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IoT BASED HOME AUTOMATION SYSTEM USING RASPBERRY Pi

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Abstract- The proposed system is to develop a home automation system using, Raspberry Pi 2 controller which may be used to control the house appliances through mobile application via the internet. Nowadays, individuals have smartphones with them all the time; therefore, it is sensible to control home appliances using application, that we are able to manage electrical home appliances with a simple click and these commands are sent via the web. In this project, we have got an inclination to tend to use the Raspberry Pi2.Using this, we are going to manage indoor lights, outdoor lights, electrical fans, and other home appliances through a mobile. The appliances are connected to relays that is controlled by the Raspberry Pi2. Unlike most gettable home automation system at intervals the market, the planned system is ascendible that one server can manage many hardware interface modules as long as a result of it exists on computer network coverage. The system supports home automation devices like power management components and security components.

KEYWORDS*: Raspberry Pi, Home Automation System, IOT.*

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I INTRODUCTION

The Internet of things (IoT) is the network of everyday objects – physical things embedded with electronics, software, sensors and connectivity enabling data exchange. IOT improves efficiency, accuracy, economic benefits along with reduced manpower. Temperature has an impact on all activities surrounding us. A precise determination of temperature is a vital factor in countless industries and different fields of science. Temperature sensors possessing temperaturedependent properties that can be measured electrically contain resistors, semiconductor mechanisms such as diodes and thermo-couples. The sensor utilized here is the LM35, LDR, ultrasonic sensor.

Home automation or Smart Homes can be described as introduction of technology within the home environment to provide convenience, comfort, security and energy efficiency to its occupants .The electrical and electronic appliances such as fan, lights, outdoor lights, fire alarm, kitchen timer, etc. can be controlled using various control techniques. Raspberry- pi is low cost small and portable size of computer board. It can be used to plug in to computer monitor or television, keyboard, mouse, etc.

1.1 Need of project

The benefits of home automation typically fall into a few categories, including savings, safety, convenience, and control. Additionally, some consumers purchase home automation for comfort and peace of mind.Here's a closer look at some of the biggest benefits that home automation provides.

- Savings: Smart thermostats and smart light bulbs save energy, cuttingutility costs over time rebates. Consumers

purchase these devices because they want to make their homes safer and more secure. Automated lightingthwarts would-be burglars, and motion sensors help people enter doors and walk hallways late at night

- Convenience: Because home automation technology performs rote tasks automatically, end users experience great convenience. For instance, you could set your smart locks to turn on your smart lighting when you unlock the front door.
- Control: Consumers also choose smart home devices to better control functions within the home. With home automation technology, you can know what's happening inside your home at all times.
- Comfort: Some people use smart technology to record shows or to play music throughout the home. Connected devices can also help create a comfortable atmosphere—they provide intelligent and adaptive lighting, sound, and temperature, which can all help create an inviting environment.
- Peace of Mind: Finally, many consumers invest in home automation technology for peace of mind. A new mom or dad can check on their little one thanks to smart cameras and other technologies. Or, if you can't remember whether you closed the garage after you left, you can verify remotely with an app.

1.2 Motivation of the project

The motivation for developing smart home systems comes from many reasons, but most prominent are convenience, security, energy management, connectivity and luxury. Smart Home systems are one of the newer areas of research that have not been fully integrated into our society. This is because the research requires many other disciplines of research and engineering to produce a functional smart home. The cost of installing a smart home is also a large hindrance to the emergence of smart home systems into the market.

The extra cost of the install is from the fact that even though a majority of homes were built in the near past, technology has been growing exponentially. This means that most homes were built before this technology was available, and this creates a barrier for the development and sales of smart home systems. However the technology is becoming better and cheaper, and this will help to make smart home systems an expense worth having when new homes are being built.

II RELATED WORK

[1] Akbar Satria, Muhammad Luthfi Priadi, Lili Ayu Wulandhari and Widodo Budiharto School of Computer Science, Bina Nusantara University, Jakarta-Indonesia wbudiharto@binus.edu

The main proposal behind this paper was to create a mobile app on a Smartphone gadget so the user can be in charge of electronic strategy; see the amount of flow that has been used in the quantity of dollars, so the problem is the complexity in saving electricity which can be determined. progress and design was done by collecting data using questionnaire to the respondents. Design method using annotations to distribute questionnaires and to learn literature, and then afterwards doing the designing in hardware (that is the microcontroller) made United Model Language (UML), database designing, code implementations and creation of user interfaces on an IOS and on the Android. The result of this study is the implementation of a remote home automation purpose in mobile which can help the users in charge to controlling the home and determining the costs of electricity that has been used in every electronic tool so that the optimization is achieved.

