



iJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 Issue: V Month of publication: May 2019

DOI: <https://doi.org/10.22214/ijraset.2019.5364>

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Home Safety, Security and Automation using IOT

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Abstract: *In this day and age automatic framework are being favored over the manual framework with the fast increment in the quantity of client of the web over the previous decade has made internet a vital part of life and 'IoT' is the most recent and rising web innovation. 'Internet of Thing' is a developing system of an ordinary system into a modern system that can share data and finish the task while you are busy with other tasks. Home safety security and automation using 'IoT' is a framework that perfectly utilize PC's or cell phone to control fundamental home appliances and highlights naturally through the web from any place around the globe. In this paper, we present a home Safety, Security and Automation using 'IoT' uses Microcontroller ATMEGA328 that utilizing the incorporation of a cloud. The wireless communication, to provide the user with remote control of various light, fans and appliances within their home and storing the data in the cloud*

I. INTRODUCTION

A. Overview

Homes of the 21st century will end up being progressively self-controlled and modernized in view of the comfort it gives, especially when used in a private home. Home automation framework is an Implies that enable clients to control electric apparatuses of changing kind. Many existing, dug in home computerization structures rely upon wired correspondence. This does not speak to an issue until the moment that the structure is orchestrated well early and presented in the midst of the physical improvement of the structure. Regardless, for formally existing structures the use cost goes high. Strikingly, Remote systems can be of unimaginable help for automation structures. With the movement of remote advances, for instance, Wi-Fi, cloud sorts out in the progressing past, remote structures are used every day and everywhere.

B. Central Purposes Of Home Automation Structures

In today's world, the wireless system like Wi-Fi become most common in home networking .use of wireless technologies gives several advantages that could not be accomplished using a wired network only.

- 1) Reduced establishment costs: First and premier, establishment costs are essentially decreased since no cabling is important. Wired arrangements require cabling, where material and additionally the expert laying of links (e.g. into dividers) is costly.
- 2) System adaptability and simple augmentation: Deploying a remote system is particularly beneficial when, because of new or changed prerequisites, expansion of the system is essential. Rather than wired establishments, in which cabling expansion is dreary. This makes remote establishments fundamental speculation.
- 3) Aesthetical advantages: Apart from covering a bigger zone, this ascribes full's aesthetical prerequisites also. And incorporate agent structures with all-glass engineering and verifiable structures where plan or studio reasons don't permit the laying of links.
- 4) Integration of cell phones: With remote systems, partner cell phones, for example, PDAs and Smartphones with the computerization framework winds up conceivable all over the place and whenever, as a gadget's correct physical area is not any more pivotal for an association (as long as the gadget is in reach of the system).

II. RELATED WORK

A. Sirsath N. S, Dhole P. S, Mohire N. P, Naik S. C & Ratnaparkhi N.S

In this paper have developed a Home Automation system that employs the integration of multi-touch mobile devices, cloud networking, wireless communication, and power-line communication to provide the user with remote control of various lights and appliances within their home. This system uses a consolidation of a mobile phone application, handheld wireless remote, and PC based program to provide a means of user interface to the consumer. The home automation system differs from other systems by allowing the user to operate the system without the dependency of a mobile carrier or Internet connection via the in-home wireless remote. This system is designed to be low cost and expandable allowing a variety of devices to be controlled. This framework utilizes a solidification of a cell phone application, handheld remote, and PC based program to give methods for UI to the customer.

