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Implementation of 802.11 Protocol in Home and Industrial Security Using Embedded System

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ABSTRACT

We are living in an hi-tech era where crime is increasing day by day. Due to increase in numbers of threats and intrusions in society, everyone needs a Hi-Tech security system which can keep their belongings secure and at the same time we also want to protect our home assets from any kind of hazard. Knowing our home is protected provides peace of mind when we are away. The wireless communication is increasing day by day. This has motivated us to use mobile phones to remotely control household appliances and to receive a feedback SMS about the security and safety of the house. Security and safety has always become a basic necessity for urban population. The customers require simple, reliable and high performance core system that can be easily implemented. The major concern of this project is to design a budget home security system based on wireless sensor network using Wi-Fi and Cloud technologies. It can detect the theft, fire, door break detector and sends an auto-generated email remotely to intimate the owner.

Keywords : Home Security, ESP8266 Module, PIR Sensor, Magnetic Door Sensor, Fire Sensor

I. INTRODUCTION

1.1 Background

Today's world is digitized starting from our handheld devices to computers to smart appliances. Thus a smart home would be the next step for a better future. The system efficiently controls lights & appliances, thus minimizing the power consumption. A smart home is a network of various sensors and controllers integrated together to provide the user with remote control of various devices within their home using IoT. Internet of Things is the latest and emerging technology, which enable physical objects used in day to day life to connect to the internet and exchange data. IOT mainly has the following three characteristics: compressive perception, which means that entity's information can be obtained at anytime and anywhere; reliable transmission, which means that entities sensor information is required to pass out accurately in real time; intelligent processing, which means that the mass of information can be analyzed & processed efficiently, then the entity's intelligent control is realized.

An efficient, low power consumption & low cost embedded access control system for smart home security based on motion detection is very important for wide range of commercial and security application. Many countries are gradually adopting smart home security control system. Today's most of the homes/ Bank/Office & industries appliances that we interact with contain microprocessors. The most important part any home security system is accurately detecting visitors who enter and leave through the door.

1.2 Necessity

The system run with pre-programmed controller to alert user to secure our home and industry without any human interaction.

1.3 Objectives

Our main objective is to make a budget smart home and industry alert system which can provide security from almost every perspective.

The main objectives of this project are:

- ✓ Hi-Tech security system.
- ✓ Easily implemented.
- ✓ Simple, reliable and high performance system.
- ✓ For alerting user system send message in form of e-mail, simple text SMS and android app message.

II. LITERATURE SURVEY

- **Pooja Dahiya et al in their paper entitled "IoT based Home Alert System using Wi-Fi and Cloud Technologies"[1]** have discussed the review of available security systems assembled with microcontrollers. They have considered microcontroller because it is affordable to the general public. It is also reliable in order to operate without any failure. A majority of homeowners simply do not have sufficient funds to pay for a professionally installed security system. The use of this Home Alert System in their paper is affordable and easy to install.
- **Safa.H et al in their paper entitled "IOT based theft preemption and security system"[2]** theyhave discussed The Internet of Things (IoT) is the physical network of things or objects—devices, buildings, vehicles, and other items—embedded with electronics, software, sensors, and network connectivity that enables these things or objects to collect and exchange data. An anti-theft system is any device or method used to prevent or deter the unauthorized appropriation of items considered valuable. In their project proposes the security system using IOT, which prevents theft in home, bank etc.
- **M.Sangeetha et al in their paper entitled "smart home control system by internet of things based on wifi module"[3]** Theyhave discussed Homes of the 21st century will become more and more self-controlled and automated due to the comfort it provides, especially when employed in a private home and security currently become a very important issue in public or private institutions in which various security systems have been proposed and developed for some crucial processes. Security systems are vital for protection of information, property, and prevention from theft or crime in home.
- **Vinod Choudhary et al in their paper entitled "Design and implementation of Wi-Fi based smart home system"[4]** have discussed the Starting from our handheld devices to computers to smart appliances, our world is digitized. Thus a smart home would be the next step for a better future. The system efficiently controls the lights and appliances, thus minimizing power consumption. The system makes use of the internet to control the house appliances and the lights.
- **Swati Tiwari et al in their paper entitled "A review paper on home automation system based on internet of things technology"[5]** have discussed there has been a growing interest among consumers in the smart home concept. Home automation system represent sand reports the status of the connected devices in an intuitive, user-friendly interface allowing the user to interact and control various devices with the touch of a few buttons.

III. SYSTEM DESIGN

3.1 Block Diagram

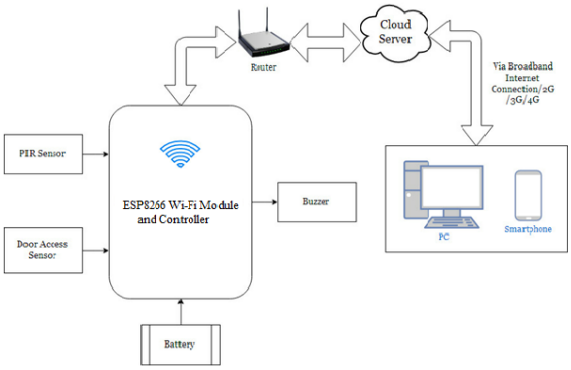

Figure 1. Block Diagram of System

The block diagram includes a PIR module which is constantly monitoring the Home or Work space to be monitored .When the PIR module detects a intruder it sends a signal to the a cloud server and also activates the alarm. Also the system incorporates a door access sensor which detects whether the door is open or closed. It will help to detect unauthorized access if any when no one is present in our home/bank/office/store. If the door opens the system sends a signal to the cloud server and also activates the alarm. The cloud server when receives a signal of intrusion it sends the data to the android app and an email notification is also sent.

