ADVANCED HOME SECURITY SYSTEM

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Abstract:

Security is the most fundamental aspect of our daily lives. Advancements in technologies such as IoT and cloud networks have assisted in making newer security systems more secure apart from becoming applicable and accessible for the common households. Our product is designed to detect intruders or any abnormal situations in our rooms. Any threats that are detected are immediately notified to the user using SMS or call. The user can also monitor the current parameters live from anywhere using the app. Smart devices that provide security in smart home systems have sensors, in our case- motion, piezo Sensor. The sensor readings are fed to the Arduino where all the data conversions and calculations are performed and sent via ESP32Cam Wifi module. This data sent by the Wifi module to the cloud can be accessed from anywhere. The system gives us notifications of intrusion or any other alerts to our phones regardless of our location using GSM module. Since the system is connected to the cloud it always provides real time information without any delay, increasing the efficiency of the system. Also, one of the key aspects of our project is the low cost of the equipment compared to other systems available in the market.

Keywords: - GSM, ESP32Cam, LCD.

1. Introduction

The primary aim is to develop feasible solution to transform a traditional doorbell into an intelligent bell which provides information of the stranger to home owner thereby enabling him to answer the door through smart phone with easy user interface. The design solution in IoT system is multidisciplinary and is scattered through various domain specific challenges. There are many researches that anticipate the failure of wireless network which is growing as the use of technology evolves. The main factors are network topology, failure of network measurement and cost minimization which decides the efficiency of the network and data delivery.

2. Objectives

- To design a Smart Home Security System Using ATMEGA And GSM that notifies an instant alert when there is any abnormality sensed by the sensors present in the security system.
- If there is an intruder detected by the piezo sensor in on door, the user is notified through SMS in their phones immediately.
- The system gives us notifications of intrusion or any other alerts to the user's phones regardless of the user's location.
- Another goal of our project was to provide a robust and efficient system for a minimal cost so that it is affordable by most households.

3. System Components

3.1 Key Components

- **Atmega 328**
- **GSM module**
- **ESP32 cam module**
- **Peizo sensors**
- **Power Supply**
- **Finger print sensor**
- **4x3 Keypad**
- **Condenser Microphone**
- **Speaker**

3.2 Block Diagram
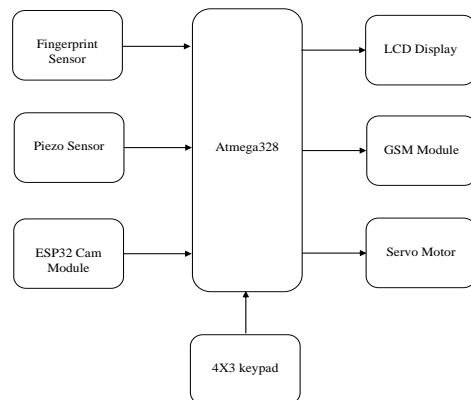
3. Working Principle

A low cost and efficient smart home system is presented in this design. This system has two main modules: the Hardware interface module and the Software communication module. At the heart of this system is the Atmga328 microcontroller which is also capable of functioning as the interface for all the hardware modules. All communication and controls in this system pass through the microcontroller. for the communication between the security system and the user, GSM module is used. It needs a normal Sim card with message service enabled. We have to set a Mobile number in the code on which we want to receive the alert messages. If any

kind of motion is detected by the system then the sensors sends a signal to the microcontroller and it sends an alert signal to the registered mobile number. The Fingerprint Reader Gives the user a unique identity to enter the house or use the lock to prevent any wardrobe. The Fingerprint reader senses the user registered finger for the registered ID number. If the ID matches with that of the registered ID, then it sends a signal to the microcontroller to open the relay with then opens the Servo Based Lock Door Lock which is connected to it. If the ID did not match then an alert message is being send to the registered mobile number. Same time photo of user or visitor is also captured and send to drive with date and time information for further information.

5. Applications

1. <u>Residential Security:</u> Protects private homes by monitoring and controlling access.

2. <u>Commercial Spaces:</u> Ensures safety for offices, shops, and warehouses with remote surveillance.

3. <u>Apartment Complexes:</u> Offers multi-user access management for shared living spaces.

4. <u>Smart Homes:</u> Integrates with other IoT devices for a fully automated and secure home.

5. <u>Emergency Notifications:</u> Alerts owners and authorities in case of break-ins or emergencies.

6. Advantages

1. <u>Enhanced Security:</u> Provides real-time monitoring, alerts, and remote control to protect homes from unauthorized access.
2. <u>User Convenience:</u> Allows remote operation of locks, alarms, and notifications via a smartphone.
3. <u>Smart Automation:</u> Integrates multiple features like fingerprint authentication, video monitoring, and tamper detection for a seamless experience.
4. <u>Cost-Efficient:</u> Reduces the need for traditional security personnel or standalone systems.

8. Future Scope

- Our system is pretty solid for its cost but there is always scope for betterment in the security world. Monitored alarm systems can be integrated with the very latest hi-tech lighting and automation facilities in order to provide even greater levels of security.
- Video monitoring could be the next big thing in security systems where the artificial intelligence is capable of recognizing you to disarm the security system and of course peek the visitor via mobile.
- Our system can be upgraded to also add intelligent home bells where you can communicate with the person outside your door when you are not available too.

9. Conclusion

- A home security system has been built successfully using fast growing technology of IoT. We have analyzed the market for use case of our product and various other options of design.
- We finalized our design and built the device. We have concluded the results for the same.

It is a reliable system which has 3 different sensors and real time monitoring. The devices can be set in various rooms. Due to real time monitoring, the damage which will be inflicted due to human negligence, fraud or natural causes can be prevented entirely or reduced considerably.

- There is scope for this product which offers various useful features and can be updated to implement potentially newer features if we wish to do so.

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