Research Article

IOT Based Home Security System Using Microcontroller

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In this fast moving world Safety is considered as the most important aspect of day today life. Due to this pandemic situation of Covid-19, the increase of unemployment rate and the increase of price for the products that we are using in our day to day life has led the opportunity to increase of crime rate. In this situation it is our responsibility to protect our belongings and to be cautious about the theft in homes. However, if we choose to fix the CCTV camera it is too expensive to bye and fix and moreover it requires a lots of space and memory for continuous recording. In this condition, it is difficult to appoint a person for maintaining the things or fixing a high effective and high quality security systems. In that aspect, we are looking for the low cost and high effective security systems.so it can be affordable even for the middle and low class peoples who are living in the cities and rural areas. This project main motive is to make a well secured environment not only for rich peoples and also the peoples in rural area and middle class peoples without spending any high cost. The System which we've been used will display live streaming video that will be monitored by the smartphone from any part of the world using IOT module. It is also designed with buzzer which alert the neighbor about the threat to do the precautions. We also developed an app from which we can see the live video and we can monitor house.

Keywords: Micro-controller, Security System, IOT, Piezoelectric Transducer.

1. Introduction

The Internet of Things (IOT) is a network of physical devices, vehicles, buildings, and other objects.electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. In 2013, the Internet of Things Global Standards Initiative (IOTGSI) defined IOT as the "infrastructure of the information society". Smart devices / systems based on the Internet of Things (IOT) platform have entered a golden age of fast-growing technology in the field of home security.

Now-a-days, Security has become the most challenging task. So, it ensures that the safety and security has become more essential. The major intention of this project is to make a smart monitoring device which monitors the area in which it is implemented. The system consist of web camera that will control the doors using a camera module used by a small controller. Whenever anyone stood in front of the door the camera would detect and send a photo to the cell phone. This process is very helpful for the owner to look forward the problem in any part of the world. Our main objective is to build high quality security for middle class peoples.

2. Existing Work

The existing system for anti theft flooring system using raspberry pi Using IOT are a system that will control the doors using the camera module used by the raspberry pi. The plan mainly consists of a webcam for detecting guests, a Raspberry Pi Model 3 with a built-in WiFi module, as well as a portable device to connect to

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the system. Whenever a person stood in front of a door the camera would detect and send the image to the cell phone. Users can control the door with their smartphone. Details of the devices that can control the system are specified by the mobile device.

When a person is detected, the webcam receives a signal and takes a picture of the person sends it to the user's mobile device with raspberry pi using the device with raspberry pi using Io (Internet of Things). This proposed activity consists of sending permission by proving authenticity to someone in the house in front of the door to open the door with the app. This project requires two internet connections, one at raspberry side and one on the user side. Defined Door locks and IoT use are the most secure solution for locking and unlocking a door within a Wi-Fi range.

3. Proposed System

Whenever the piezoelectric sensor senses a disturbance or vibrations in either front or back of the door it send it to the ATMEGA328p Micro-controller to validate, once it is validated it will generate an alert message immediately and send it to the user via the IOT and there is a certain limit value if the vibration or the pressure exceeds the limit value only then the alert is generated and the camera which shows the live video of the front it can be seen through the app and also the exceeding limit value can seen in the app. once the system is turned on it start showing the live video and when the limit value increases it is intimated through the node MCU. The node MCU is connected to the internet so it can send the thread through internet and which the user can be seen through the app from any part of the world. Once the input signal is generated.
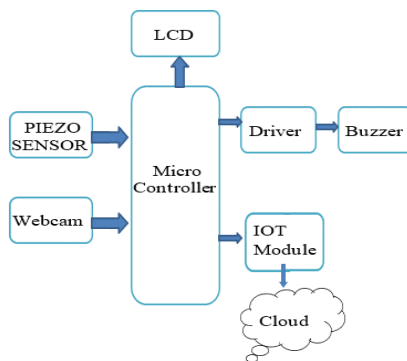
Fig.1. Block diagram

Figure 1. represents the block diagram. There is buzzer in this which makes sound when the system is crashed or fried or damaged to alert the neighbors that someone breached the house. And moreover, the total cost of this whole setup will be low and it could be affordable even for the low and middle class people who are living in the rural and city side Therefore it is more efficient.

4. Hardware Description

4.1. Micro-controller

The smallest controller used in our project is ATMEGA328P. ATmega48PA / 88PA / 168PA / 328P has a low power CMOS 8-bit micro-controller based on RISC enhanced AVR architecture. The ATmega48PA / 88PA / 168PA / 328P brings close to 1 MIPS per MHz through powerful directions per single clock cycle, allowing system designers to increase power consumption and processing speed increases.

The AVR context combines 32 general purpose work registers and a large set of guidelines. The Arithmetic Logic Unit receives all 32 registers directly (ALU). Two independent registers can be accessed with a single command that operates in a single clock cycle. The new structure improves code efficiency while providing ten times the performance of a standard CISC standard controller.


Fig.2. Micro-controller

4.2. Piezoelectric transducer

A vibration sensor is a tool which senses vibration and converts it into an analog electric powered sign whose importance relies upon the vibration applied. Vibration transducers are also called that because they convert vibration into an electrical signal. A vibration is the use of perpendicular to the disk causes a charge of charge and voltage at the electrodes. The applied pressure determines the output voltage. This output electrical signal can be calibrated with respect to vibration applied on the disk.