B. Deepali, Javale, Mohd. Mohsin, Shreerang Nandanwar

This paper put advances the plan of home mechanization and security framework utilizing Android ADK. The plan depends on an independent installed framework board Android ADK (Accessory Development Kit) at home. Home apparatuses are associated with the ADK and correspondence is built up between the ADK and Android cell phone or tablet. The home machines are associated with the information/yield ports of the implanted framework board and their status is passed to the ADK. We would build up a verification to the framework for approved individual to get to home machines. The gadget with ease and adaptable to less change deeply is much significant. It exhibits the structure and usage of computerization framework that can screen and control home machines through android telephone or tablet. The prime goal of this paper is to help impeded/old matured individuals. It gives essential thought of how to control different home machines and give security utilizing Android telephone/tab. The outline comprises of Android telephone with home automation application, Arduino Mega ADK. A client can collaborate with the Android and send control flag to the Arduino ADK which thus will control other implanted gadgets/sensors

C. Basma M. Mohammad El-Basioni, Sherine M. Abd El-kader, and Mahmoud Abdelmonim Fakhreldin

This paper proposes another plan for the keen home utilizing the remote sensor arrange and the biometric advancements. The proposed framework utilizes the biometric in the verification for home passage which upgrades home security just as effectiveness of home entering process. The proposed brilliant home Wireless Biometric Smart Home (WB-SH) plan is one of only a handful couple of structures or it is the main structure that tends to the incorporation between the remote sensor organize and biometric in structure shrewd homes. The structure of the framework is portrayed and the consolidated correspondences are broke down, additionally an estimation for the entire framework cost is given which is something ailing in a ton of other brilliant home plans offers. The expense of the entire WB-SH framework is resolved to be roughly \$6000, which is an appropriate expense as for the expenses of existing frameworks and regarding its offered administrations. WB-SH is intended to be fit for fusing in a structure mechanization framework and it very well may be connected to workplaces, facilities, and different spots. The paper closes with a creative ability for the eventual fate of the savvy home when utilizes the biometric innovation in a bigger and progressively complete structure.

III. FRAMEWORK ANALYSIS

A. Issue Definition

Home Automation frameworks confront four principle challenges, these are a mind-boggling expense of possession, rigidity, poor reasonability, and trouble in accomplishing security. The principal destinations of this exploration are to plan and actualize a home computerization framework utilizing IoT that is fit for controlling and automizing the vast majority of the house apparatuses through a simple reasonable web interface. The Implemented framework has incredible adaptability by utilizing Wi-Fi innovation to interconnect its conveyed sensors to a home automation server. This will diminish the arrangement cost and will build the capacity of redesigning, and framework reconfiguration.

B. Implemented System Feature

The Implemented framework is a conveyed home Automation framework, comprises of server, sensors. Server controls and screens the different sensors, and can be effortlessly designed to deal with more equipment interface module (sensors). The Microcontroller ATMEGA328, with worked with Wi-Fi module to which the module is Embedded, goes about as web server. Computerization System can be gotten to from the internet browser of any neighbourhood PC in a similar LAN utilizing server IP, or remotely from any PC or portable handheld gadget associated with the web with fitting internet browser through server genuine IP (web IP). Wi-Fi innovation is chosen to be the system foundation that interfaces server and the sensors. Wi-Fi has enhanced framework security (by utilizing a secure Wi-Fi association), and to expand framework portability and adaptability.

