IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Smart Home Automation System Using IOT

Balwinder Kaur Dhaliwal, Arvinder Kaur, Muskan Bhutani, Naman Thakur, Akash Singh, Bhavnath Jha

Abstract— With advancement of Automation technology, life is getting simpler and easier in all aspects. In today's world Automatic systems are being preferred over manual systems for human comfort. With the rapid increase within the number of users of internet over the past decade has made Internet a neighborhood and parcel of life, and IoT is that the latest and emerging internet technology. It is meant to save lots of the electrical power and human energy. The home automation system differs from other system by allowing the user to work the system from anywhere round the world through internet connection. In this paper we present a Home Automation system using Arduino, Wi-Fi Module, Touch Screen, etc. to provide the user with remote of varied lights, fans, and appliances within their home and storing the information. The system will automatically change on the basis of data. This system is meant to be low cost and expandable allowing a spread of devices to be controlled.

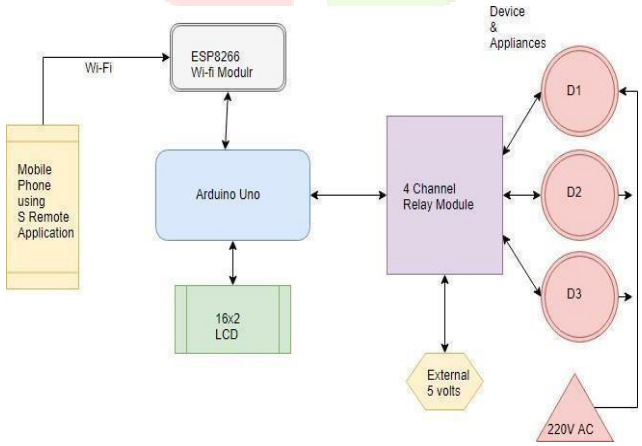
KEYWORDS-IOT, WI-FI, SENSORS, INTERNET, HOME AUTOMATION

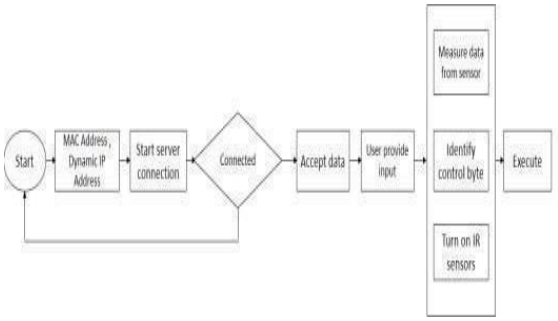
I. INTRODUCTION

With advancement of Automation technology, life is getting simpler and easier altogether aspects. In today's world Automatic systems are being preferred over manual systems for human comfort. With the rapid increase within the number of users of internet over the past decade has made Internet a neighborhood and parcel of life, and IoT is that the latest With advancement of Automation technology, life is getting simpler and easier altogether aspect. As rapid change in technology always aims to serve the mankind, the expectation for living an easy yet advance life keeps on increasing. Internet has become a crucial a part of human's social life and academic life without which they're just helpless. IOT (Internet of things) devices are pieces of hardware, like sensors, actuators, gadgets, appliances, or machines, that are programmed surely applications and may transmit data over the web or other networks. The IOT devices not only controls but also monitors the electronic, electrical and various mechanical systems which are utilized in various sorts of infrastructures. These devices which are connected to the cloud server are controlled by one user (also referred to as admin) which are again transmitted or notified to all or any the authorized user connected to it network. For digitalizing home appliances like lighting, heating, security, au-dio, video etc. An IOT in home automation is that the simplest business resolution lately . the rise within the popularity of IOT has widely spread to simple in-home applications and everyday tasks. the utilization of IOT in homes is for the aim of energy monitoring and saving while

