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Home Automation and Automatic Temperature Control

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Abstract: A Home Automation or Smart Home is a very Useful Project Based on IoT Which Can Be controlled Worldwide with Google Assistant and Alexa this is done using Node-MCU ESP8266, Sinric pro and Google home. With this Node-MCU ESP8266 project, we can control home appliances with Google Assistant, Alexa or any other assistants and manual switches. The control of the relays from the google home or amazon Alexa app and other relevant apps from anywhere in the world. The control the relay module from the manual switches is possible in case of any disturbances in the internet connections. The devices like google nest or amazon echo dot is not necessary for the control of the model through vocal command instead smart devices are made use. The control of the fan or the air conditioner for the optimum temperature control, the modulation by the usage of thermostat and the temperature sensor is done. The Home automation system is extension of current activities performed inside the home and this home automation system can be developed easily now a days. Due to powerful computational devices and wireless sensors network, to IoT based smart bank to achieve home automation with gesture detection and control. The main objective of this project is to develop a home automation system using microcontroller which can be controlled by the mobile phones. Modern houses are gradually shifting from conventional switches to centralized control system, involving remote controlled switches.

I. INTRODUCTION

The Home automation is the technology referred to the automatic and electronic control of household features, activity, and appliances in simple terms, it means you can easily control the utilities and features of all the houses via the internet to make life more convenient and secured and even spend less on household bills. Home automation system typically connects controlled devices to a central Smart home hub (sometimes called a "Gateway"). The user interface for control of the system uses either wall-mounted terminals, tablet or desktop computers, a mobile phone application, or a Web interface that may also be accessible off-site through the Internet.

While there are many competing vendors, there are increasing efforts towards open-source systems. However, there are issues with the current state of home automation including a lack of standardized security measures and deprecation of older devices without backwards compatibility. Home automation has high potential for sharing data between family members or trusted individuals for personal security and could lead to energy saving measures with a positive environmental impact in the future. The main objective of this project is to develop a home automation system using an Arduino board with Bluetooth being remotely controlled by any android OS smartphone, modern houses are gradually shifting from conventional switches to centralized control system, involving remote controlled switches.

Fig 1 - Internet of things

1.1 History:

Early home automation began with labor-saving machines. Self-contained electric or gas powered home appliances became viable in the 1900s with the introduction of electric power distribution and led to the introduction of washing machines (1904), water heaters (1889), refrigerators (1913), sewing machines , dishwashers, and clothes dryers.

In 1975, the first general purpose home automation network technology, X10, was developed. It is a communication protocol for electronic devices. It primarily uses electric power transmission wiring for signaling and control, where the signals involve brief radio frequency bursts of digital data, and remains the most widely available. By 1978, X10 products included a 16-channel command console, a lamp module, and an appliance module. Soon after came the wall switch module and the first X10 timer. By 2012, in the United States, according to ABI Research, 1.5 million home automation systems were installed. Per research firm Statista more than 45 million smart home devices will be installed in U.S. homes by the end of the year 2018.

The word "demotics" is a contraction of the Latin word for a home and the word robotics. The word "smart" in "smart home" refers to the system being aware of the state of its devices, which is done through the information and communication technologies (ICT) protocol and the Internet of Things (IoT).

1.2 Present scenario:

Home Automation is a set of components that aims to trigger / move or monitor the most diverse loads and variables within a building to promote convenience, safety and efficiency for the user, this term means status and has a relatively high price for the acquisition. The automation of a residence and the adaptations that justify the insertion of technological parameters have to be based on the notions of equity with regard to the use of electrical energy, the building electrical installations, in the traditional format, follow predetermined norms that extend since its distribution as all the dimensioning of equipment and conductors, since the conductors can be qualified by the economic characteristic and accessibility in the market, the most used ones are copper and aluminum. ABNT NBR 5410 (2004) standardizes that there is a series of minimum value requirements for installing conductors and safety equipment. The parameters indicate that for the minimum section of the supply conductors of a lamp, it must have a minimum section of 1.50mm². What reflects in view of ANEEL's indication (2010) that in building electrical installations there are standards defined by the voltage concessionaire of 117Vac or 220 Vac voltage with the nominal frequency of 60 Hz, the cables used in the installations are dimensioned for three Phases, Neutral, Return and Earth. What highlights the standardization of the system to be used. According to Oliveira (2019), Alves (2003), Teza (2002) Sebrae (2015) and Gomes (2016) home automation is an impacting technological tool and refers to: "Union of the words domes and robotics. Domus of Latin origin has the meaning of home, and the word robotics is the science that develops automated mechanical systems controlled by an electronic system. Home automation is the union of sensor technologies, logic controllers and actuators that perform interventions in the building controlling the systems. Starting from a coincident idea of automation carried out in industries.

