Smart Home Security Based on Allowing Stored Mac Address of Devices In Hotspot Using Arduino

Prakash S[1] , R Kaviarasi[2] , S Nivetha[3] , V Preethi[4]
[1,2,3,4]Anna university(BIT Campus)-tiruchirappalli

Abstract- *To provide the more security in smart home with the help of hotspot enable Arduino kit. To allow list of allowed devices in hotspot. Allowed devices means the MAC ADDRESS of required devices (Known Persons Only) are stored in a memory and if any devices connect to our hotspot then first check the mac address of that device is mapped to stored address. In case the mac address is not mapped and that device can't to connect out hotspot network. After successful connecting the connected device can control the electronic devices in smart home.*

Electronic devices like TV, Fridge, AC, Door, Water heater and any other devices are connected via Arduino kit can control the known person's devices only. This feature improve parameter of security in smart home.

Keywords- Arduino kit, Mac address, Memory, Hotspot

I. INTRODUCTION

The Internet of things (IoT) is the network of physical devices, vehicles, home appliances and other items embedded with electronics, software, sensors, actuators, and network connectivity which enables these objects to connect and exchange data. Every word has its own meaning .Similarly the IOT (Internet of Things) means the things which is controlled or ruled by internet

Arduino is an open source electronics and easy to use. The Arduino I board have the Microcontroller with 54 digital I/O pins. The low-voltage switching relays were used to integrate devices with Arduino. The LM35 temperature sensor is used to control a smart home environment. The ESP8266 Wi-Fi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.

Fig (a) Arduino Board

Arduino is a small size mother board and it has all the features of computer mother board. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board

ESP8266WiFi:

The ESP8266 module is an almost limitless fountain of information available all of which has been provided by excellent support.

The ESP8266 is support the wireless communication between the devices. Based on the instruction provided by IOT (internet of things) gives solutions.

ESP8266 [9] is a low cost development board that consolidates GPIOs, I2C, UART, ADC, PWM and WiFi for rapid prototyping. Powered by 3.3V supply, ESP8266 together with voltage regulator and USB to serial is packaged as ESP-12 module. Applications can be developed on this board through Arduino IDE or Lua based ESPlorer.

Fig .2 ESP8266WiFi

NOTE: The ESP8266 module is not capable of 5-3v logic shifting and will require an external logic level converter. Please do not power it directly from your 5v board.
NOTE: The new version of the ESP8266 WIFI module has increased the flash disk size from 512k to 1mb.

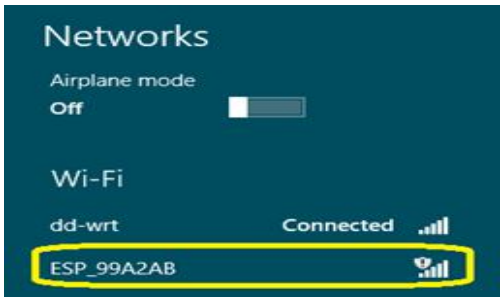
MAC ADDRESS:

A Media Access Control is unique identifier assigned to network interface controllers for communication at the data link layer of the network segment. To allow list of allowed devices in hotspot. Allowed devices means the MAC ADDRESS of required devices (Known Persons Only) are stored in a memory.

MAC ADDRESS are used to as a network address for most IEEE 802 network technologies, including Ethernet and WIFI. In this context, MAC access control protocol sub layer.
The original IEEE 802 MAC address comes from the original Xerox Ethernet addressing scheme. This 48bit address space contains potentially 248 or 281,474,976,710,656 possible MAC addresses.

IEEE 1394 (FireWire) IPv6 (Modified EUI-64 as the least significant 64 bits of a unicast network address or link-local address when stateless auto configuration is used) ZigBee / 802.15.4 / 6LoWPAN wireless personal-area networks

On broadcast networks, such as Ethernet, the MAC address is expected to uniquely identify each node on that segment and allows frames to be marked for specific hosts. It thus forms the basis of most of the link layer (OSI Layer 2) networking upon which upper layer Protocols rely to produce complex, functioning networks. Usage in hosts.