IV. SYSTEM DESIGN AND IMPLEMENTATION

A. Implemented Home Automation System

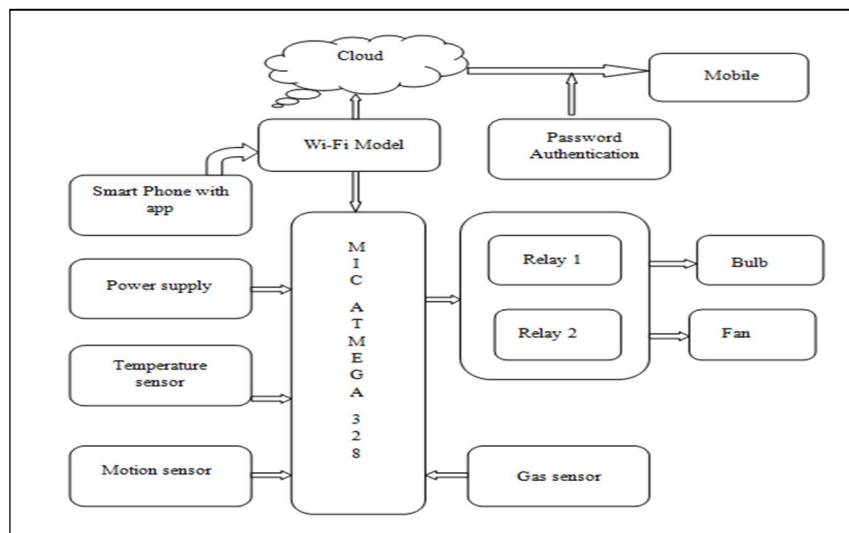


Figure 1:- Implemented Model of Home Safety, Security, and Automation Using Iot Model

The Implemented model of the home automation framework is as appeared in the figure1. The model comprises of various sensors like temperature, gas, and movement. At first the Microcontroller ATMEGA328 interfaces with the web through Wi-Fi module. At the point when the association is built up, it will begin perusing the parameters of sensors like p1, p2, p3 and so on. The threshold levels for the required sensors are set as t1, t2, t3 and so on. The sensor information is sent to the web server and put away in the cloud. The information can be broke down anyplace whenever. In the event that the sensor parameters are more prominent than the limit level then the particular caution a1, a2, a3 and so forth will be raised and the required activation has improved the situation the controlling of the parameters. In the Implemented display the temperature, gas leakage, movement in the house is checked. The temperature and movement identification are put away in the cloud for investigation. In the event that the temperature surpasses the edge level then the cooler will turn on naturally and it will off when the temperature comes to control. So also when there is a leakage of gas n the house caution is raised giving the alarm sound. The required lights are turned on/off naturally by identifying the light outside the house. The client can likewise screen the electric apparatuses through the web by means of a web server. On the off chance that the lights or any electrical machines are left on inrush can be seen and killed remotely through basically composing the IP address of the web server.

B. Implemented Home Automation System Functions

The Implemented home automation system has the capabilities to control the following components in users home and monitor the following alarms: Temperature and humidity, Motion detection, Fire and smoke detection. The Implemented system can control the following appliance: Lights on/off, Fan on/off, On/off a different appliance.

C. Software Design

- 1) **Front End Design:** HTML is a format that defined a computer on how to display a web page. The documents themselves are plain text files with special "tags" or codes that a web browser uses to interpret and display information on your computer screen. HTML stands for Hyper Text Markup Language; an HTML file is a text file containing small markup tags. The markup tags tell the Web browser how to display the page. An HTML file must have an htm or HTML file extension.
- 2) **Cloud Storage:** Distributed computing is the act of utilizing remote servers on the web to oversee, store and process information as opposed to utilizing a PC. Distributed computing is a general term that is better isolated into three classifications: Infrastructure-as-a-Service, Platform-a-Service, and Software-as-a-Service. IaaS (or utility figuring) takes after a conventional utility display, furnishing servers and capacity on request with the shopper paying in like manner. PaaS takes into account the development of utilization inside a supplier's system, similar to Google's App Engine. SaaS empowers clients to utilize an application on request by means of a program. A typical case of distributed computing is a web server, where you can get to your put away information from any PC with web get to. Here we are utilizing web server for the capacity of the information.