II. LITERATURE SURVEY

Zigbee based home automation system using cell phones: To monitor and control the home appliances the system is designed and implemented using Zigbee. The device performance is record and store by network coordinators. For this the Wi-Fi network is used, which uses the four-switch port standard wireless ADSL modern router. The network SSID and security Wi-Fi parameter are preconfigured. The message for security purpose first process by the virtual home algorithm and when it is declared safe it is re-encrypted and forward to the real network device of the home. Over Zigbee network, Zigbee controller sent messages to the end. The safety and security of all messages that are received by the virtual home algorithm. To reduce the expense of the system and the intrusiveness of respective installation of the system Zigbee communication is helpful.

Home automation using Android ADK: The devices of home are associate to the ADK, and the Connection is established between the Android device and ADK. The devices of house are link to the input/output ports of the board (EMBEDDED SYSTEM) and their current situation will have passed to the ADK. The microcontroller board (Arduino ADK) is based on the ATmega2560. It has a USB host connection to associate with Android based phones, and that is based on the MAX3421e IC. The two important features of Android Open Accessory Protocol 2.0(AOAP) are as follows: It has audio output that is from the Android device to the component, and it also support for the component serves as one or more Human Interface Devices (HID) to the Android device. This paper depends upon Android and Arduino platform in which both are FOSS(Free Open-Source Software). Including motion sensors for safety systems will detect an unauthorized action and it will automatically notice the user through cell phone or the security system

Wi-Fi based home automation system using cell phones: Wi-Fi based home automation system mainly consist of three modules, the server, the hardware interface module, and the software package. The figure shows the system model layout. Wi-Fi technology is used by server, and hardware Interface module to communicate with each other. The same technology uses to login to the server web-based application. The server is connected to the internet, so remote users can access server web-based application through the internet using compatible web browser. Software of the latest home automation system is split to server application software, and Microcontroller (Arduino) firmware. The Arduino software, built using C language, using IDE comes with the microcontroller itself. Arduino software is culpable for gathering events from connected sensors, then applies action to actuators and preprogramed in the server. Another job is to report the and record the history in the server DB. The server application software package for the proposed home automation system, is a web-based application built using

asp.net. The server application software can be accessed from internal network or from internet if the server has real IP on the internet using any internet navigator supports asp.net technology.

Irjet Template sample paragraph. Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, SC, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

Fig 2 - Smart house

Smart home is widely used technology in the future generation, as the improvement in the technology of the field like electrical and other fields enhance the living style and economically helpful.

Fig 3 - Animation of smart technology

A smart home allows homeowners to control appliances, thermostats, lights, and other devices remotely using a smartphone or tablet through an internet connection. Smart homes can be set up through wireless or hardwired systems. Smart home technology provides homeowners with convenience and cost savings.

III. PROBLEM STATEMENT

The major Problems Faced by automation in recent times are: -

i. Insufficient features and functionality
ii. Too many controls application
iii. No manual control
iv. Delay in operation.
v. No integrated sub systems
vi. Cost In-efficient

IV. OBJECTIVES

- Due to these Various problems faced in automation We through our Project plan to Accomplish to build:
- A Cost Efficient and Effective Integrated Automation system.
- Low Delay and Perfect automation system
- Using Modern AI software (Google Assistant, Amazon Alexa) and manual control equipment.
- To help Handicapped and Aged people control home appliances from wherever they want.

