International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 09 Issue: 06 | June 2022 www.irjet.net p-ISSN: 2395-0072

Home security based on Internet of things Review paper

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1. Abstract

In these modern days, technology has brought major changes in people day-to-day lives in their various environment whether at work or home. In houses several gadgets are being deployed and those set of gadgets connect to make a network known as Internet of Things (IoT). IoT is the promising and emerging internet technology and has bigger impact in human life as well as in different field like educational field. It provides in information accurately and also performance tasks based on giving instructions which allows us to be focus on other things. In this present paper, we are proposing a smart home security system implementation based on IoT for controlling gate access based on facial recognition. The implementation of the IoT system consists of both hardware and software interfaces. In term of hardware, we use an Arduino Uno microcontroller board on which we integrated the required component such the ESP8266 Wi-Fi module, buzzer and sensor for controlling home the security appliances. On the other hand, a software application is provided to the users on their smartphones to control the whole system. The machine will acknowledge the owner of premises through notification of any unauthorized access or request to access the premises and also each time the door is opened. The major benefits of this system are to control any entry to the premises as well as to notify for any intrusion for quick action to be taken.

***Keywords*--- Internet of Thing (IoT), Arduino Uno micro-controller, ESP8266 Wi-Fi module, buzzer, sensor.**

2. Introduction

In this new generation where technology is unavoidable, the net of factors (IoT) facilitates lots in connecting numerous gadgets. IoT may be described as a worldwide infrastructure that permits superior offerings with the aid of using interconnecting[1]. IoT is the interconnection among gadgets through net, and it permits the ones gadgets to ship and acquire data. IoT turn out to be important hobby as consequences of generation improvement and industry. With the technological improvement, the call for clever matters is extensively improved in daily-life. The IoT is one of the important additives that offer a facility to engage with IoT-enabled gadgets.

The software of IoT has been broadly carried out in each area together with safety systems, industry, agriculture, E-commerce, and medicine. Internet of factors also can be used as a controlling, and tracking domestic[2]. Home safety is a totally essential characteristic of domestic automation and perhaps the maximum critical one, the safety stage withinside the domestic turns into extra essential and stronger gadget always, domestic safety gadget is now paramount due to the fact own circle of relatives and domestic belongings wishes a steady vicinity and safe. Houses and its environment need to be absolutely blanketed from malicious disturbances

An essential component to bear in mind whilst we speak approximately domestic automation is Security. Home protection is a completely essential function of domestic automation and perhaps the maximum vital one. Home protection has undergone drastic changes in recent years and has continued to grow by the tons of extra withinside the coming years[3]. Previously domestic protection structures intended having an alarm that might burst off whilst anyone might damage in however a clever steady domestic can do tons extra than that.

Therefore, the principal goal of our paper, is to layout a gadget that could alert the proprietor and others of an outsider damage-in with the aid of using sending a notification to their clever phones. The proprietor may even have the capacity to prevent or begin the alarm remotely the use of simply his clever phone. This gadget will assist the customers to protect their houses with the aid of using putting the gadget at the doorways or home windows and tracking the pastime through their clever phones.

3. Related Work

IoT has brought major changes in home security with automation and also centralized management of equipment. So, many researchers have proposed various IoT based home security systems with different IoT components which have shown great improvement in home security. In this section of our work, we present the various proposed IoT based home security systems have been proposed by authors.

In the paper from the Lalit Mohan Satapathy et al authors in [4] they have got proposed a low-price bendy and dependable domestic automation device with extra safety the usage of Arduino microcontroller, with IP connectivity thru nearby Wi- Fi for gaining access to and controlling gadgets via way of means of legal person remotely the usage of Smart telecall smartphone utility. Lalit Mohan et al created an impartial server and using IoT as a way to manipulate human desire. On the identical perspectives Sadi Mahmud et al in [5] additionally speak approximately the identical low price of domestic automation device via way of means of developing an internet in which each equipment may be manipulate then he interfaces an internet site in a totally easy manner in which all people can get admission to it. They used an aspect including Arduino, Wi-Fi module and a internet site which offers the possibility to govern home equipment.

Another domestic automation device has been proposed via way of means of Urvi Singh et al in [6] which they supplied a device in which the admin himself offers permission to the entire device for different person to have the ability controlling domestic home equipment, an app changed into additionally created for controlling more than one user. They used an Arduino microcontroller and the ESP8266 Wi-Fi module for controlling the house home equipment in addition to the house safety. In [7] Sudha Kousalya et al use the Wi-Fi as conversation protocol for controlling the house safety, then the applied it via way of means of the usage of an exclusive sort of wi-fi conversation like ZigBee, Wi-Fi, Bluetooth, GSM.

