

IMPLEMENTATION OF IOT IN SMART HOME AUTOMATION

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Abstract— As we know home automation system uses portable device as user interface, monitoring and controlling home appliances will be the demand of new era. main objective to developed proposed system is to provide remote level control and monitoring by means of few communication protocol like this Wi-Fi, Zigbee. This system uses wireless technology to avoid wired connection between appliances and the gateway. It helps to do complete monitoring and control functionalities of the home environment using wireless sensors and actuators modules than just the switching ON/OFF functionality provided by similar systems. Multiple appliances can be control and monitor using IOT in propose system web portal will play an interface between appliances and android app to be develop. Raspberry pi which will control devices and sensors in propose system, relay controller will be used to automate the home appliances. If the web affiliation is down or the server isn't up, the embedded system board still will manage and operate the appliances domestically. By this we provide a climbable and price effective Home Automation system.

Keywords--- Android, Raspberry pi, sensors, Wi-Fi, web portal.

I. INTRODUCTION

To enhance the lifestyle of people through the provision of different services, smart home or automated home comes into picture. It aims at providing leisure and ease of work. The goal of this project is to operate home devices smartly through an android app using IOT (Internet Of Things). IOT is the network connectivity. All these things collect and transfer data between themselves. IOT has increased significantly in the last few years since it has added a new dimension to the world of information and communication technologies.

For the making of digital home appliances such as lighting, heating, security, audio, video etc. IOT in home automation is the best for the smart home solution these days. Then the increasing use of personal android mobile phones, media players, etc. people have more knowledge about these technologies and are more comfortable with its use. Thus home automation will be easily accepted by the people.

The paper will further tell about the proposed system which uses wireless technology for automated home. It comprises of 3 main components i.e. Arduino, web-server and android application.

II. EXISTING SYSTEM

There has been a significant growth in home automation in back few years due to higher affordability and advancement in smart phones and tablets which allows vast connectivity. Then the introduction of IOT the research and fulfill of home automation are getting more popular. Various wireless consisting in system treatment that can support some form of remote data transfer, sensing and control such as Wi-Fi networks have been resort to bed in the various levels of intelligence in the home. The studies have presented Wi-Fi based home automation systems using smart phones without the internet controllability we use the remote. The devices are physically connected to a Wi-Fi sub-controller which is then accessed & controlled by the smart phone using built-In Wi-Fi connectivity. As the range of Wi-Fi is limited, operation of the system can only be controlled within that particular area. Controlling the home appliances through the radio frequency or Wi-Fi have some disadvantages due to which it is not always feasible for the devices that are at far distance. A GSM and Zig Bee based communication and control for home appliances has also been presented by where the device is connected to a Zig Bee Transceiver and it communicates with each and every node present inside home. From the mobile, command can be send via SMS to the same mobile, which in turn clarify the command and then operative the required 'switch' to control the electrical item. The disadvantage of the system is that at remote places there should be proper coverage of GSM mobile signal.

The above the processes of thinking in systems have made significant subscription to the design and development of home automation systems. However, the existing works were mainly focused on switching ON and OFF for home load or connected devices rather than remotely monitoring of home environment. Home automation should provide a user-friendly interface on the host side, so that the devices can be easily setup, monitored & controlled. Furthermore the overall system should be swift enough to realize the true power of wireless technology. The system should also be cost effective so as to justify its application in the field of home automation.

III. SYSTEM ANALYSIS AND DESIGN

This portion describes the proposed tectonics and design of ductile and low cost home controlling and monitoring system. The three basic building blocks of this project are Arduino microcontroller, Web server and Android application. The basic idea is to control different appliances and devices using the hint of equipments. Sensors will be used to sense different factors such as water level, temperature and send corresponding messages to the android application. On receiving alert messages the user can instruct the devices to behave accordingly. Web server will help the user to access the devices remotely. Such an application is very useful but less secure; anyone can share that application or access it if no security is provided. So to make the app more secure we can provide a password protection for the android app or we can make it unshareable / shareable to a limited number of users as per the requirements.

The designed app for the home automation system provides the following functionalities to the user:

- Remote connection through internet to the Web server.
- Provides IP and user authentication.
- Controlling and monitoring of Home
- Appliances.
- Scheduled reminders or messages.
- Password change option.
- Android app lock.

Provides voice commands. Sensors also play an important role in this concept. Different sensors keep track of their corresponding stimuli. The system is adoption to supply a cost capable home automation technology.

1) Arduino

Arduino is a single-board microcontroller, which is build to the process of using electronics in edging projects more available. The other durable equipment consists of a simple open hardware design for the Arduino board with an Atmel AVR processor and on-board input/output support. The software consists of a major programming language computer program that decodes instruction in higher level language and the profit loader that runs on the board. The Arduino board is a inter react concede you to control and monitor hardware devices with your computer. We are the make a home with help of RS part components in automation system using the Arduino. There are many functions in our home automation system. These are some features about our system.

