IOT BASED HOME AUTOMATION SYSTEM

Sai Prakash. H, Smithin Reddy, P. Sudheer Reddy, Boini Ganesh, Ravi Kant Sahu

School of Computer Science & Engineering

Lovely Professional University, Jalandhar, India

Abstract:

Nowadays everyone is leading a busy life; people are choosing smart and efficient ways to deal with the tasks in daily routines. And many organizations and companies are working on reduction of energy consumption and try to save energy in every possible way. To compensate it many smart and automated products or appliance are introducing in the world market. This is the project that came from all these factors, that is to create a system that has the ability to access and control the home appliances form anywhere in the world because one of the major factors is wasting of electricity. An android application or web is used to control all the appliances. In this most different technology are used like Bluetooth, Wi-Fi, Arduino Uno, ZigBee helped to Create the project. These kinds of projects are increasing and attracting the people. This paper gives all information and analysis similar kind of projects.

General Terms:

Home Automation System, Web Application, Remote access Systems, Embedded System and Mobile Application.

Keywords:

Raspberry Pi, Portability, Physically Challenged, Electrical and Electronic Devices, Home Automation, GUI, Arduino Uno and Energy Conservation.

I. INTRODUCTION:

IoT is the base technology helped to build these projects it is the combination of electronics and software that with the internet. Using the GUI technology, sensors, Arduino made the more advanced and easier to use for the user. Remotely accessible to ON/OFF the electrical appliances such as lights, fan, AC, water motors, heaters, etc. Mobile and web applications made more informative are provides data about the amount of withdrawal of electricity. Some of the provides advanced security feature that allows fingerprints and sends alerts via messages to the owner or tenant when someone tries to open forcefully. This paper aims to perform a survey of some of the leading projects build before and compares with each project.
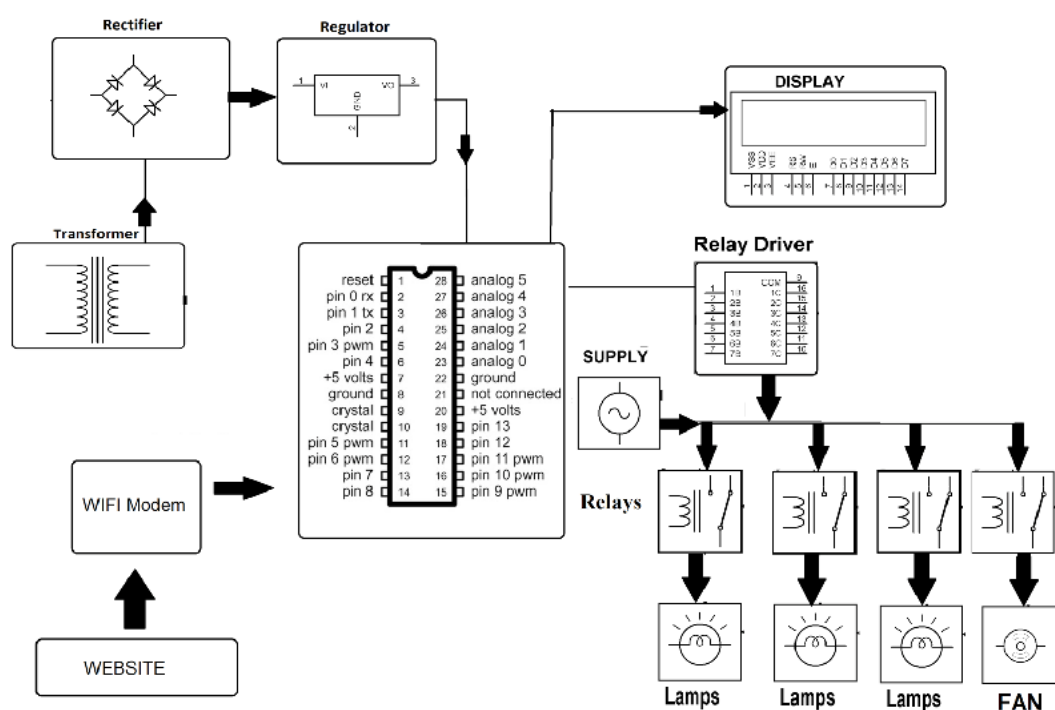
The paper will also compare and contrast all the systems and look at their various features and disadvantages. A wide variety of options are available for home automation systems. All of these will be examined at length.