achieving and maintaining a particular level of comfort. Home automation systems using IOT consists of three major parts. the primary part is that the sensing and data acquisition part. this is often done by placing sensors or devices, also called things, at several locations throughout the house to live and gather desired information like temperature, humidity, or lux. The second a part of the system is that the processing . Sensors provide data in raw form. These data are sent to the processor through a mode of transmission, wired connection or wireless. The processor then translates the info into comprehensible values. These values are transmitted to a tool to be controlled automatically and/or to a interface . The last a part of IOT automation is that the internet. Most systems use a server to upload data after processing, so it are often accessed by the user. the web also helps to watch data and manually control devices remotely. By automatically executing several commands, automation systems can help to save lots of time, provide a better quality of life in homes, and save energy. There are many features which help the devices to work . The alerts and therefore the status of the IOT system are often accessed by the user from anywhere even where Internet connectivity might not be readily available. the prevailing infra-red (IR) or Blue-tooth remote controls present within the market are generally appliance. Electrical appliances connected through Bluetooth making use of Blue-tooth enabled smart phones can't be managed from a foreign location. Thus, functions like having the ability to show on an air-conditioner while returning home can't be through with such systems. In-contrast, this work gives a price effective and straightforward solution for wireless home automation and residential security systems. Today's Home Automation System include Bluetooth, Wi-MAX and Wireless LAN (Wi-Fi), Zig Bee, and Global System for Mobile Communication (GSM). the remainder of sections during this paper will contain the proposed model, outcomes of home automation system, advantages and drawbacks

II. PROPOSED AUTOMATIONDIAGRAM





Arduino Microcontroller is Connected to Wi-Fi module and Relay Module. Relay Module are going to be further connected to devices and appliances. Home Devices are controlled through mobile using application. Application will take the dynamic IP address, accept data, user provide the input through on/Off button, through which the sensor will identify the device to regulate and execute.

III. COMPONENTS USED

Servo Motors, HC-05 (Bluetooth), Arduino Uno, Jumper wires, LDR, Relay, LED, ULTRASONIC detector, PIR Sensor, TEMPRATURE SENSOR.

• Servo Motors: - Servo motors are double-geared DC motors with the closed-loop equipment incorporated inside them. the elemental configuration of a servo motor composed of a DC motor, gearbox, potentiometer and feedback circuit.

• HC-05 (Bluetooth): -The HC-05 has 2 operational modes, one is that the knowledge mode within which it'll send and receive knowledge from different Bluetooth devices and also the various is that the AT Command mode wherever the default device settings are going to be modified.

• Arduino Uno: - Arduino is an ASCII document physics platform supported easy-to-use hardware and package.
Arduino boards are ready to scan inputs - light-weight on a a) detector, a finger on a button, or a Twitter message - and switch it into AN output - activating a motor, turning on a LED , publication one thing on-line.

• Jumper wires: - Jumper wires are merely wires that have connecter pins at every finish, permitting them to be used to connect 2 points to each different while not fastening. Jumper wires are usually used with breadboards and different prototyping tools so on form it simple to change a circuit pro re natal. Fairly easy. In fact, it doesn't get far more basic b) than jumper wires.

• LDR: - LDR stands for light-weight Dependent device . An LDR could also be a neighborhood that comes with a (variable) resistance that changes with the sunshine intensity that falls upon it. this permits them to be used in light-weight sensing circuits.

• Relay: - Relay is additionally a switch that connects or disconnects 2 circuits. However instead of manual operation a relay is applied with electrical signal, that successively connects or disconnects another circuit. Relays are going to be of varied sorts like robot , solid state. robot relays are often used.

• LED: - LED Stands for "Light-Emitting Diode." A light-emitting diode is AN device that emits light-weight once AN electrical current is skilled it. LEDs are unremarkably used for indicator lights on electronic devices. They even have many various applications, also as electronic signs, clock displays, and flashlights. Since LEDs are energy economical and have an extended period of time , they have begun to modify ancient light-weight bulbs in many areas.

• Ultrasonic detector: - A supersonic detector is AN device that measures the space of a target object by emitting supersonic sound waves, and converts the mirrored sound into an electrical signal. supersonic waves travel quicker than the speed of sounding sound (i.e. the sound that humans will hear).

