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A Survey on Home Automation System Using IOT

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Abstract—Today's world is agile and modern world. Everything is in this world enhancing digitization using internet. Internet is only one source through which man can discover smart world. Using Automation effort of doing task has reduced abruptly. With the expeditious expanding the figure of internet user the past decade has made the internet as factor of his life and IoT is the current and latest internet technology. Internet of things is a developing network of everyday activity from industrial machine to consumer goods that can contribute the information and complete tasks while you are busy with other activities. Wireless Home Automation system using IoT is a system that adopts the computers system or mobile devices to control essential home purpose and features undoubtedly through internet from anywhere around the world, an automated home is frequently called a smart home. It implies to save the electricity and human energy. Wireless Home Automation System using IoT is the system that controls the home appliances like speed of fan, light and temperature using the mobile phone anywhere around the globe through internet.

Keywords: *Internet of Things, Smart Home, wireless Home Automation system (WHAS), Android Smartphone*

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I. INTRODUCTION

A. Overview

We live in an exciting time where more and more everyday items "things" are becoming smart! "Things" have sensors and can communicate to other "things" and can provide control to more "things". The Internet of Things, IoT, is upon us in a huge way and people are rapidly inventing new gadgets that enhance our lives. The price of microcontrollers with the ability to talk over a network keeps dropping and developers can now tinker and build things in expensively. The home automation systems can be divided into two categorize: locally controlled systems and remotely controlled systems. The one which uses an in-home controller to achieve home automation is locally controlled systems and in such systems the user can control their home devices within the home through wireless interface. Whereas globally-controlled systems uses an internet connection. Such systems can be controlled through mobile devices, personal computer, Laptop, tablets etc. There are some issues with home automation system using

Bluetooth, GPRS or RFID: one is that it needs a separate hardware and software environment to be installed in each home, and the other is limited access as the access area is restricted only within a specific range. Home automation systems using mobile devices through IOT eliminate the need to install and run applications on the customer's own computers and simplify maintenance and support. This project integrates the locally and remotely controlled systems with the use of a Internet of things.
Wireless Home Automation system(WHAS) using IoT is a system that uses computers or mobiles to control basic home features and function automatically through internet from anywhere around the world, an automated home is sometimes called a smart home. It is meant to save the electric power and human energy.
This paper will describe the approach which we are implementing to control various home appliances with Android smart phone.

B. Advantages

In modern years, Wi-Fi has become very trivial in home networking. And in home and building automation systems, wired technology does not provide pliant system that is provided by wireless technology.

1) Economical Installation: In Home Automation system cost of installation is inexpensive as it doesn't require cables for installation. Wired automation need cables, but material as well as the professional mounting of cables) becomes costly.

2) Scalable System and easy to expand: Implementation of wireless network is particularly favorable when the lengthen of network is required because of alteration in demanding. In differ to wired installation in which cabling lengthen is ponderous. This makes wireless installation a strong influence to investment.

3) Desired benefits: Aside from covering large part of area, this system support to full desired requirements as Well. Examples encompass building representation with glass architecture and ancient buildings where design of such a structure does not require any kind of cabling.

4) Assimilating mobile devices:Using wireless networks, mobile devices like smartphones and PAD's having automation system gets possible all over at any time, as a device's specific physical position is never compelling for connection For all such reasons, wireless technology is not only an interesting prime in improvement and replenishment, but also for unique accession.

II. RELATED WORK

A. *Home Automation System Based On Bluetooth*

Home Automation system that exploits the assembling of cloud networking, multi-touch mobiles, power-line communication, wireless communication, and to deliver end user with remote controlling of different lights and gadgets inside their home.A standard Home Automation System using Bluetooth encompasses a host andmore than one client modules. If we consider the transport price of the Bluetooth, it will be low cost of having more than one Device Controllers connected to a Bluetooth device. Every Device Controller, then, checks more than one Attached Devices shown in Fig.