II. METHODOLOGIES:

2.1 Home Automation System Using IoT (HAS)

This project is about the development of the automation of home appliances. It is based on IoT technology. Home Automation System (HAS) can be developed easily nowadays, because of powerful computational devices and wireless sensor networks. It provides user-friendly and cost-efficient. In these different technologies are used for communication like Wi-Fi, Bluetooth, and ZigBee. For instance, this can include turning on your air conditioning or you're heating while you are still in your car on your way back home. Smart home technologies can be quite convenient, yet there are also some problems associated with them. There are many other things that you can do if your home is connected which can save you plenty of energy and also gives you full control over your home you can even adjust several settings in other rooms of your house.

This gives you full control over your home and you can even adjust several settings in other rooms of your house. Smart homes can be easier to manage and more comfortable than conventional houses because your systems can be aligned to your particular needs. According to top real estate analysts, investment in smart home technology can help increase your home's resale value. Many home-

buying consumers are willing to pay for the features that are associated with smart homes.

2.1.1 Basic Flow diagram

2.2 Smart Home Automation System:

Home Automation System (HAS) can be developed easily nowadays, because of powerful computational devices and wireless sensor networks. It provides user-friendly and cost-efficient. Smartphones, tablets, and laptops are been used to control the appliances with the help of different communication technologies like Wi-Fi, Bluetooth and ZigBee. HC-05 Bluetooth module which is remotely controlled by a smartphone. Moreover, remote-controlled switches are more used than conventional switches to operate electrical appliances. It did not have the Google and Alexa support to access the control. With that, it makes a huge difference in adding that support to access the appliances. We are dealing with different software coding compared to this. Arduino UNO board is used to develop these projects. In some other projects, motion-detecting sensor lights are used for floodlights and used microphones and microcontrollers to receive the command.

It needs a separate password to access the controls of the whole system. They are used to control a high voltage circuit with a small voltage signal that cannot on and off the appliances manually. It needs a special technician to repair or replace the malfunctioned parts in the system.

2.3 Arduino based Home Automation System:

Everything in the world is been automated. Every sector is updated most systems have become machine-driven, such as industrial automation, automation in homes and alternative businesses. People are choosing the system which has less human effort so that the home automation project is used for the development of the home appliances controlling system. The help of the phones, laptops, and tablets runs in most the human hands which makes it easy to complete the tasks. With the help of them, this project is developed. This project offers the touch screen by replacing the manual switchboards it adds a premium flavor to the whole project.

GUI (Graphical User Interface) application on the phone that receives the command and transmits the information. Using the landline connection, it acts as a remote in the absence of a phone. The proposed system controls any home appliances through a landline if someone dials the selected number for an exact load. We can dial from the home phone or any other outside phone. A remote controller is also provided in this project using RF technology. Some features are touch screen is provided which provides more details. Remote controls, Google assistant, voice-controlled and timer controls, and Landline phones are also used to control appliances. Many modes of control are there to switch on/off the appliances.

2.4 Individual Control Home Automation System:

Home automation has made it possible to have smart and intelligent life at home. It can detect and identify, automatically adjust the lighting to our taste, it opens the door automatically, plays our favorite music, water the plants, heats the water for bath and tea, it can do almost every work we do basically. It makes life very easy it provides lighting, entertainment, security, communications, and temperature adjustment all in one centrally controlled system. This project is highly advanced from most of the other projects I had seen. This is very useful for people who have a busy schedule every day and handy for maintaining huge houses with less staff. A house with all appliances and devices is best suitable for this project. It detects smoke, excessive electrical power usage, burglar attempts, and unauthorized movements in the house and alerts you. RFID (Radio Frequency Identification) tags are used in this project.