D. Implementation Setup

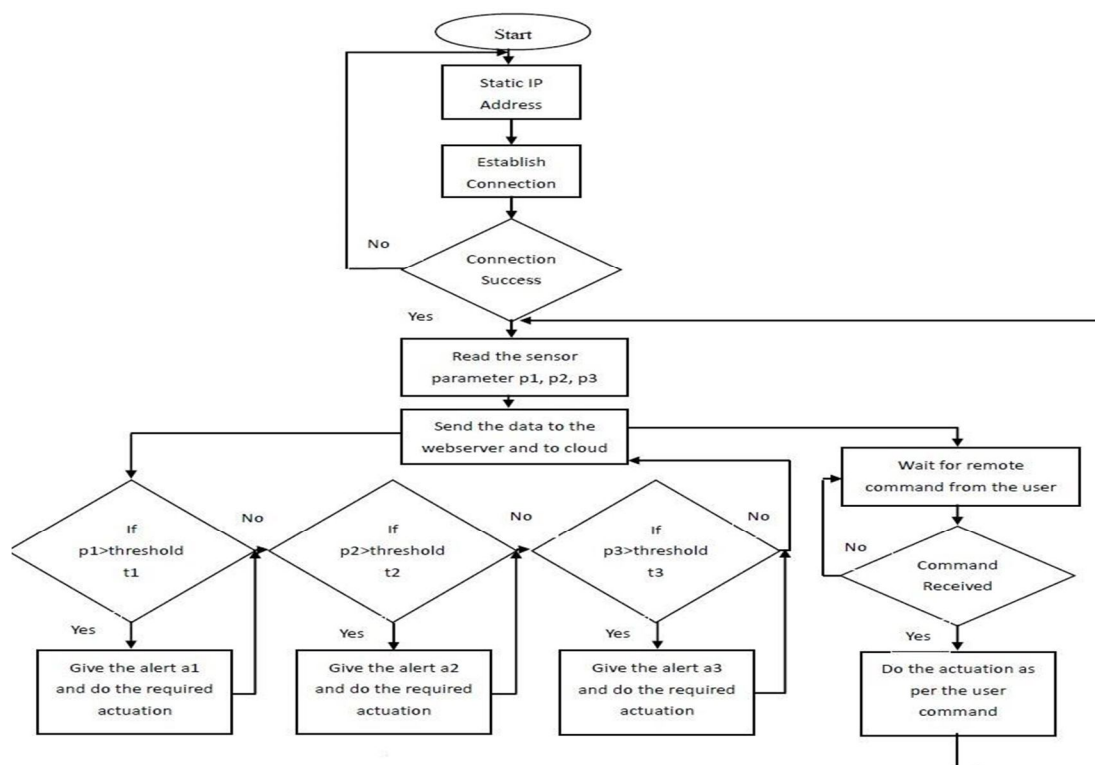


Figure 2:- Sequence of Activation HAS

Figure 2 represents the succession of exercises in the HAS. At the point when the association is built up, it will begin perusing the parameters of sensors like p1, p2, p3 and so forth. The limit levels for the required sensors are set as t1, t2, t3 and so on. The sensor information is sent to the web server and put away in the cloud. The information can be investigated anyplace whenever. On the off chance that the sensor parameters are more noteworthy than the limit level then the particular caution a1, a2, a3 and so forth will be raised and the required activation has improved the situation the controlling of the parameters.