The ESP8266 is the brain of the system. It is the Wi-Fi module to control the security system from the user's mobile phone with a potential internet connection. It is the Wi-Fi based microcontroller with low power operation.

The battery is used in hole system powered to make it portable and be able to be place or attached any ware required.

IV. PERFORMANCE ANALYSIS

4.1 System Implementation

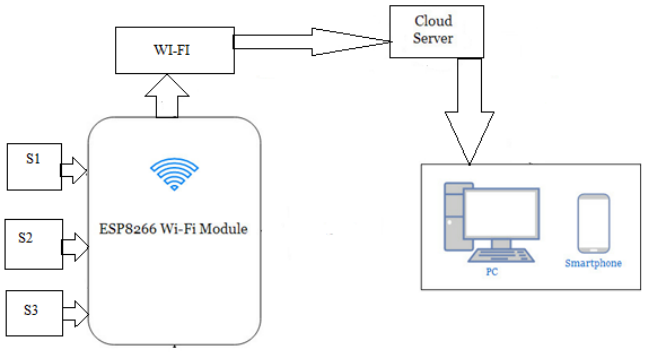

Figure 2. Working Diagram

A Wi-Fi based Home security system which alerts it's owner occurrence of any unauthorized activity in his/her absence. The project includes a PIR module which is constantly monitoring the Home or Work space to be monitored .When the PIR module detects a intruder motion and it sends a signal to the a cloud server and also activates the buzzer. Also the system incorporates a door access sensor which detects whether the door is open or closed. If the door opens the system sends a signal to the cloud server and also activates the buzzer. The cloud server when receives a signal of intrusion it sends the data to the android app and an email notification is also sent. The system uses ESP8266 Wi-Fi module to control the security system from the user's mobile phone with a potential internet connection

4.2 circuit diagram

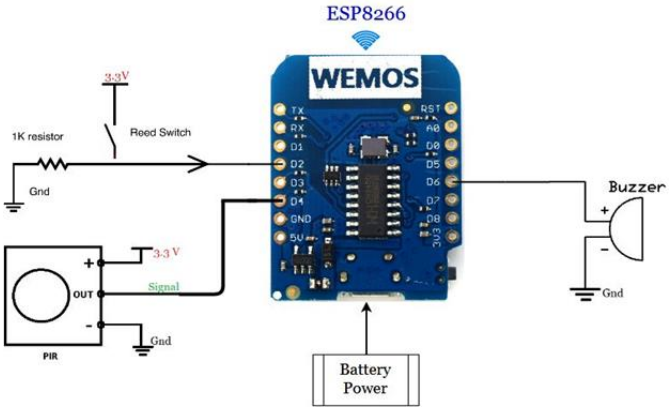

Figure 3. Circuit Diagram

V. CONCLUSION

In our project on Implementation of 802.11 protocol in home and industrial security using embedded system which is very useful and also very economical. It provides simple and easy way to control the household appliances with a single SMS or by using an android application. The main advantage here is that even though the controlling can be done by the android application which has safety features but in absence of an android mobile phone one can control it by sending a normal SMS to the GSM modem. Also the safety and security system can be easily installed in the house and used. It informs the owner in case of fire, gas leakage and theft even when the owner is not in the house.

VI. FUTURES SCOPE

We can further extend this project by adding some more features which can make it more efficient and security oriented. The camcorder can also be used to track all the activities of the unknown person or intruders. An emergency Alert can also be made to police and fire brigade as well. The complexity of the algorithm of the system can be increased by introducing number of sensors to make the system more efficient. We can use voice command to convey the message more clearly about the unforeseen happenings inside house. Door locking system can be implemented at door which can be locked/unlocked using face detection and finger prints. This system can have the facility to predict the natural hazards and alert the people about it.

VII. APPLICATIONS

- ✓ The system is basically designed to protect homes from any kind of threats.
- ✓ But it can also be deployed in college premises to increase the safety.
- ✓ It can also be used in Hospitals and Industries to detect the temperature and smoke level.

VIII. ADVANTAGES

- ✓ Remote indication: with the wireless technology owner of the house or industry gate remote indication through e-mail, SMS, android app messages. So even if the user is away from home or industry, he/she will be intimated about the hazardous or undesirable conditions /situations inside the house.
- ✓ This system is fully automated. So once the system is installed inside home or industry, then it does not require any human interaction to operate.
- ✓ With the use of this system we can save the life of person inside home/industry. Since the accidents caused due to fire and LPG gas leakage can cause life threat.
- ✓ Also the property inside house and various materials inside the house industry are saved from the theft and from fire detection.
- ✓ This system is cost effective also it is fast and efficient.

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