Major advantages are various sensors are used in this for recognition, temperatures and controlling purposes. Temperature controlling, security alarm interface and sensors, very easy to operate the system, Audio-video control, sense and remote controlling, useful for the mansion, complexes, and malls. Cons are Very expensive; LAN is needed throughout the home circumference. It works on different technology so to set up things it needs expert, high maintenance.

2.5 An Intelligent, Secure and Smart Home Automation System:

People love the luxury of caring for and changing the state of electronics in any part of the world using remote access. Eventually it has become a necessity for everyone. It is a flexible and inexpensive solution to everyday life problems, although researchers propose to use multiple sensory combinations. The project is structured in a straightforward manner, exploring all the key parameters that make the system difficult. Not displayed with user GUI environment. Users are unable to understand system performance due to lack of GUI information. Unlike most expensive systems, it does not provide electricity bill forecasts and can retrieve information from a computer or other electronic device. The GSM technology module enables you to control household electrical items such as lighting, conditional system, and security system via SMS text messages. It provides a cloud-based solution that controls appliances through the internet with it uses blockchain technology that ensures identification and authentication. To ease the user's prototype of the home design that is added in it. Some plus points are Identification and Security system alerts, very ease to operate the system, remote controlling, and budget-friendly. Drawbacks are not fancy, less digital informs.

Table 1 Comparison report of all System.

PROJECT	2.1	2.2	2.3	2.4	2.5
APPLIANCES	Small voltage appliances	All appliances	All appliances	All appliances	Small voltage
BLUTOOTH	Yes	Yes	No	No	Yes
PHONE BASED	Yes	Yes	Yes	Yes	Yes
AUTHENTICATION REQURIED	No	Yes	No	No	No
COST	Moderate	Expensive	Expensive	Very expensive And premium	Cost-friendly
VOICE COMMAND	No	Yes	Yes	Yes	No
GOOGLE ASSISTANT	Yes	Yes	Yes	Yes	No
ZigBee	Yes	Yes	No	Yes	Yes
TOUCH SCREEN	No	No	Yes	Yes	No
REMOTE	No	No	Yes	Yes	Yes

III. ACKNOWLEDGEMENT:

I'd like to thank Professor Ravi Kant Sahu, for the patient instruction, passionate support, and useful critiques of this research work. We are grateful to all of my team with whom we had the pleasure to work with Prakash, Sudheer, Ganesh, and Smithin during this project. We would also like to show our gratitude to Lovely Professional University for sharing their pearls of wisdom with us during the course of this research.

IV. CONCLUSION:

According to all the systems surveyed and their advantages and drawbacks, this paper presents the features to be possessed by an ideal system for home automation with remote access. This kind of automation system will be more advanced by using interfaced with sensors including motion sensors, light sensors, and temperature sensors, and provide automated toggling of devices based on conditions. An ideal system should be available from all over the world to a user and in real-time. In the future, it will be used a very wide range of homes and more advanced versions in complexes, offices, and malls. Some countries like USA, Israel, and Japan already implemented it in greater communities. Soon it will be available at affordable prices with more features.

4. REFERENCES:

https://www.electricaltechnology.org/2019/07/smart-home-automation-system.html

https://www.electricaltechnology.org/2018/02/voice-recognition-based-home-automation-system.html

elprocus.com/home-automation-projects-engineering-students/

https://www.academia.edu/7130278/INDIVIDUAL_CONTROL_HOME_AUTOMATION_SYSTEM?pop_sutd=false

https://www.researchgate.net/publication/345000793_An_Intelligent_Secure_and_Smart_Home_Automation_System

https://nevonprojects.com/iot-home-automation-project/