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Thief Detection and Prevention: Home security using IoT (Internet of Things)

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Abstract: ***Nowadays the crime has raged to a new height and providing security frames is the most important part of life. When it comes to word security first thing that comes in the mind is house. Providing security to the house gets much easier with IOT sensors. This project's aim is to provide security to house without any human interference. This system also focuses on not only detection of some unauthorized access, but also prevents the house from unauthorized access using sensors. In the past technology the system just used to detect the unauthorized access in the house or bank etc., but in this system it also prevents the house from thieves.***

Keywords: Internet of things (IOT), Arduino, Sensors, Security, Node MCU, Relay Module

I. INTRODUCTION

The Internet of Things is the physical network of things or devices, objects, buildings and other items embedded with electronics, software, sensors, and network connectivity that enables these things or objects to collect and exchange data. A security system is any device or method used to prevent or detect the unauthorized access inside the premises. This project proposes the security system using IOT which prevents theft at home, bank etc. the aim of the project is to design and implement a security system. A system that offers control ability through a hand held mobile phone by means of IOT. The commands from a mobile phone are used to switch ON and OFF the alerting system as well as the room locks. When there is a modern home with minimum human efforts it is said as modern house. Wireless and digital technologies all together, it produces an automated intelligent security system to the house. Speed data transmission takes place while using the Wi-Fi to security systems which helps the user to control and monitor the system. The main component of this system is esp8266 node MCU.

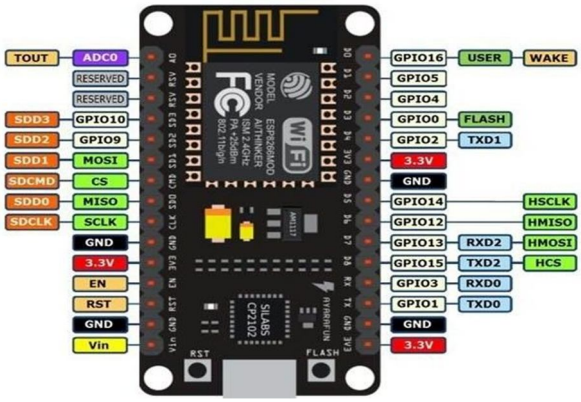

Fig. 1 Node MCU ESP8266 Pinout

Power – 3.3v, GND, Vin Control pins – RST Analog pin – A0, GPIO pins – GPIO1-16, Flash Memory: 4 MB SRAM: 64KB, Clock Speed: 80MHz, USB-TTL based on CP2102 is included on board, Enabling Plug nPlay, PCB Antenna Small Sized module to fit smartly inside your IOT projects. The Node MCU ESP8266 development board comes with the ESP-12E module containing ESP8266 chip. Node MCU has 128 KB RAM and 4MB of Flash memory to store data and programs. Its high processing power with inbuilt Wi-Fi / Bluetooth and Deep Sleep Operating features make it ideal for IOT projects.

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II. RESEARCH REVIEW

From the feature based Haar cascade face detection classifier algorithm is used for detecting faces,edges and lines. From made use of BOT NET to function the controlled IoT devices. Install negative Bayes machine learning package for activity recognition purpose. From Piezoelectric RF Resonance voltage is used as amplifier for the IoT devices for reducing power consumption. In propose a smart home system to monitor the surrounding parameters such as temperatures smoke and intensity. In propose the low power PIR detectors take advantage of pyro electricity to detect a human body that is a constant source of Passive Infrared. The system senses the signal generated by PIR sensor detecting the presence of individuals not at thermal equilibrium with the surrounding environment . Detecting the presence of any unauthorized person in any specific time interval, it triggers an alarm and sets up a call to a predefined number through a GSM modem. According to the change in infrared radiation there will be a change in the voltages generated which was amplified and used to turn ON the camera and lighting system through a relay. The camera placed on a stepper motor rotates to the direction of the intruder and starts to record and save the video. Once the intruder moves out of detection range of the sensor the camera and light gets turn OFF. In The System has implemented a fingerprint based authentication system to unlock a door. This system helps users by only allowing the users whose fingerprint are authorized by the owner of the house. This system can also be used to monitor who all have used the sensor to gained entry into the house. The system is coupled with a few more home protection features such as gas leakage and fire accidents. Although a good system, fingerprint sensors are expensive and complex (as they need increased sensor resolution) to integrate into an IoT setup. Some experts also argue that only relying on a fingerprint sensor is not wise as it is relatively easy to lift someone's fingerprints and replicate them, which is why it is always advised to use fingerprint scanners in a two factor authentication systems where an additional layer of security is available in the form of PIN, pass-code, voice recognition, etc.

III.HARDWARE REQUIREMENTS

1) *ESP8266Node MCU:* The Node MCU ESP8266 development board comes with the ESP-12E module containing ESP8266 chip. Node MCU has 128 KB RAM and 4MB of Flash memory to store data and programs. Its high processing power with inbuilt Wi-Fi/ Bluetooth and Deep Sleep Operating features make it ideal for IOT projects.