• PIR Sensor: - PIR sensors enable you to sense motion, nearly always want to watch whether or not somebody's has emotional in or out of the sensors vary. they're little, cheap, low-power, simple to use and don't wear out. For that reason, they're unremarkably found in appliances and gadgets employed in homes or businesses.

• Temperature Sensor: - A temperature sensor is an device that measures the temperature of its environment and converts the input file into electronic data to record, monitor, or signal temperature changes.

IV. CHALLENGES AND OBSTACLES TO IOT

Deployment of IPV6: As per the increasing demands of technology sensors and computing devices would be connected to the web with having unique IP address. Internet of Things continues to grow, devices that need true end to finish Internet connectivity won't be ready to believe IPV4.They will need a replacement enabling technology IPV6.This protocol makes the management of network easier thanks to auto configuration capabilities and offers improved features in security.

Sensor energy: The important hardware in IOT is its sensors. The devices contains high energy modules, power management modules and sensing modules. So, so as to succeed in IOT at its height sensors will got to be self-sustaining and independent. The changing of batteries within the billions of deployed devices across the planet wouldn't be possible. So, we'd like how that sensors could generate their electricity from environmental elements like vibration of sunshine and airflow.

c) Heterogeneous Things: Internet of Things authorize framework to take care of its working with some

heterogeneous devices who are dissimilar with one another in response to convention, data location, data collection and data storing capability then on are analyze. it's a demanding also as difficult challenge to create such a protocol that supports transmission of data among all devices. Standard arrangement is required to facilitate device to device (D2D) transmission of data more efficiently.

d) Power: The devices developing the bottom of Internet of Things are wireless in type and deployed in hostile terrain (e.g. environment monitoring sensing devices) where power is that the crucial problem. Eventually power saving effective algorithms and hardware are required for reducing the speed of consumption of battery power and make sensor device to remain effective for long duration of your time .

e) Safety: -Most of comparable device as of the various frameworks, safety shines out among the foremost necessary problem. This problem seems to be most vital in Internet of Things when these are in working stage the system perform persistently. Particular information seclusion methodology is required to offer suitable advantage to the top client as shown by their power. encoding computation are need to be far more supported. Particular information isolation technique is additionally needed to deliver proper privilege to the top clients consistent with their capability. most importantly , the algorithm formulated should be power efficient such they will be utilized in very low power, low energy devices across different Internet of Things based application.

V. ADVANTAGES

- Energy-saving: -Home automation manages control elements that contribute to saving water, electricity, and gas. That is, we'll program all the devices to show on or off at the specified time. Home automation control of lighting and air conditioning controls the management of 70% of energy consumption. It is possible to make sure that every one the lights within the house are turned off which the reference temperature of the air conditioning is in saving mode when nobody is within the house. When going to sleep, lights and blinds are transitioned and thus the reference temperature is economy and contributes to being more ecological.

- Security: - Another of its important advantages has the ability to detect fires, intruders, gas leaks or a water leak. you'll see everything that happens from anywhere through cameras and simulate presence by turning lights on and off remotely.

- Communication: - it's essential nowadays to work out correct communication between people and housing. New technologies and thus the web are a natural a part of home automation and become intuitive and practical tools. Even the recognition of voice or body movements can become a channel of communication with our home. With of those elements, the house can interact with people through the house automation elements of the installation, text messages, emails, and voice calls.

- Comfort: - The tasks to be administered in our homes are much easier, and you will do many actions comfortably from a screen. Wellness: - Through home automation, we can automatically close the blinds, detecting the amount of sunlight that enters the rooms or the wind that causes it; control the degree of sunshine within the different rooms, and be able to direct the varied environments of the house.

- Telecare: - The system consists of a gaggle of sensors that monitors the user's life habits, just like the time spent in bed, bath, taking medications. The parameters obtained by these sensors configure a profile that's stored on a central server supervised by healthcare professionals 24 hours every day modified for the night. Detecting the presence or not in each area of the house can activate other savings policies. What produces effects within the domestic

VI. DISADVANTAGES

- Initial cost: - the worth of the house automation installation remains very high. The initial investment that possesses to be made is extremely important since the whole home must be wired.