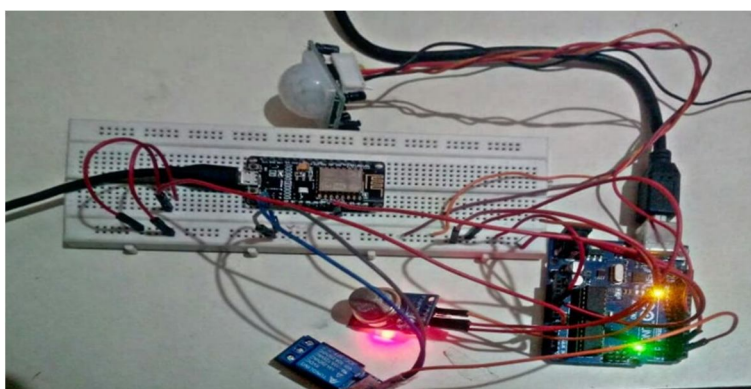


Figure 3: Experimental Setup on PCB for HAS

A PCB model is worked for the home automation framework and is as appeared in figure 3. At the entryway of the house, a motion sensor is settled to distinguish any development close to the entryway. Light 1 will turn on naturally when light sensor distinguishes the murkiness. A cooler/Fan will turn on when the room temperature surpasses the set edge and thusly lessens the room temperature. The gas sensor MQ-6 is distinguished any gas leakage if any leakage is recognized the alert in the lobby is raised. The hand-off is utilized to switch the electrical machines like light, fan and so forth. The Microcontroller ATMEGA328 is put in the storeroom or carport. The Microcontroller ATMEGA328 is associated with Wi-Fi module and accomplished the connectivity with the internet.

V. RESULTS

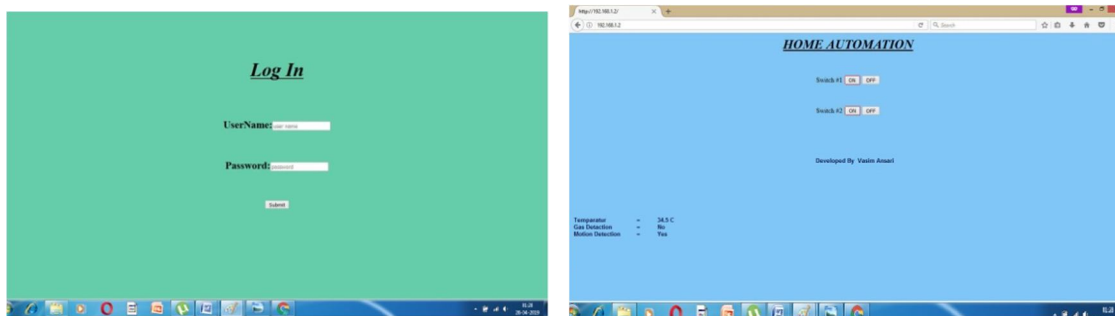
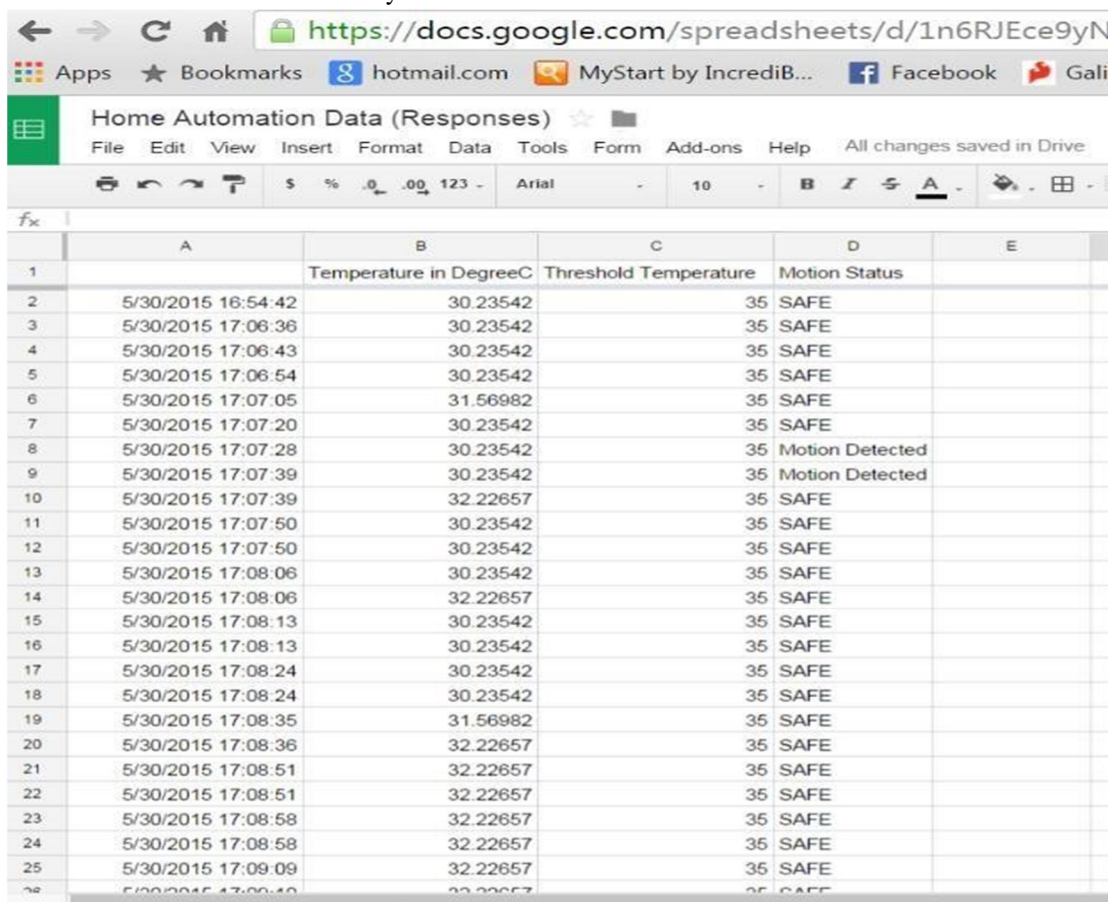