Fig. 2 Node MCU controller board

2) *PIR Sensor:* A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR - based motion detectors. PIR sensors are commonly used in security alarms and automatic lighting applications.

Fig. 3 PIR Motion sensor

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3) *Relay Module:* A relay is an electrically operated switch that can be turned on or off, letting the current go through or not, and can be controlled with low voltages like the 5V provided by the Arduino pins.

Fig. 4 Channel 5V Relay module

4) *Solenoid Lock:* The solenoid lock denotes a latch for electrical locking and unlocking. It is available in unlocking in the power-on mode type, and locking and keeping in the power-on mode type, which can be used selectively for situations.

Fig. 5 Lock style Solenoid 12VDC

IV. CONFIGURATION OF BLYNK APP

After the user installs the Blynk app on the smartphone, an account has to be created in the app to access its services. The first time the app is opened it will ask to either sign in or create an account. Create an account and add a new project to get started as given in each project has its own authentication code which is used by the code to communicate with that particular mode. To interface with our components we need to add widgets to our model. To add widgets press „+" to add to the model. The app provides a neat interface to add all the required widgets and setting them up according to the code. The Blynk needs to be running in the background for the user to get real time notifications.

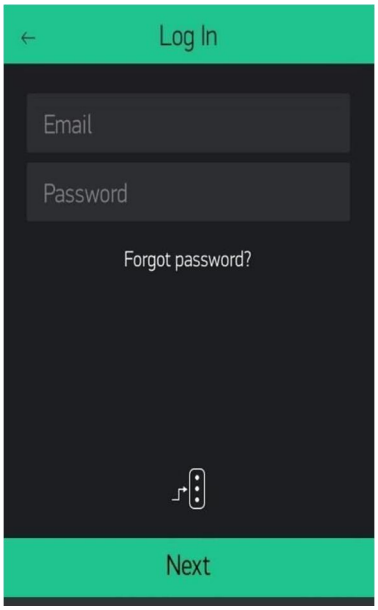

Fig. 6 Login Page

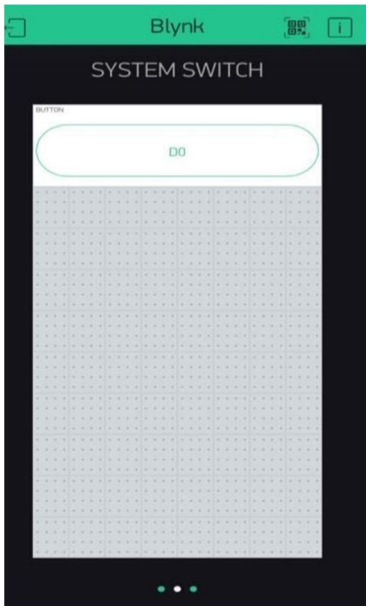

Fig. 7 System Switch

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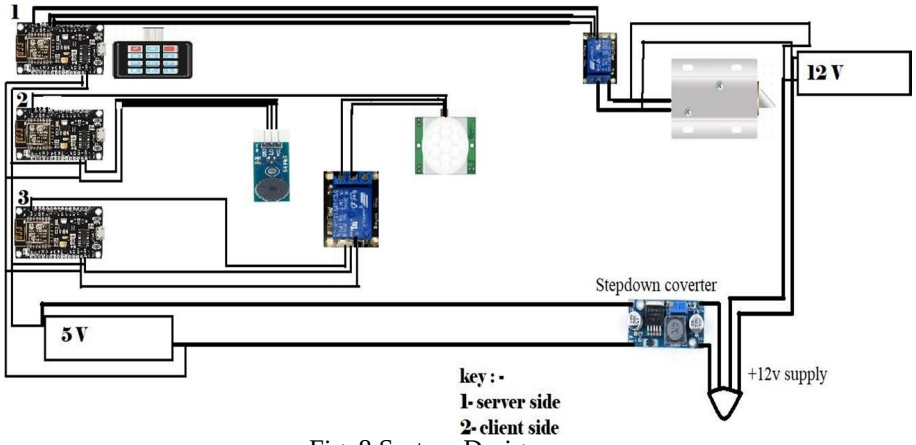

Fig. 8 System Design

V. EXPERIMENTAL OUTPUT

The experiment is carried in serial monitor of Arduino application. The software required for Arduino IDE in windows operating system. The resultant system is checked thoroughly by repeating the motion of turning system on and off by opening and closing of the door and see if the solenoid gets locked and the buzzer is switched on or off which show that the system works in intended way.

VI. RESULT OBSERVATIONS

The resultant system was checked thoroughly by repeating the motion of opening the door multiple times to see if each time the PIR sensor senses the motion or not and by remotely switching the buzzer on or off and the solenoid lock locked the room or not. To check the battery stand by check the battery was charged for 3-4 hours and then on normal supply it gave the system enough power to work. The Blynk app which showed that the system works in the intended way and flawlessly. To test the endurance of the hardware, the setup was left turned on for a couple of hours and tested afterwards. The components got heated which is acceptable but still the system functioned as it should.