According to Mohammad Asadul Hoque et al in [8] lays out a structure for a price-powerful clever door sensor a good way to tell a person thru an Android utility, of door open occasions in a residence or workplace environment. The used an aspect including Arduino-well matched Elegoo Mega 2560 microcontroller board together with the Raspberry Pi 2 board for speaking with an internet server that implements a RESTful API. So many programing languages has been used for the higher functioning of the project. Sari Setyaning Tyas in [9] use an SMS for developing a gateway to enhance the generation and the house safety primarily based totally on a microcontroller. The created device can also be ready with a taking photograph equipment for a higher notification.

In this gift paper from Andi Ainun Najib et al in [10] applied the safety device with RFID manipulate the usage of E-KTP and IoT the usage of NodeMCU V3 ESP8266 as a microcontroller, RFID sensor, PIR sensor, solenoid, led, buzzer, relay. Then an android app changed into supplied for controlling the house safety and its home equipment, and that they designed a clever door lock the usage of RFID sensor, passive infrared sensor (PIR), solenoid as door locks, buzzer, led, E-KTP as RFID tags and additionally android utility to controlling and tracking made with android studio is hooked up to NodeMCU V3 ESP8266 as garage information and connect to firebase Realtime database as opposed to traditional keys. Abdulrahman Ihsan Abdulla et al in [11] they mentioned approximately the privateness and domestic safety to be covered from terrible people, terrible occasion or movement show up despite if the proprietor interior or out of doors domestic.

According to Tanaya et al in [12] they recommend a safety device together with the face detection device as a method and feature designed and evolved a wi-fi Home Security System thru Internet of Things module and Raspberry Pi model 3. It is a lively device in an effort to display whether or not the man or woman is allowed for domestic or unauthorized. Md. Sadad Mahamud et al [13] a goal changed into to make human existence smooth via way of means of the usage of IoT. They use a device in which the person can extrude a load of variety consistent with the requirement primarily based totally the web, and, the device changed into managed via way of means of the ESP32 Wi-Fi module. In [14] M. Al-Kuwari et al have proposed a device at the clever domestic automation the usage of IoT primarily based totally Sensing and Monitoring Platform in which they supplied a fundamental idea of the way a domestic automation may be carried out the usage of IoT

Comparison of the related work table

As we have seen in the above section, there are many systems proposed for home security system using IoT and below is the comparison table of the different IoT based home security systems. This table allow us to get a clear view of the different IoT components implemented in those proposed work.

Author	Proposed Model	Platform	Purpose\ Application
Lalit Mohan Satapathy et al	Arduino UNO microcontroller and esp8266-01	android application known as "ESP8266 Wifi control	The proposed machine is server unbiased and makes use of Internet of factors to manipulate human favored home equipment beginning from business gadget to patron goods.
Sadi Mahmud et al	Arduino, home automation, internet of things (IoT), metering system	Web based application	Domestic automation device that is designed the usage of IoT. With the assist of this device, all the house home equipment and digital machines may be managed and determined thru a internet site very easily.
Urvi Singh et al	Smart Home Automation (SHA), Internet of Things (IoT), ESP8266 Wi-Fi Technology, Arduino, Sensors	Smart phones, tablets, and laptops	Controlling domestic gadgets without difficulty with a couple of customers and one of the first-rate strategies for a strength control system
Sudha Kousalya et al	Arduino UNO, Node MCU Relays for connecting home appliances, Air purity Sensor (MQ135) Humidity and Temperature (DHT11) IR Sensor Camera module (OV7670)	Smart phone	Ambitions at controlling domestic home equipment and constructing a clever wi-fi domestic safety machine the usage of Wi-Fi as communique protocol.
Sari Setyaning Tyas	Home Security System, Wemos D1, Microcontroller, IOT, Arduino	Web based application	To enhance technology, a domestic protection machine primarily based totally on a microcontroller and IoT has been created.
Abdulrahman Ihsan Abdulla et al	IoT, Smart Home, Home Automation System, Smart Home Security.	platforms, applications	Discussed approximately the privateness and safety of domestic to shield from any terrible occasion such theft, hearthplace or any movement show up no matter if the proprietor inner or out of doors domestic.
Md. Sadad Mahamud et al	Home Automation, IoT, ESP32 Module, Relay Module, Cloud Server	Web based	To make human existence clean and snug through the usage of IoT

Table 1 Comparison table of Precious proposed IoT home automation system

4. Technique Involved

The home security system based on internet of things was has been brought out by using a simple symbolic way, the research based on home security system was constructed because of several ways based on some people experiences and then they are inspiration for making a secured home system.

Being able to sketch the propose system some use of hardware and way of installing the components was first tested.

Based on my research, the use of some components that are going to helpful in a secure home and its appliances. A device named Arduino Uno is going to be the motherboard by connecting the rest of the components on it such as ESP8266 Wi-Fi module, reed sensor, buzzer, breadboard and the jump wire for a better functioning system. Another security system will be use which is the CCTV camera that are going to recognizing faces already added in the data base for it to be able for the oping of the door without alerting or making a sound of the alarm. Here is the figure for an explanation.