[2] Ravi Wankhade, Shashank Karhade, Pratik Mohite, Kanchan Dhole "Home Automation System Based on IOT using Cellular Devices", 2019 IJSRST | Volume 6 | Issue 1 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X.

This paper proposes 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. Internet by using Bluetooth wireless technology to provide a link from the appliance to the Internet and Wireless Application Protocol (WAP) to provide a data link between the Internet

and a mobile phone. However, technical details relating to the controller are not revealed.

[3] **A Mathi,P.Thilagavathy "Home Automation Based On IOT",International Journal of Advance Research, Ideas and Innovations in Technology. ISSN: 2454-132X Impact factor: 4.295 (Volume3, Issue3) Available online at www.ijariit.com**

This paper proposes a new design for the smart home using the wireless sensor network and the biometric technologies. The proposed system employs the biometric in the authentication for home entrance which enhances home security as well as easiness of home entering process. The paper ends with an imagination for the future of the smart home when employs the biometric technology in a larger and more comprehensive form. The paper ends with an imagination for the future of the smart home when employs the biometric technology in a larger and more comprehensive form.Personal digital assistants (PDAs) or handheld computers are generally considered embedded devices because of the nature of their hardware design, even though they are more expandable in software terms. This line of definition continues to blur as devices expand. With the introduction of the OQO Model 2 with the Windows XP operating system and ports such as a USB port — both features usually belong to "general purpose computers", — the line of nomenclature blurs even more.

[4] Mohammad Kasim1, and Firoz Khan2 "Home Automation using Raspberry Pi-3", Article in Saudi medical journal • July 2015

The main objective of this Paper is to design and implement a control and monitor system for the smart house. Smart house system consists of many systems that controlled by LabVIEW software as the main controlling system in this paper. Also, the smart house system was supported by the remote control system as a sub-controlling system. Internet of Things (IoT) is a concept that imagines all objects around us as part of internet. IoT covers a very wide range of objects and includes variety of objects like smart phones, tablets, digital cameras and sensors. When all these devices are connected to one another, they enable more and more smart services and processes that support our everyday needs, environment and health. Cloud based platforms help to connect to the things around us so that we can access anything at any time and any place in a user friendly manner using customized portals and built-in applications.In this paper we present a Home Automation system (HAS) using Arduino Uno.

[5] Mohamed Hisham Moubarak "Internet of Things for Home Automation", Media Engineering and Technology Faculty German University in Cairo15 May, 2016

A home gateway system for interconnecting home network consisting of IEEE 1394 AV network and X10 power line home automation network with Internet. This provided remote access functions from Internet for digital AV appliances like Digital Video Camera,Digital VCR connected to IEEE 1394 network and home appliances like TV desk lamp, electric fan connected to X10 controller.- Internet of Things (IoT) is a concept that imagines all objects around us as part of internet. IoT covers a very wide range of objects and includes variety of objects like smart phones, tablets, digital cameras and sensors. When all these devices are connected to one another, they enable more and more smart services and processes that support our everyday needs, environment and health.Applications that interact with devices like sensors and digital cameras have special requirements for massive amounts of storage to store big data, huge computation power to enable the real time processing of the data into information. In this paper we present a Home Automation system (HAS) using Raspberry Pi3.

[6] Kari Pulli, Anatoly Baksheev, Kirill Kornyakov, and Victor Eruhimov. "Real-time computer vision with opencv communication", ACM, 55(6):61{69, June 2012.

The home appliances were controlled from ports of embedded system board connected to PC based server at home. The main security is provided by camera module which captures the images and uploads into the internet and also stores the same images in Raspberry pi module SD card. Raspberry pi acts like a small minicomputer it is totally a Linux platform. By just connecting mouse and keyboard

we can operate it as minicomputer where we can play games, play videos etc just like our personal laptop work. And also the WI-FI module is used in this project to control the devices from remote location also by getting the status of the devices into smart phone android app everything is going on internet itself our day to day life. Future generation will work on internet itself by sitting in one place we can do anything on internet.

[7] R. Piyare and M. Tazil, "Bluetooth Based Home Automation System Using Cell phone", in IEEE 15th International Symposium on Consumer Electronics, Singapore 2011, pp. 192 195

A system for controlling home electrical appliances over the Internet by using Bluetooth wireless technology to provide a link from the appliance to the Internet and Wireless Application Protocol (WAP) to provide a data link between the Internet and a mobile phone. However, technical details relating to the controller are not revealed. temperature. This will contribute to overall energy saving and cost reduction which is one of the main concerns of many households. This implementation of IOT represents a flexible and low cost home control and monitoring system using an embedded micro-web server, with IP connectivity for accessing and controlling devices and appliances using a web server. The proposed system does not require a dedicated server PC with respect to similar systems and offers a unique communication protocol to control and monitor the home environment with more functionality than just switching.