VII. CONCLUSION WITH FUTURE SCOPE

The sensor which is placed on the door senses the motion when the system is turned on using blynk application. After the PIR sensor sense the motion it will ring the buzzer and as this system adapts client server parameter. The PIR sensor and Buzzer is on client side of the system and Solenoid lock and keypad module is on server side. To isolate the PIR sensor a relay module is used to turn PIR sensor on and off as it is attached directly to the power supply. As the PIR senses the motion it rings the buzzer it gives command to the server side that is solenoid lock to lock itself until the user unlocks the lock using their phone or by using keypad and enter the dedicated password set by the user. All this process works on an internet parameter.Another important component of the project is the connectivity between the ESP8266 Node MCU and the Blynk server. The system successfully connected to the Blynk server using the authentication token and the Blynk libraries. The developed system can also be used to in industrial and commercial applications such as houses, offices, bank locker and other areas where some areas are reserved for authorized personnel only or other places where safety and precautions are of primary concerns such as a house which has big amount of cash or some precious things at their place from where they can be stolen. The system can also be easily upgraded to add extra safety features such as cameras, face detection module etc. for increased safety.

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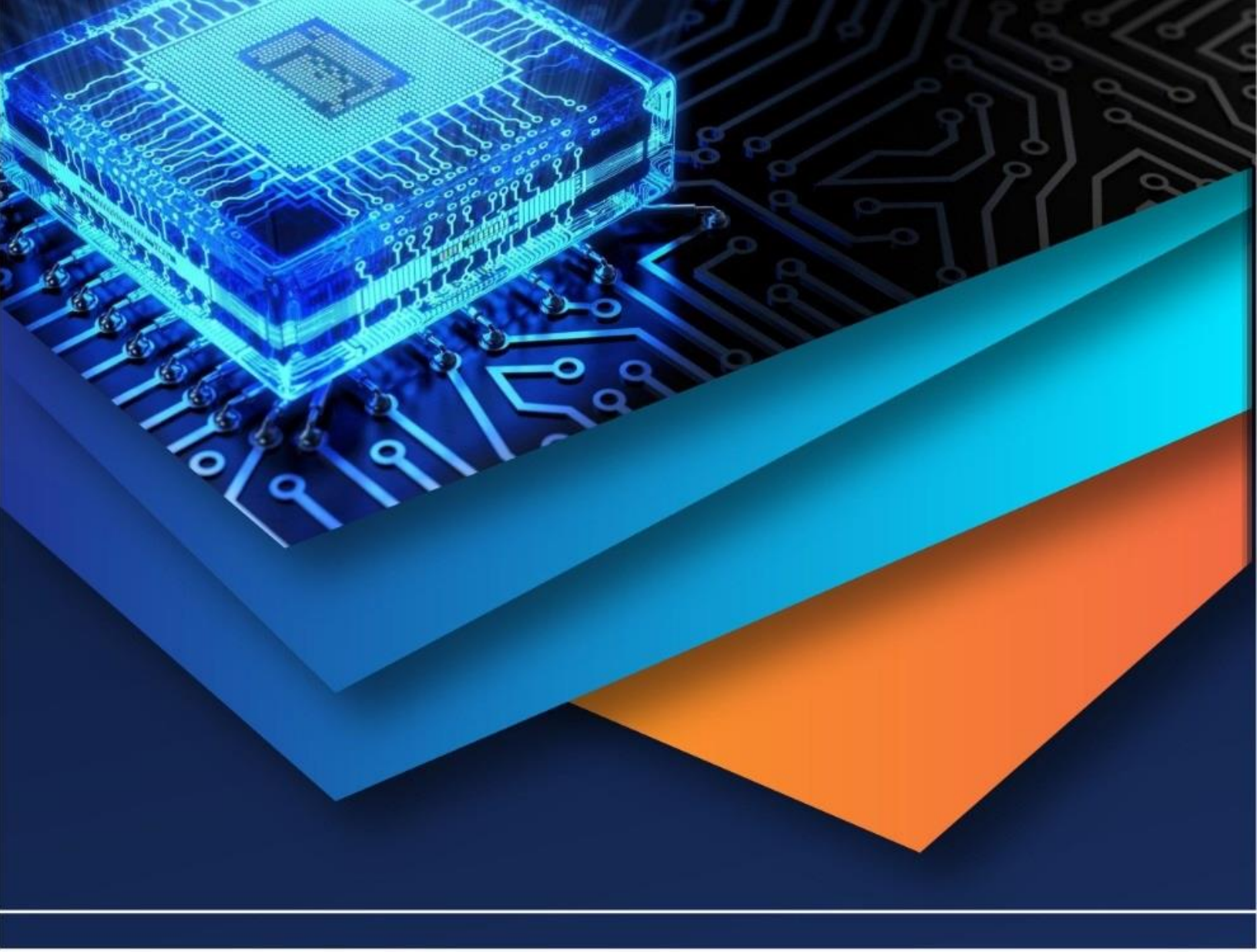

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