Although intended to be a permanent and globally unique identification, it is possible to change the MAC address on most modern hardware. Changing MAC addresses is necessary in network virtualization. It can also be used in the process of exploiting security vulnerabilities. This is called MAC spoofing.

II. LITERATURE SURVEY

[1] A.Z. Alkar and U. Buhur, "An internet based wireless home automation system for multifunctional devices," IEEE Trans. This paper tells how wireless system works in home by automatically with multifunctional devices. Also History of internet of things and their needs, evolutions of IoT, connection between wired and wireless network on the Arduino board, how to write program in Arduino IDE (Integrated Development Environment) software.

[2] "The Internet of Things: Do-it-yourself at Home Projects for Arduino." By D.Norristhis paper said how to connect electronic devices to Arduino via wi-fi and how to write programming in Arduino.

[3] "The Internet of Things" by D.Giusto, A.Iera. This paper tolled how to store Wi-Fi Password in Arduino Board. Also what is internet of things (IOT) and their features , how to buy a Arduino board, History of internet of things and their needs, evolutions of IoT , Latest projects in IoT, and ongoing , future projects.

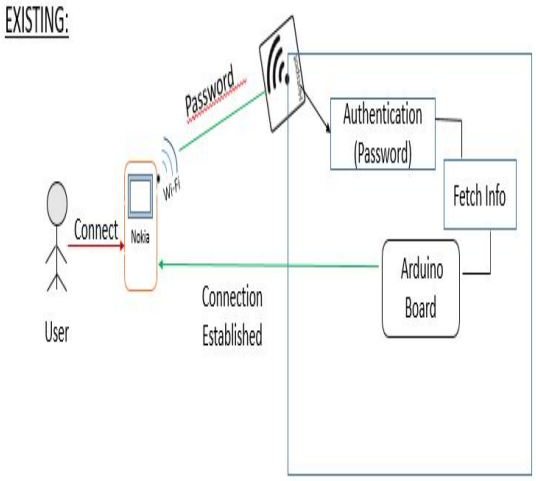
[4] Mahmood, S M, Abduls attar, M, Firas, A Y; Home Automation Management with WLAN (802.11g) and RF Remote Control. Author's told in this paper as how to connect WLAN (802.11g) and how to control Arduino board via RF Remote Control and give the clearer idea about home automation.

[5] Anandan, R, Karthik, B, Kumar, K," WIRELESS HOME AND INDUSTRIAL AUTOMATION SECURITY SYSTEM USING GSM, JGRCS". In this paper has detailed about how to connect WLAN (802.11g) and how to control Arduino board, how to use GSM (Global System for Mobile Communications, originally Group Special Mobile) and how many ways to use it

III. METHODOLOGY

3. (A) Existing System

In the existing system a user can connect hotspot enabled Arduino kit to phone with the help of Wi-Fi via password only. After successful connecting all details of mobile phone fetched into the Arduino board like mobile mac address and account details etc. one of the security issue of this system is if any one known your password then easily hack your smart home.



Advantages:

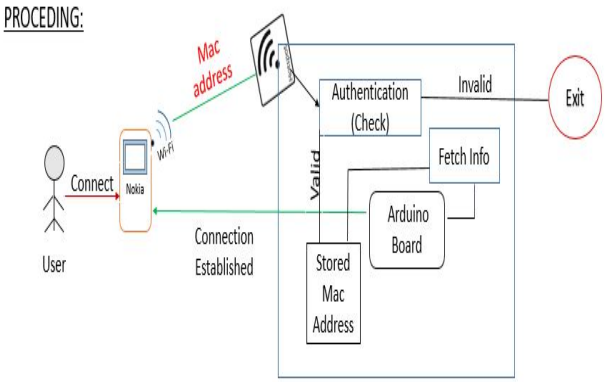
- Increased efficiency
- Better coverage
- Flexibility
- Cost saving

Disadvantages:

- Security
- Installation problem
- Coverage
- Transmissions speeds

3. (B) Proceeding System

To overcome this security issue in the proposed system. In the proposed system we are previously store the mac address of the known person mobile devices. While connecting the board first fetch the mac address of the mobile device and check if the mac address is match to stored address then connect to board successful. Otherwise can't connect to the board.