Figure 4: Web Server Page

After the effective association with the server, the information of the sensor is sent to the web server for checking of the framework. Figure 4 demonstrates the web server page which will enable us to screen and control the framework. By entering the allocated IP address in the internet browser this web server page will show up. The web server gives the data about the temperature in better places of the house and movement state in the house. It likewise gives the status of the different electrical machines like light, fan and so on which we can control remotely.



	A	B	C	D	E
1		Temperature in DegreeC	Threshold Temperature	Motion Status	
2	5/30/2015 16:54:42	30.23542	35	SAFE	
3	5/30/2015 17:06:36	30.23542	35	SAFE	
4	5/30/2015 17:06:43	30.23542	35	SAFE	
5	5/30/2015 17:06:54	30.23542	35	SAFE	
6	5/30/2015 17:07:05	31.56982	35	SAFE	
7	5/30/2015 17:07:20	30.23542	35	SAFE	
8	5/30/2015 17:07:28	30.23542	35	Motion Detected	
9	5/30/2015 17:07:39	30.23542	35	Motion Detected	
10	5/30/2015 17:07:39	32.22657	35	SAFE	
11	5/30/2015 17:07:50	30.23542	35	SAFE	
12	5/30/2015 17:07:50	30.23542	35	SAFE	
13	5/30/2015 17:08:06	30.23542	35	SAFE	
14	5/30/2015 17:08:06	32.22657	35	SAFE	
15	5/30/2015 17:08:13	30.23542	35	SAFE	
16	5/30/2015 17:08:13	30.23542	35	SAFE	
17	5/30/2015 17:08:24	30.23542	35	SAFE	
18	5/30/2015 17:08:24	30.23542	35	SAFE	
19	5/30/2015 17:08:35	31.56982	35	SAFE	
20	5/30/2015 17:08:36	32.22657	35	SAFE	
21	5/30/2015 17:08:51	32.22657	35	SAFE	
22	5/30/2015 17:08:51	32.22657	35	SAFE	
23	5/30/2015 17:08:58	32.22657	35	SAFE	
24	5/30/2015 17:08:58	32.22657	35	SAFE	
25	5/30/2015 17:09:09	32.22657	35	SAFE	
26	5/30/2015 17:09:10	32.22657	35	SAFE	

Figure 5: Database of The Sensors Data Stored In The Cloud

All the required information is put away in the cloud (Gmail). The put away information can be examined at whenever and anyplace. Figure 5 demonstrates the temperature in degree Celsius put away at various time interims. And furthermore, it demonstrates the condition of the movement identifier alongside the time. It additionally gives data about time of movement recognized and how often too. This data is put away in the cloud which can be checked by the client whenever far from home