III METHODOLOGY

Block Diagram

Today in the headway of Automation innovation, life is getting simpler and less demanding in all spheres. Home automation is a modern technology that modifies your home to perform different sets of task automatically. Today Automatic frameworks are being favored over manual frameworks. No wonders, home automation in India is already the buzz word, especially as the wave of second generation home owners grows, they want more than shelter, water, and electricity. The first and most obvious advantage of Smart Homes is comfort and convenience, as more gadgets can deal with more operations (lighting, temperature, and so on) which in turn frees up the resident to perform other tasks.

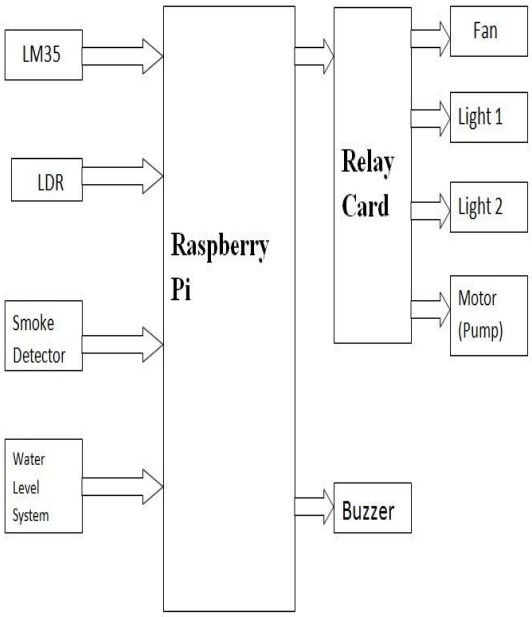

FIG 1 SYSTEM BLOCK DIAGRAM

Smart homes filled with connected products are loaded with possibilities to make our lives easier, more convenient, and more comfortable. There is no shortage of possibilities for smart home IoT devices as home automation seems to be the wave of the future. This block diagram consists of Raspberry Pi, Temperature Sensor, Light Dependant Resister, Smoke Detector, Ultrasonic Sensor, Buzzer, Relay, and external appliances.

Hardware Description

In this hardware description we are discussing about raspberry pi 2 and different kinds of sensors.

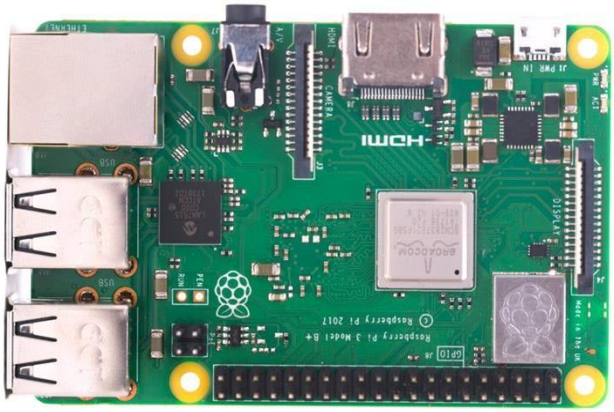

Fig. 2 Raspberry Pi

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The Raspberry Pi is a low cost, small and transferable size of computer board. It can be used to plug-in to computer monitor or television, keyboard, mouse, pen-drive etc.

- Raspberry Pi has built in software such as Scratch which enables users to program and design animation, game or interesting video. In addition, programmers can also develop script or program using Python language; it is main core language in Raspbian operating system.
- The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse System.