V. METHODOLOGY

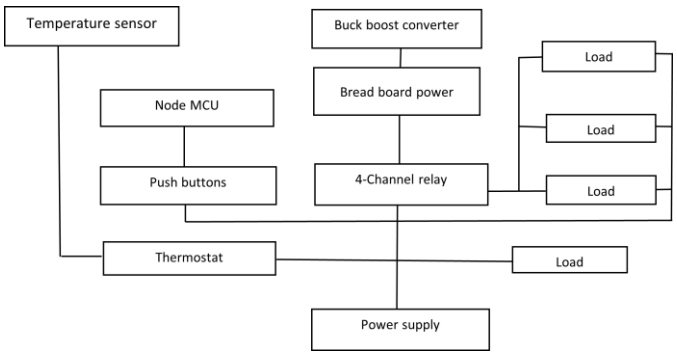

Fig 4 – Home automation and automatic temperature control block diagram

Node-MCU is a low-cost open source IoT platform. It initially included firmware which runs on the ESP8266 Wi-Fi SoC from Espress-if Systems, and hardware which was based on the ESP-12 module.
Node-MCU is an open-source firmware for which open source prototyping board designs are available. The name "Node-MCU" combines "node" and "MCU" (micro-controller unit). The term "Node-MCU" strictly speaking refers to the firmware rather than the associated development kits.
The 4 Channel Relay Module is a convenient board which can be used to control high voltage, high current load such as motor, solenoid valves, lamps, and AC load. It is designed to interface with microcontroller such as Arduino, PIC etc. The relays terminal (COM, NO and NC) is being brought out with screw terminal. It also comes with a LED to indicate the status of relay.
The W1209 is an incredibly low cost yet highly functional thermostat controller. With this module (HCTHER0006) you can intelligently control power to most types of electrical device based on the temperature sensed by the included high accuracy NTC temperature sensor.
A thermostat is device that detects temperature changes for the purpose of maintaining the temperature of an enclosed area essentially constant. In a system including relays , valves, switches,
the thermostat generates signals, usually electrical, when the temperature exceeds or falls below the desired value.
A temperature sensor is a device, typically a thermocouple or resistance temperature measurement in a readable form through an electrical signal. A thermometer is the most basic form of a temperature meter that is used to measure the degree of hotness and coolness.
The buck-converter is a type of DC-to-DC converter that has an output voltage magnitude that is either greater than or lesser than the input voltage magnitude. it is equivalent to a flyback converter using a single inductor instead of a transformer.
4 Channel relay is an interfacing board which is to control the various appliances and other equipment with larger currents. It can be controlled directly by microcontrollers.

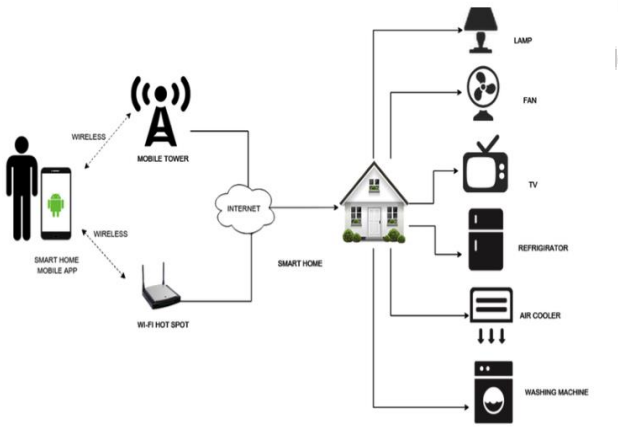

Fig 5 - Home automation control

VI. HARDWARE AND SOFTWARE REQUIREMENT

6.1 Hardware requirement

The following project consists of the following parts:

1. Node-MCU ESP8266
2. 4-channal 5v relay module
3. Buck-boost converter
4. Thermostat
5. Temperature sensor
6. Manual switches

6.2 Software requirement

The following project consists of the Software's:

1. Adriano IDE
2. Sinric pro
3. Google Home
4. Amazon Alexa
   Or any other AI software's

VII. DISADVANTAGE OF EXISTING SYSTEM

The major Problems Faced by automation in recent times are: -

1. Insufficient features and functionality
2. Too many controls
3. No manual control
4. Delay in operation.
5. No integrated sub systems
6. Cost In-efficient