Advantages:

To overcome one of the disadvantages of existing system is security. In security we are using a password to connect the devices. But today the passwords are easily hacked by hackers. So in the proposed system we are going to use a mac address instead of passwords. But the mac addresses are difficult to memorize and it is unique. So we are stored the mac addresses earlier in the board. While connecting the device no need to give password and mac address. That is Wi-Fi network is open network. But the mac address stored devices only can connect to the hotspot device. Other devices can't connect to the hotspot

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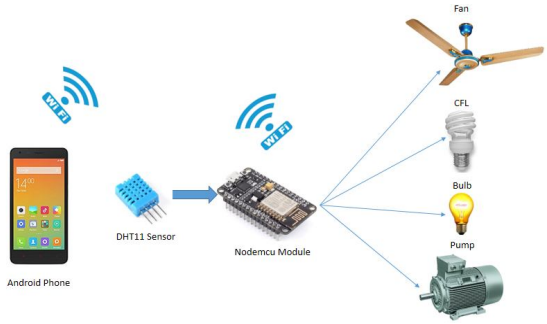
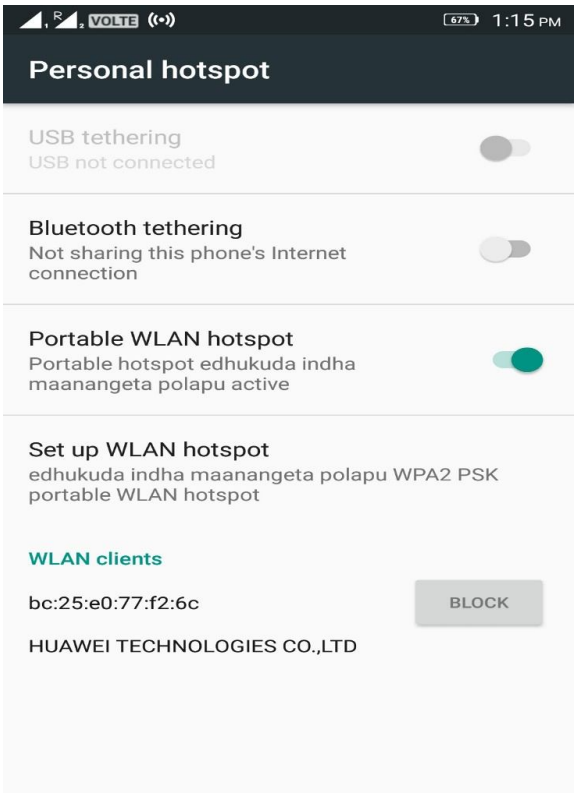
Result:

This is our expected result, we get the result in future with implementation. In result first hotspot is turned on in Arduino and Wi-Fi is turned on in mobile device or personal computer. After turned on Wi-Fi, search wireless devices and select the required device name. Note that our required network should be open network, but we can't connect to that network. Because our mac address is not stored in the required Arduino board. After stored mac address, connect to required network. Now the devices are connect to our required network.





IV. CONCLUSION

In the proposed system we are going to implement in future. In this paper, we have proposed the Security issues in the home automation which include the Authorization and the access control. The Existing systems used in the home Automation have been briefly explained in this paper. This is our expected result, we get the result in future with implementation. In result first hotspot is turned on in Arduino and Wi-Fi is turned on in mobile device or personal computer. After turned on Wi-Fi, search wireless devices and select the required device name. Note that our required network should be open network, but we can't connect to that network. Because our mac address is not stored in the required Arduino board. After stored mac address, connect to required network. Now the devices are connect to our required network.

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