- Maintenance: - within the event of some kind of breakdown, its repair is usually complex and expensive. additionally to the present, it's possible that an important a neighborhood of the system goes to be blocked and more functions are going to be canceled. Therefore, the worth of any kind of breakdown is usually very high.

- Data transmission speed: - counting on the quantity of systems that are connected, when transferring an outsized amount of data , the network can become congested and reduce the transmission speed, causing the functions to hamper .

- Ring connection: - When the knowledge is connected within the type of a hoop, there could even be some delay which will also depend on the quantity of points that are connected to the network, which provides little reliability to the system.

- Installation: - Installation work could also be a headache in some areas for instance , hilly areas. In some areas, electricians face different sorts of issues like different sort of wiring, configuration problem because of slow internet connection, etc.

- Dependency on Internet: -The basic requirement for the smart home system is that the internet. Without an honest and strong internet connection, you'll not be ready to take control of this. If there's no internet

connection for some reason, there's no other way through which you can access and control your system.

- Dependency on Professionals: - just in case there's a problem with the smart home system, you can't simply call a handyman or someone almost like repair or manage the bug. you'll need to depend upon the professional.

VII. OUTCOMES

In this paper we focused on different process of operating or controlling electrical and electronic appliances remotely with the assistance of Arduino. This method of controlling such applications is mentioned as automation. The experimental setup which we designed has its focus on controlling different home appliances providing 100% efficiency. thanks to advancement in technology, Wi-Fi network is definitely available altogether places like home, office block and Industrial Building so proposed wireless network easily controlled using any Wi- Fi network. The wiring cost is reduced. Since less wiring is required for the switches. This also eliminates power consumption inside the building when the hundreds were in off conditions. The system is fully functional through android application. For future use, the researchers would recommend as
: (I)Reducing the time delay to show on and off of an appliance
(ii) Adding speech recognition to the system (iii)using automatic smart phone detection through Wi-fi such it'll operate the hundreds automatically when it's in range.(iv) Expansion of range of Wi-Fi such one can operate in permissible long distance through smart phone.

VIII. FUTURE SCOPE

Using this technique , the system are often expanded to incorporate various other options for home security feature like capturing the photo of an individual traveling the house and storing it onto the cloud. this may reduce the info storage than using the CCTV camera which can record all the time and stores it. The system are often expanded for energy monitoring or weather stations. this type of a system with respective changes are often implemented within the hospitals for disable people or in industries where human invasion is dangerous and also for environmental monitoring. Limitation to regulate only several devices are often removed by extending automation of all other home appliances. it'll be flexible to support various wired also as wireless technologies like Bluetooth, Zigbee, WIFI, World Wide Web. By doing this technique will increase system mobility, configurable, and scalability.

IX. CONCLUSION

The home automation using Internet of Things has been experimentally proven to work satisfactorily by connecting simple appliances to it and the appliances were successfully controlled remotely through internet. The designed system not only monitors the sensor data, like temperature, gas, light, motion sensors, but also actuates a process according to the requirement, for example switching on the light when it gets dark. It also stores the sensor parameters in the cloud (Gmail)in a timely manner. This will help the user to analyze the condition of various parameters in the home anytime anywhere

X. REFERENCES

1) B. Kaur Dhaliwal and Rattan K. "Datta Secure and Energy Efficient Trust Aware Routing Protocol in IoT using the Optimized Artificial Neural Network: SEETA-IoT" International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2252 – 8965, Volume-8 Issue-6, August, 2019.

2) Grégory Nain, Francois Fouquet, Brice Morin, Olivier Barais, JeanMarc Jézéquel, “Integrating IoT and IoS with a Component-Based approach”, 36th EUROMICRO Conference on Software Engineering and Advanced Applications, 2010

3) AM.D. Celebre, A. Z. D. Dubouzet, I. B. A. Medina, A.N. M. Surposa and R. C. Gustilo, Home automation using raspberry Pi through Siri enabled mobile devices, International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment and Management (HNICEM), Cebu City, (2015), 1-6.