Features

- Minimum Impedance: 1 MΩ
- Preferred Disruption: 10 MΩ and above
- Power output: 10 mV to 100V depending on Force and circuit impedance
- Storage temperature: 40 ° C to + 70 ° C [40 ° F to 160 ° F]
- Operating temperature: 0 ° C to + 70 ° C [32 ° F to 160 ° F]
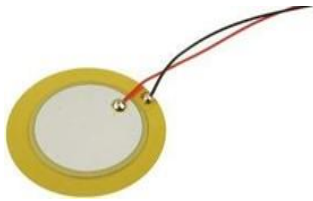
Fig.3. Piezoelectric transducer

4.3. LCD

The LCD screen (liquid crystal display) is an electronic display module and can be used in many different applications. The 16x2 LCD display is a very simple module and is widely used in various devices and circuits. These modules are more advanced than 7-segment and other LEDs with multiple categories. The reasons are as follows:

- LCD saving
- Easy to plan
- There are no restrictions on the display of special characters.

Fig.4. Piezoelectric transducer

Features

A 16x2 LCD can display 16 characters in each row, which means there are two such lines. In this LCD, each character is displayed on a matrix of 5x7 pixels. Command LCD commands are kept in the command register to perform jobs like:

- Getting started
- Clear its screen,
- To set the location of the cursor,
- Display control

4.4. Node MCU

The ESP8266EX offers a highly integrated WiFi SoC solution to meet the industry's ongoing demand for power-efficient, compact design and reliable performance. With complete and independent Wi-Fi communication capabilities, it can act as a standalone application or MCU host. When ESP8266EX hosts the application, it will start immediately from the external flash.

The integrated high-speed repository helps improve system performance and improves system memory. ESP8266EX can be used on any microcontroller design as a WiFi adapter with SPI / SDIO or I2C / UART interface.

Fig.5. Node MCU

4.5. Buzzer

Buzzer or buzzer is a mechanical and audible signaling device electron mechanical or piezoelectric. Common use of the buzzer and the beep sound and provides an audible indication to the user. When the power is turned on, the machine power is supplied to the power supply is cut off, the cycle will continue until the power is turned off. Vibration frequency is strictly dependent on the mechanical inertia.


Fig.6. Buzzer

5. Power supply

Power supply circuit made up of filters, filters, and power controls. Starting with ac voltage, a constant dc voltage is obtained by adjusting the ac voltage, then filtered to a level of dc, and finally, managing to obtain

the desired dc voltage. The rules are usually taken from the IC voltage control unit that detects the DC voltage and provides a slightly lower DC power supply that remains the same as a DC power switch or outgoing load connected to a DC voltage change will be made.

6. Circuit Diagram
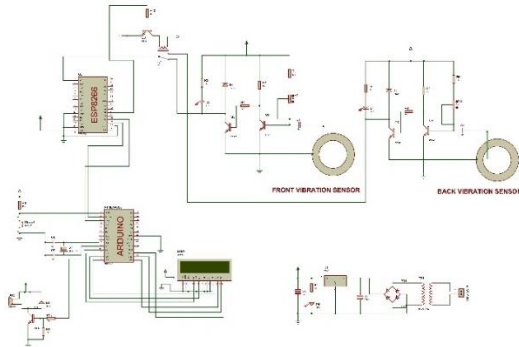
Fig.7. Circuit Diagram

Fig.8. Circuit Connection

7. Conclusion

From this project we came to conclude that we can make the future home more secured with a less cost and more efficient security systems. The circuit which we've designed is reliable and simple. It not only reduces wastage of time but also safeguard our assets. The entire system made of a group coordination which make our model a safe one and more unique and simpler. For future work, we would attempt to expand producing a greater number of systems and various updations of the app which we've used under a safe and secured solitary server making an entire city mechanization utilizing IOT. This also makes the people gaining some knowledge about how we can use the IOT technology in other useful ways and helps our country to improve in Technology.

REFERENCE

[1] Dr.M.Suresh, A.Amulya,M.Hari Chandana,P. Amani,T.Lakshmi Prasanna (2021)"Anti-Theft Flooring System Using Raspberry PI Using IOT"International Journal of Research In Engineering And Science(IJRES).

[2] Sonali Das, Dr. Neelanarayan. V(2020) "IoT Based Anti Theft Flooring System" International Journal of Research in Engineering and Science(IJRES).

[3] Sanjana kute, Ruthvik pimpalkar,Vaibhav more, M.r. Gorbal (2021) "Theft Detection System" Iconic Research and Engineering Journals (IRE).

[4] S. Snigdha, K. Haribabu (2019) "IoT based Security System using Raspberry PI and Mail Server" International Journal of Research in Engineering And Science(IJRES).

[5] Divya K,Puneeth S ,Vijeth A Belle ,Jayaraghavan ,Dr. Saravana Balaji B(2018) "Home security using Piezoelectric sensor" International Journal of Research in Engineering and Science (IJRES).

[6] PoojaSri, N. Gayathri , K. Heshma,G. Raja Sekhar(2020) "Iot Based Anti-Theft Detection And Alerting System Using Raspberry Pi "International Research Journal of Engineering and Technology (IRJET).

[7] P.Amit Teja, A.Anne Frank Joe,V .Kalist (2021) "Home Security System using Raspberry PI using IOT" Institute of Electrical and Electronics Engineers(IEEE).

[8] Deepak Kumbhar ,Shubhangi Taur, Harish C Chaudhari, Shubhangi S Bhatambrekar (2018) "IoT Based Home Security System Using Raspberry Pi-3"International Journal of Research and Analytical Reviews (IJRAR).

[9] Nagalakshmi Venugopal, Chalamalasetty Edward Pradeep Kumar , Goutham PrashanthV G,Manoharan E, Kesavamurthy K(2021) "IoT based Security System using Raspberry Pi" International Journal of Engineering Research & Technology (IJERT).