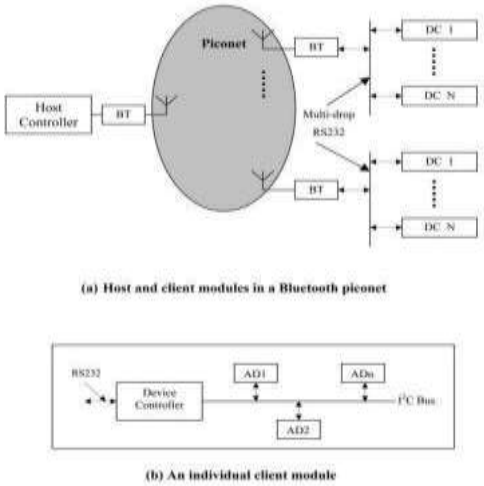

Fig 1.Bluetooth based Home Automation

B. *Block Diagram of Smart House*

Basil Hamed has design, plan and implement smart house control and monitor system. Many more system consist in smart home system which controlled by the software LabVIEW. As also the remote control system used as a sub controlling system was supported by smart house system. The system is connected with internet. By using LabVIEW software the house equipment and appliance can easily monitor and control the system through internet. The computer interfacing and remote control interfacing are two unit interface of smart house. The main control unit for all system in house is computer device that provided with LabVIEW software. The system of smart house perform different operation, it receive data from different sensors, process that information transmit controlling signal to house system and sensors, update it for another different system and sensors and switching output devices. In order to be informed of the changes in the system in additionally LabVIEW has competence to observe the important operation in the system. Operator can also chos the best system control different system competence that required and important. To control some application in the house, remote control interfacing is available of LabVIEW interface for the smart house and it is connected to LabVIEW software for other application.

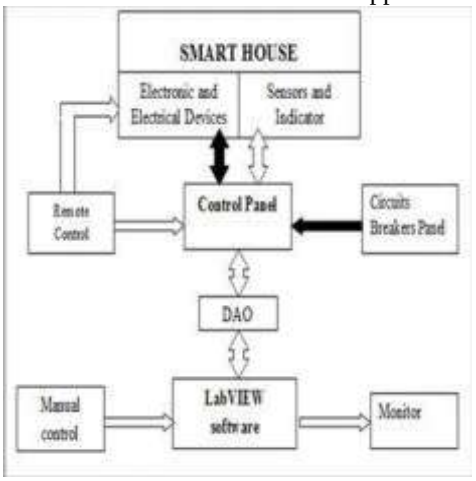

Fig.2 Smart House Block Diagram

C. *Android ADK Based Home Automation System*

This system has goal to support old and handicapped people. The system contribute essential concept of controlling distinct appliances in home and maintain the security using Android application in phone or tablet. This implementation contains android phone having Arduino Mega ADK and home automation application. User can collaborate with the android device and deliver the control signal to the Arduino ADK which then control another embedded devices or sensors.

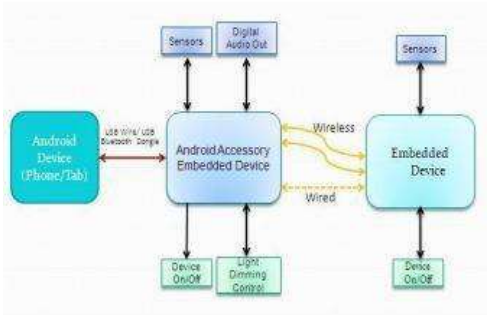

Fig 3:Home Automation using Android ADK

III. SYSTEM DESIGN AND IMPLEMENTATION

A. *Proposed system features*

The proposed system is a distributed home automation system, consists of server i.e. Wi-Fi module, sensors. Server controls and monitors the various sensors, and can be easily configured to handle more hardware interface module (sensors). The Arduino board, with built in Wi-Fi module acts as web server. Automation System can be accessed from the web browser of any local PC using server IP, or remotely from any PC or mobile handheld device connected to the internet with appropriate web browser through server real IP (internet IP). Wi-Fi technology is selected to be the network infrastructure that connects server and the sensors. Wi-Fi is

chosen to improve system security (by using secure Wi-Fi connection), and to increase system mobility and scalability.

B. Working of proposed system

The proposed model of the home automation system is as shown in the below figure. The model consists of different sensors like temperature and motion sensor. In the proposed model the temperature and motion in the house is monitored. The temperature and the motion detection are stored in controller for analysis. If the temperature exceeds the threshold level then the fan will turn on automatically and it will off when the temperature comes to control. The user can also monitor the electric appliances through the internet via web server. If the lights or any electrical appliances are left on in hurry can be seen and can be turned off globally by just typing the IP address of the web server.