VIII. HARDWARE IMPLEMENTATION

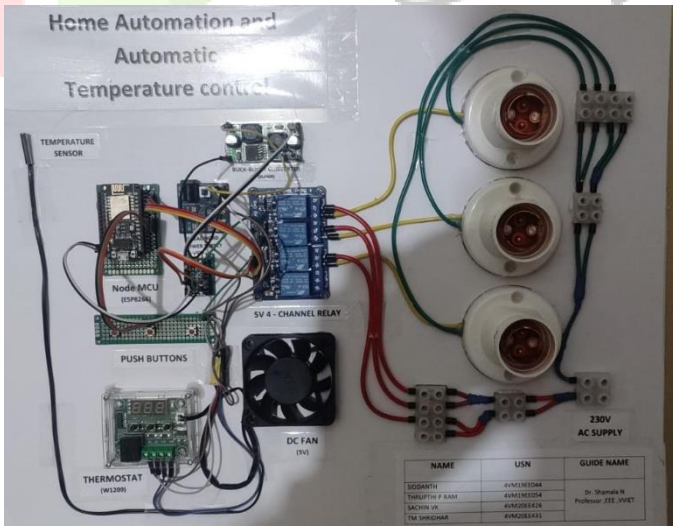

Fig 6 – Home automation and automatic temperature control

Advantages:

1. It can operate anywhere through the world.
2. Security against burglars.
3. It is available at low cost.
4. Voice control home function.
5. Managing all your home appliances from one place. The convenience factor here is enormous.
6. Flexibility for new devices and appliances also Maximizing home security.
7. Remote control of home functions.
8. Increased energy efficiency.
9. Improved appliance functionality.
10. Home management insight.
11. Reduce human effect: As the system works automatically humans do not required to apply more efforts.
12. Multi-tasking: Multiple tasks are done at the same time without the efforts of the human.
13. Reduce time: As the system is multi-tasking so the time required will be less.

IX. APPLICATIONS

1. Lighting control
2. Lawn/Gardening management
3. Smart home appliances
4. Improved home safety and security
5. Home air quality and water quality monitoring
6. Better infotainment delivery
7. Most preferable language-based voice assistant

X. SCOPE FOR FUTURE WORK

Using this system as a framework. The system can be expanded to include various other options which could include home security features like capturing the photo of a person moving around the house and storing it onto the cloud. This will reduce the data storage that using the CCTV camera which will record all the time and stores it. The system can be expanded for energy monitoring or weather stations. This kind of a system with respective changes can be implemented in the hospitals for disabled people or in industries where human invasion is impossible or dangerous and it can also be implemented for environmental monitoring. Future scope for the home automation systems involves making homes even smarter. Homes can be interfaced with sensors including motion sensors, light sensors and temperature sensors and provide automated toggling of devices based on conditions. Home automation offers a global standard for interoperable products. The home automation market is primarily driven by growing need for effective solutions in various domestic applications such as lighting, safety and security, energy management, entertainment, heating, ventilation, and air conditioning

XI. CONCLUSION

The Home automation using IoT has been experimentally proved 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 sensor but also actuates a process according to the requirement. For example, the switch 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. Home automation is undeniably a resource which can make a home environment automated. People can control their electrical devices via these home automation devices and set up controlling actions through mobile. In future this product may have high potential for marketing. Further it can be demonstrated from computer instead of mobile phones for controlling appliances of any large places like industries, hospitals, institutions etc., centrally.

XII. REFERENCES

[1] Hill, Jim (12 September 2015). "The smart home: a glossary guide for the perplexed". T3. Retrieved 27 March 2017

[2] "IOT Brings Fragmentation in Platform" (PDF). Archived from the original (PDF) on 2016-10-07. Retrieved 2018-03-19

[3] Heierman, E.O.; Cook, D.J. (2003). "Improving home automation by discovering regularly occurring device usage patterns". Third IEEE International Conference on Data Mining. Melbourne, FL, USA: IEEE Compute. Soc: 537–540.

[4] Open-Source Projects for IoT". Linux.com | The source for Linux information. Retrieved 2016-11-22

[5] Hendricks, Drew. "The Trouble with the Internet of Things". London Datastore. Greater London Authority. Retrieved 10 August 2015

[6] "Project Connected Home over IP". Google Developers Blog. Retrieved 16 September 2020.

[7] Mihalcik, Carrie. "Apple, Amazon, Google, and others want to create a new standard for smart home tech". CNET. Retrieved 24 December 2019

[8] "A more helpful Google Assistant for your everyday". Google. January 7, 2020. Retrieved January 21, 2020

[9] Energy Information Administration, ‘‘Residential energy consumption survey,’’ U.S. Dept. Energy, Washington, DC, Tech. Rep., 2001

[10] KMC Controls. "Room Sensor and Thermostat: Mounting and Maintenance Application Guide" (PDF). Retrieved April 12, 2021.