VI. COMPARISON WITH THE RELATED SYSTEM

Parameter	System A Home Automation using Cloud Network and Mobile Devices	System B Home Automation and Security System Using Android ADK	System C Smart Home Design using Wireless Sensor Network and Biometric Technologies	System D Home Safety, Security And, Automation Using IoT. (our system)
Using of Internet of thing	Yes	No	No	Yes
Microcontroller	89C51 I Microcontroller	ATMEGA2560 Microcontroller	ATMEGA128 Microcontroller	ATMEGA328 Microcontroller
Trainer kit	89C51 I Microcontroller Board	Arduino Mega ADK	ATMEGA128 Development Board	Arduino Uno Development Board
Communication Type	Serial communication	Serial communication	Serial communication	Serial communication
Controlling with the help of	Android mobile or pc	android phone or tablet	Mobile remote control	web link
Security	low	medium	highest	High
Complexity	high	medium	highest	Low
Cost	medium	high	highest	Low
Special function	It control appliances through mobile or pc, and it also allow the user to server using GUI.	develop an authentication to the system for authorized person to Access home appliances.	developed the smart home using wireless sensor network and the biometric technologies	It can also control appliances when the web connectivity is off, and allow user to control appliances using android app

VII. COMPARISON RESULT WITH OUR SYSTEM

As we compare the above table we get existing systems having more Complexity, high cost. System (A) uses 89C51 I Microcontroller which is belongs to 8051 microcontroller family. Atmega328 is faster than 8051 as it uses lesser number of clock cycles for instruction execution. And In Atmega328 you can use internal oscillator, saving additional circuitry. But in 8051 you have to add an external crystal oscillator. If you have to use PWM in Atmega328, there are dedicated pins and timer modes. It is much easier to use PWM in Atmega328 than in 8051, in which you have to do everything by yourself. Whereas system (B), system (C), system (D) uses ATMEGA2560, ATMEGA128, ATMEGA328 Respectively. There are many features that are common to all Arduino boards, making them very versatile. All Arduino boards are based around the ATMEGA AVR series microcontrollers from ATMEL which feature both analog and digital pins. Only difference between the (systems A) provide ATMEGA 2560 and Arduino Uno uses ATMEGA328P and Mega provides you plenty of GPIO's, plenty in the sense way to much more than Arduino Uno. All systems have the same communication type which is serial communication. And some systems are controlled using mobile and pc. Using mobile and pc, provided limited controlling ability. Those we use web link to provide increasing in controllability. As we see the security aspect in the first system there is no security. Whereas in the third system uses the biometric system gives security to the home but no security on controlling device. To overcome this problem we use web link server, whereas only an authorized person can control the appliances. And our system is less complex with Low cost as compared to the other home automation system.

VIII. CONCLUSION AND FUTURE WORK

A. Conclusion

Home safety, security, and automation using IoT has been tentatively demonstrated to work agreeably by associating basic apparatuses to it and the machines were effectively controlled remotely through the web. The planned framework not just screens the sensor information, similar to temperature, gas, light, movement sensors, yet additionally impels a procedure as per the necessity, for instance exchanging on the light when it gets dim. It additionally stores the sensor parameters in the cloud in an opportune way. This will assist the client in analysing the state of different parameters in the home whenever anyplace.

B. Future Work

Utilizing this framework as structure, the framework can be extended to incorporate different choices which could incorporate home security highlight like catching the photograph of an individual moving around the house and putting away it onto the cloud. This will decrease the information stockpiling than utilizing the CCTV camera which will record constantly and stores it. The framework can be extended for vitality observing, or climate stations. This sort of a framework with particular changes can be actualized in the medical clinics for handicap individuals or in ventures where a human attack is inconceivable or hazardous, and it can likewise be executed for ecological observing.

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