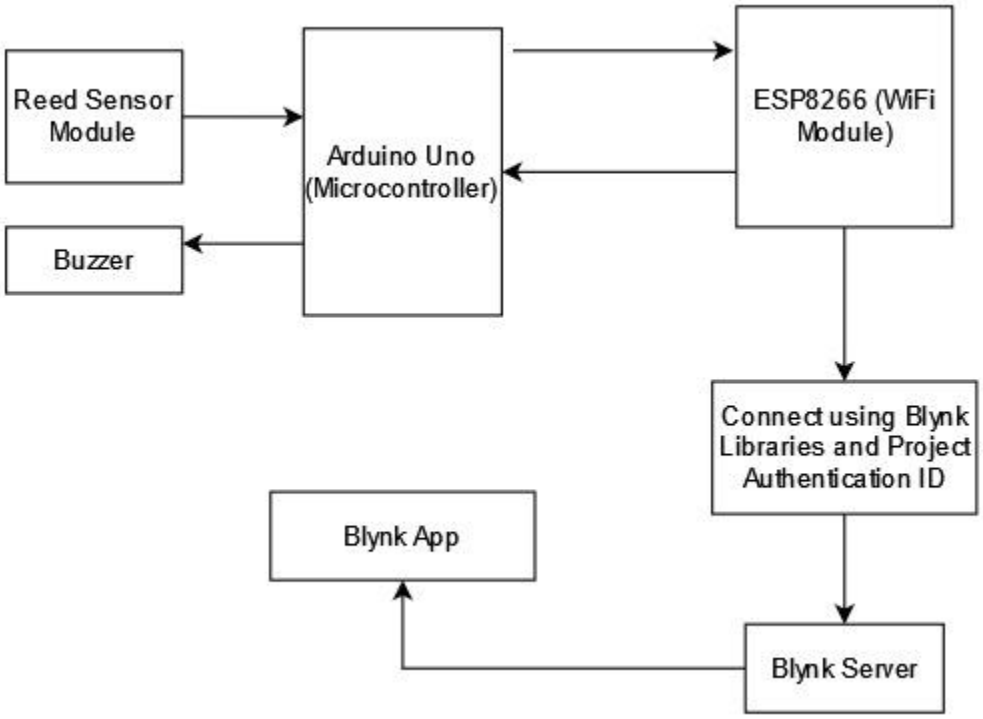

Figure1: Diagram of the working model proposed

The system works when the passive infrared sensor is active which detect movements then will automatically send a message to the camera for a facial check then open the door for the user or anyone already added in the data base, but, if you are not in that data a notification will be send to owner to alert him for a better precaution or you try to open the door an alarm will automatically take place for an alert.

5. Motivation

Many factors contribute to the development of smart home systems, but convenience, security, energy management, and connectivity are the most important, and opulence. Intelligent household systems is one of the more recent disciplines of study even though our society has almost fully assimilated them, but some are still remaining. This is due to the fact that providing a

smart home that functions necessitate a variety of studies and engineering areas. The cost of installing a smart home is also a significant barrier to the marketing of smart home systems.

The simplicity is indeed the motivating factor behind smart home solutions which is very convenient in another way of saving time in this word where everything is really moving faster. Most of the smart things we use today is based on convenience like smart phones that get us closer to people or computer that help us to achieve our work or get them done. So, a little convenience as it has been done by some will definitely be adorable because it allows all the user to save time and be secured even if they are not in the house.

Another factor that influenced my decision to buy this gadget is its connectivity. The concept of connectedness is that connecting things results in communication or information transfer. Information about the household is simply obtained by linking everything in the house so that everything can talk to each other. There are numerous advantages to expanding the amount of data available. One of the primary advantages is that data extraction is considerably easier when everything is combined into a single network. For example, interconnectivity will provide data extraction capabilities such as the amount of electricity consumed by specific appliances or components. Another factor is going to be the luxury factor in the home security system without forgetting that not everyone can really afford them and only those that can afford it will definitely benefit from a secure home system based on IoT.

6. Conclusion

In this paper we are showing how IoT has an impact in our daily life, we are going to design a secure home for an authorized and unauthorized entry by acknowledging the user who has entered the house or forced the door to be open, without forgetting that it's a simple software with a clear interface. It is simple to set up and may be utilized anywhere that is connected to the internet of things. It may be easily installed at any place and controlled using the Blynk app.

This is going to be developed as a remotely control because it will use a Wi-Fi for transmitting data through the Blynk application to alert the user.

7. Future work

The domestic safety device has an extended manner to go. As the technology enhancing each second, with time we can also additionally have many methods for domestic safety with greater mild protocol and much less postpone withinside the output. With upcoming technology there might be correct enhancement withinside the laptop board in addition to the communique protocols, so that you can make it less complicated in addition to greater mild and secure.

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