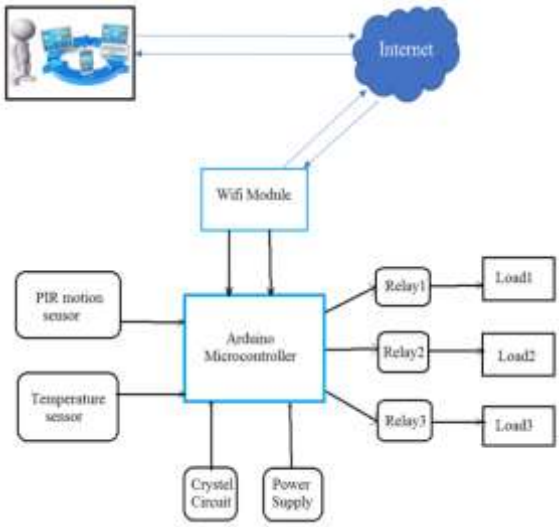

Fig 4: Block Diagram of Home Automation System

Arduino: We are implementing Home Automation System using Arduino. Arduino is an open-source electronics prototyping platform based on flexible, easy-to use hardware and software. It's proposed for hobbyist's peoples, designers, artists, and anyone who are interested in making creative and interactive objects or environments. Arduino can feel and sense the environment by receiving input from a various sensors and can change its surroundings by controlling motors, lights, and other actuators. Microcontroller on the board is programmed with the help of Arduino Development Environment and Arduino programming language. Arduino projects can interact with software running on a computer or they can be stand-alone. There are lots of other microcontrollers are available. So you may be asking, why should choose the Arduino only? The reason behind this is Arduino simplifies the process of developing projects on a microcontroller thus making it a great platform for amateurs. You can efficiently initiate working on one with having no previous electronics experience.

C. Proposed Home Automation Function

The proposed home automation system has the capabilities to control the following components in users home and monitor the following sensors:

- Temperature
- Motion detection

The proposed home automation system can control the following Operations:

- Lights ON/OFF
- Fan ON/OFF/Control

D. Implementation

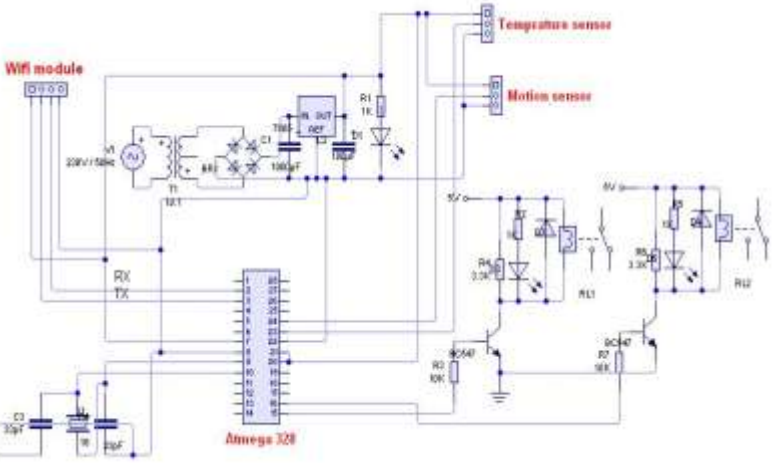

Fig 5: Circuit Diagram of Home Automation System

In our circuit diagram, we are using Atmega 328 microcontroller. This controller has 20 pins. Using these pins, the operations like receiving and sending the signals are carried out. Wi-Fi module have 4 pins, Out of which two pins are connected to controller, one is connected to pin number 2 which will be used for sending signals from microcontroller to Wi-Fi module and another one is connected to pin number 3 which will drive signals from Wi-Fi module to controller. Remaining two are connected to VCC and ground.one pin of motion sensor is connected to controller at pin number 23 and other two are connected to VCC and ground. Temperature sensor has 3 pins out of which one pin is connected to controller at pin number 23 and other two pins are connected to VCC and ground. Appliances are connected to the microcontroller through relay circuit. Crystal oscillator is important to drive the microcontroller.

IV. FUTURE WORK AND CONCLUSION

A. Conclusion

The home automation using Internet of Things has been practically 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 and motion sensors, but also control the appliances according to the requirement, for example switching on the light and fan when it gets dark when temperature is above some threshold. It also reflects the status on android app. This will help the user to analyze the status of each appliance in the home anytime anywhere and he can change its status too.

B. *Future Work*

Using this system as framework, the system can be augmented to include various other options which could include home security feature like capturing the photo of a person who forcefully was to get entry into home and alerting the user by showing his photo on android app. The system can be expanded to include for energy monitoring, or weather stations. This type of a system with respective changes can be designed for environmental monitoring or in industries where human intervention is dangerous, and it can also be in hospital for disable peoples.

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