IV DESIGN FLOWCHART

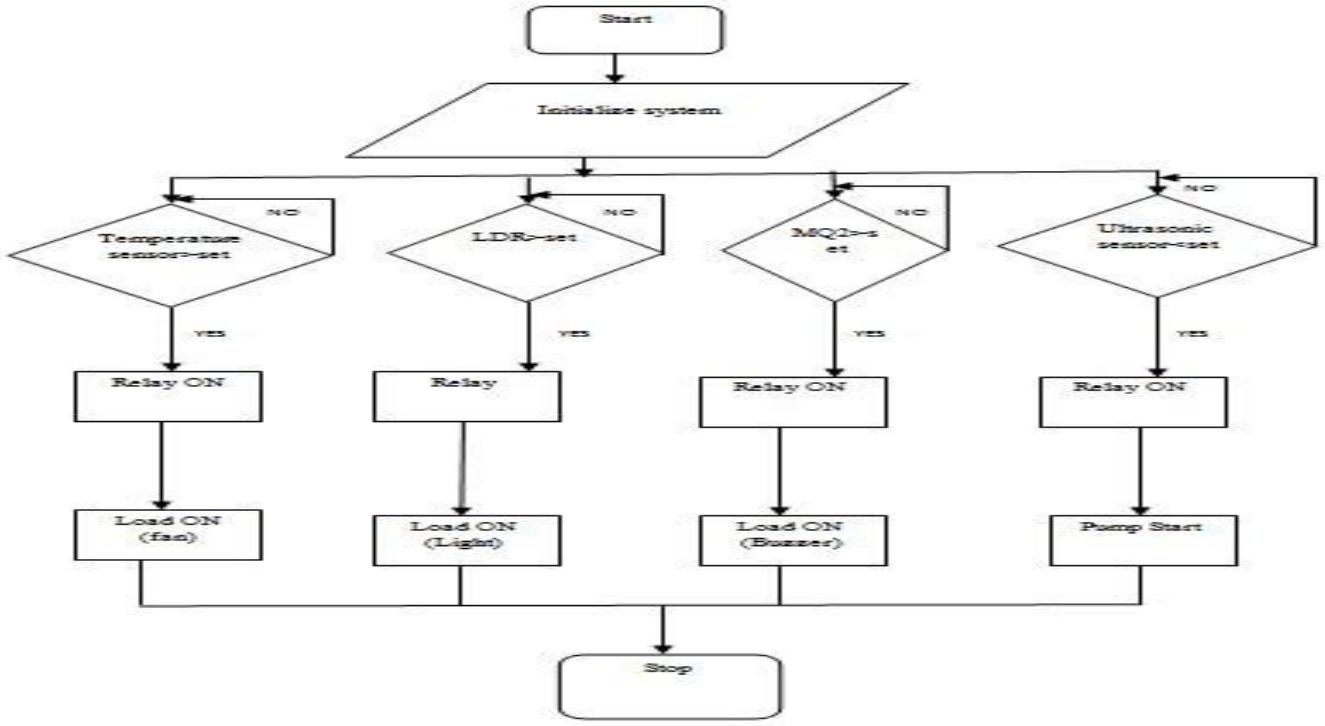

Fig. 3 Design Flow of System

V EXPERIMENTAL RESULTS

Result:

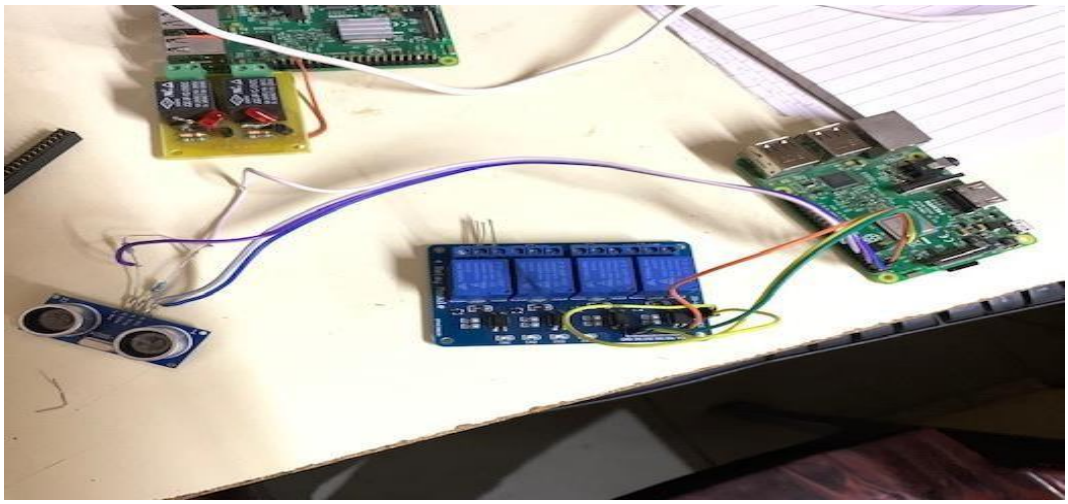

Fig. 4 System In Working condition

Applications

- More security and making it live
- Simpler and easier life.
- Addition of sensors

VI CONCLUSION

The work for IoT based home automation is completed successfully using internet source and Raspberry pi. It is reliable and scalable home automation system with low cost and easy to implement. It makes human life easy and comfortable. It is possible to operate home appliances from any part of the globe.

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