telecast in ZEB Home mobileApplicatioS

VI. CONCLUSION AND FUTURE SCOPE

In this project, we have implemented a motion detection system using IoT technology. The current system is compact, lightweight, and consumes minimal power. The use of open-source code facilitates the utilization of all functionalities to their fullest extent, ensuring optimal performance. This paper discusses our CCTV footage-based security system integrated with GSM technology, offering a cost-effective solution for safety and security. It provides a simple and convenient method to control household appliances with a single device. One of the main advantages of this system is the incorporation of multiple sensors to enhance safety features. The CCTV camera is utilized for monitoring live feeds of the area, equipped with night vision technology.

VII. REFERENCES

[1]. H.S. Shahrudin, "Malaysia's crime index sees 4.6 per cent increase", Retrieved on 18 January 2017 from http://www.nst.com.my/news/2016/05/144196/malaysias-crime index-sees-46-cent-increase (2016).

[2]. I.R.A. Hamid, and J.H. Abawajy, "An approach for profiling phishing activities", Computers & Security, 45, 27-41 (2014).

[3]. C.C. Wen, E. Dawson, J.M.G. Nieto, and L. Simpson, "A framework for security analysis of key derivation functions", in International Conference on Information Security Practice and Experience, (Springer Berlin Heidelberg, 2012), pp. 199-216.K. Kohli, and J.P. Singh, "Motion Detection Algorithm", Int. Journ. of Comp. Sc. & Apps 1:12, (2013).

[4] G. Lee, R. Mallipeddi, G.J. Jang, and M. Lee, "A Genetic Algorithm- Based Moving Object Detection for Real-time Traffic Surveillance", IEEE Signal Processing Letters 22(10), 1619-1622 (2015). Maviya Noorin, Suma KV, "IoT based wearable device using WSN technology for miners", 2018 3rd IEEE, In- formation & Communication Technology (RTEICT- 2018), MAY 18th & 19th 2018