- **Temperature sensing System**
- **Automatic Lighting System**
- **Air-conditioning control**
- **Scheduled Reminders**
- **Water level sensing**

For the whole system, it will setup based with the Arduino Uno.

2) Web-Server

The web server is used for storing the signals and user records and serves to the other components in the system. It manages the communication between the Arduino and mobile smart device and is used for supporting the bidirectional communication between them, local device and web server and also mobile device and web server. In our project web server is developed to connect the hardware devices and the microcontroller and then to android application. To successfully connect and access the web server in the home automation system the user has to enter the real IP address. If a web service in network to convey access to home automation system the command containing the response code is received. The android application process the command to determine the web server's replication.

3) Android Application

The mobile device, either a smart phone or a tablet, needs to run Android operating system since the user system involves an Android application. Android application simply receives the users' requests, transfers request to the web server using HTTP POST method. To maintain the security of the app we will be also providing a lock for the app. The lock can be any lock such as pin, pattern, password or we can use a more complex one as given in [8]. The android app provides a graphical user interface (GUI) for accessing and controlling the devices at home through server real IP. Voice commands and scheduled reminder are additional features included. Different voice commands will be provided to control different devices. When the user will give those commands, the application will recognize it, decode it and then perform the respective action.

Another concept of scheduled reminder or messages will be provided. Whenever a message need to be broadcasted in the house , let it be any message such as “ gather in living room” or “ come for dinner”, we can make use of scheduled messages. The message will be provided through the android app, which in turn will announce the message in the house with the help of speakers or send it to phones of all members as a popup notification. Another use of scheduled reminder is if no one is in the house and any task needs to be performed, then one message can be kept with schedule time such that the message get convey to members present in the house at specified time.

4) Raspberry pi

The Raspberry Pi is a low cost credit card sized single board computer developed by raspberry pi foundation.

- Raspberry pi is controlled by a modified version of Debian Linux optimized for the ARM architecture. The heart of the home automation system is this minicomputer. Here in this system we are using model B

plus. In proposed system raspberry pi act as web server.

III. COMPLETE BLOCK DIAGRAM

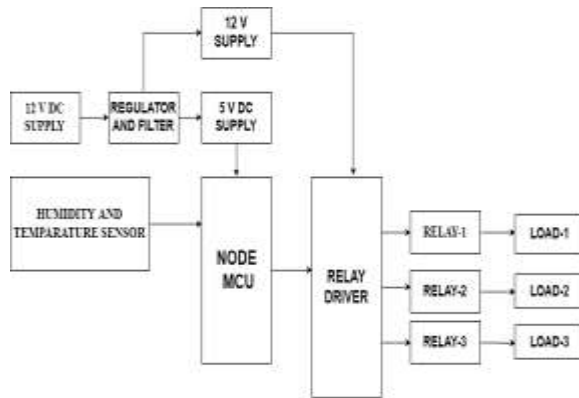


Fig: Complete block diagram of Implementation of IOT In Smart Home Automation

IV. PROBLEM STATEMENT

The aim of project is capability implementation of IOT use for controlling and monitoring the equipment via user interface device .They can communicate with automation network through an internet gateway by means of low power conferences protocol like Wi-Fi .This project aims at controlling home appliances via smart phone using Wi-Fi as conference protocol.

V. MAJOR COMPONENTS

- TRANSFORMER -12V,1AMP
- DIODE - IN4007
- FIRE SENSOR – IR SENSOR / OP-AMP
- BODY TEMP. – LM35
- RELAY – 12V
- IR MODULE
- TRANSISTOR – BD139
- PIR MODULE
- TEMP. & HUMIDITY SENSOR - DHT11
- MICROPROCESSOR. 328 IC
- GSM - SIM 800C

- WIFI –ESP01

VI. RESULT

After the successful connection to the server, the data of sensor are sent to the web server for monitoring of the system. The figure 4 shows the web server page which will allow us to monitor and control the system. By entering the assigned IP address in the web browser this web server page will appear. The web server gives the information about the temperature in different places of the house and motion state in the house. It also gives the status of the various electrical appliances like light, fan etc which we can control remotely.



All the required data is stored in the cloud. The stored data can be analysed at anytime and anywhere. It also provides information about time of motion detected and how many times as well. All this information is stored in the cloud which can be checked by the user any time when away from home.

VII. CONCLUSION

In this proposed system, a prototype low cost home appliances control and monitoring system based on gateway is proposed and implemented. The home automation using Internet of Things has been experimentally proven to work adequately by connecting simple equipment to it and the appliances were successfully controlled remotely through internet. The designed system not only monitors the sensor data, like light sensors, but also motivate a process according to the user demand, for example switching on the light when it gets dark. Any Android based Smart phone can be used to near approach the home component remotely through internet.

Future works can be done on increase this protocol model by including all home equipment and services that provide notifications, energy saving ,automation,

telecommunication ,security ,entertainment and computers etc and thus make a more intelligent home automation system. It also stores the sensor parameters in the database (webpage) in a timely manner. This will help the user to observe the condition of various parameters in the home anywhere anytime.

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