4) VinaySagar K and Kusuma S, “Home Automation Using Internet of Things”, International Research Journal of Engineering and Technology, Volume 2, Issue 3 on pp. 1965 1970, June 2015.

5) B. S. S. Tharaniya soundhari, M., “Intelligent interface based speechrecognition for home automation using android application,” pp. 1 –11, march 2015
BCC Research, “Sensors: Technologies and global markets,”.

6) S.P. Pande, Prof. Pravin Sen, “Review On: Home Automation System for Disabled People Using BCI” in IOSR Journal of Computer Science (IOSR-JCE) e-ISSN:2278-0661, p-ISSN: 2278-8727 PP 76-80.
Basil Hamed, “Design & Implementation of Smart House Control Using LabVIEW” at International Journal of Soft Computing and Engineering (IJSCE) ISSN: 2231-2307, Volume-1, Issue-6, January 2012.

7) Basma M. Mohammad El-Basioni1, Sherine M. Abd Elkader2 and Mahmoud Abdelmonim Fakhreldin3, “Smart Home Design using Wireless Sensor Network and Biometric Technologies” at Volume 2, Issue 3, March 2013.

8) Inderpreet Kaur, "Microcontroller Based Home Automation System with Security" at IJACSA) International Journal of Advanced Computer Science and Applications, Vol.1, No. 6, December 2010.
9) M. Zhou, "Internet of Things: Recent advances and applications", Proceedings of the 2013 IEEE 17th International Conference on Computer Supported Cooperative Work in Design (CSCWD), 2013.
10) J. Gubbi, R. Buyya, S. Marusic, and M. Palaniswami, "Internet of Things (IoT): A vision, architectural elements, and future directions," Future Generation Computer Systems, vol. 29, no. 7, pp. 1645–1660, 2013
11))Qiu, Tie, et al. "ERGID: An efficient routing protocol for emergency response Internet of Things." Journal of Network and Computer Applications 72 (2016): 104-112.
12) H. ElKamchouchi, Ahmed ElShafee (2012) "Design and Prototype Implementation of SMS Based Home Automation System" IEEE International Conference on Electronics Design, Systems and Applications (ICEDSA), pp. 162-167
13) Neng-Shiang Liang, Li-Chen Fu, Chao-Lin Wu (2002) " An integrated, flexible and Internet based control architecture for home automation system in the internet era" 2002 IEEE International Conference on Robotics and Automation, vol. 2, pp. 1101 – 1106
14) Neha Malik, Yogita Bodwade (2017) "Literature Review on Home Automation System" International Journal of Advanced Research in Computer and Communication Engineering, Vol. 6, Issue 3, pp. 733-737
15) Rakesh K. Deore, Vijay R. Sonawane, Pooja H. Satpute (2015) "Internet of Thing Based Home Appliances Control" International Conference on Computational Intelligence and Communication Networks (CICN), pp. 898-902
16) Debroy, Saptarshi, et al. "SpEED-IoT: Spectrum aware energy efficient routing for device-to-device IoT communication." Future Generation Computer Systems (2018).
17) Pan, Meng-Shiuan, and Shu-Wei Yang. "A lightweight and distributed geographic multicast routing protocol for IoT applications." Computer Networks 112 (2017): 95-107
18)Kyu Hwang and Jin-Wook Baek (2007) "wireless access monitoring and control system based on digital door lock" IEEE Transactions on Consumer Electronics, Vol. 53, No. 4, pp.1724- 1730
19) Tanenbaum and D. Wetherall , "Introduction, Computer networks. Boston: Pearson Prentice Hall,".2011
20) 1) R.Parashar, A. Khan and Neha , "A Survey. The Internet of Things," International Journal of Technical Research and Applications, vol. 4, no. 3, pp. 251–257.2016.