



AN AMELIORATED METHODOLOGY FOR THE DESIGN AND IMPLEMENTATION OF HOME AUTOMATION SYSTEM

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Abstract- In this era of digitization and automation, the life of human being is getting simpler because almost everything is automatic where the old manual systems is replaced with the automated system. There is an increase in demand for the internet and most of the businesses are automated today. At the same time, people are also fully dependent on the internet for day-to-day activities. In this paper, we are proposing an automated tool which controls the operations of Home appliances such as light, cooler, water tank, motion sensor, T.V., smoke detector through the use of mobile phone. This system uses the hardware devices such as arduino, ethernet shield, relay board, PIR sensor, MQ2 sensor; temperature sensor. Internet of things (IOT) provides a platform that allows devices to connect and control remotely across a network infrastructure. In this paper, we have proposed an automated system (HAS) using arduino that employ the integration of cloud networking, wireless communication to provide the user with remote control of various home appliances. The system will automatically change the status of the home appliance on the basis of sensors data. This system is designed to be a low cost and expandable to other appliance.

Keyword: home automation system (HAS), internet of things (IOT), cloud networking, wifi module, arduino.

1. INTRODUCTION

The recent scenario shows that in this century of digitization people are referring automatic devices which are often referred to as smart devices. Since 2013 with the development of new technologies the internet of Things (IOT) has also emerged to make smart devices smarter. Earlier in the 1990's almost every home consisted of electrical appliances such as television, heater, air conditioner, washing machine, induction, electronic security systems and other controlled making a smart home. With the evolution of IOT all these manually controlled electrical and electronic devices can be controlled automatically. Internet of things (IOT) will provide you to monitor the home appliances continuously. In traditional approach people have to be in home and monitor the devices. The user has to be at the tank to check the water level of the tank and he can pump the water to the tank so it will be difficult for the people especially for the handicapped and the old aged people. In this traditional approach of home automation there is an excess flow of water and as well as sometimes there is a deficiency of water in tank. Every time to start and stop the water pump the user needs to stay in the house itself. Sometimes there is a breakdown in the power supply; the user has to wait until he gets a power supply to switch on water pump. To overcome all these problems with the existing system we are proposing an automates system using the appropriate hardware devices like arduino, relay board, Ethernet, shield, sensors and other components like bread board, wires. Assume a system where from the office desk, the user could view the status of the devices and decides to take control by turns on the cooling system, say the air conditioner and switches on or off some of the lights. This user could walk back home and only find a very comfortable, pleasant home.

1.1 MOTIVATION

The design of smart home control system. Which allow people control their home devices by using smart phones, pc. This is a wireless system. People could control almost all the facilities at home including light, fan, and t.v. our smart home system is a simulation product for the future life. the purpose of it is to make people life more convenient. To replace turn on or turn off on switches by hands for current product, our system is to control these appliances remotely through smart devices. And motivation is to design low cost system with use friendly functionality.

1.2 LITERATURE SURVEY

[1] AR.Shahriyar proposed GSM based communication and control of home appliances. Different AT commands are sent to the home mobile for controlling different appliances.

The existing system has a drawback That the graphical user interface (GUI) is not provided to the user and the user has to remember all the AT commands to control the connected devices. Also the system uses the java based functions. Now a day the usage of those mobile has less. But in the proposed system we are controlling all devices through android mobile and web server and the user no need to remember the commands also. Some devices are automated like cooler.[2] JitenderRajendra Rana Proposed a Zigbee based home automation system. zigbee is a high level communication protocol used to create personal area network.it supports any kind of micro controller. The system eliminates the complication of wiring in case of wired automation. Considerable amount of power supply is also possible. Operating range is more than the Bluetooth. The existing system does not allow remote monitoring and controlling of appliances. But where as in the proposed system the system using the wifi based home automation system it allows to monitor and control the appliances.

[3] KUMAR, S. P., Proposed a Radio frequency (RF) based home automation.in the existing system it uses the RF design process is difficulty as it involves- cryptography to provide security but in the proposed system we are using arduino the design process is simple and provides the better security for transmitting the signals. [4] Kumar, MProposed a voice recognition home automation. In the existing system problem faced by visually challenged in operation of home appliances. The voice needs to be trained initially so that it can be used to recognize commands. but in the proposed system the user will control the devices through mobile. and not using any voice commands. [5][6]Keertikumar. M. Jand Mr. Pranay. P proposed a home automation in the existing system the 1990's the people in every home has electronic devices which are controlled manually but in our proposed system we are controlling all electronic appliances through remotely The IOT application have become this popular in this 21 st century is due to dominant use of the internet, evolution of smart phone technology and raised standard of mobile communication. [7] Kumar mandula proposed recent advancement in cloud computing and data analytics allows intelligent system to process and analyze the data in a more efficient manner. [8] Deepalijavale proposed a home automation system in the existing system the people like handicapped/old aged people has difficult in operating the home devices but the prime objective of this paper is to assist handicapped/old aged people. It gives basic idea of how to control various home appliances and provide a security using android phone/tab. The design consists of android phone with home automation application. Arduino uno ADK. User can interact with the android phone and send control signal to the arduino ADK which in turn will control other embedded devices/sensors. [9-16] R.piyare and M.tazil, R. A. Ramlecin the existing system have presented Bluetooth based home automation system using android smart phones without the internet controllability. The devices are physically connected to the Bluetooth sub controller which is then accessed and controlled by the smart phone using built in Bluetooth connectivity. However, due to limited range of operation [maximum up to 100 meters] the system is unable to cope with mobility and can only be controlled with in vicinity. But in the proposed system have also attempted to provide network interoperability and remote access to control device and appliances at home using home gateways.

1.3 TERMINOLOGIES

Internet of things: The internet of things represents the extension of the internet to things and places in the physical world. The internet of things (IOT) represents the exchange of information and data from devices in the real world to the internet.

Interoperability: The capacity of a product or system to communicate in a standard way with other products or system.

Cloud networking: cloud computing is the practice to use remotely data or store data on the internet.

Arduino: The arduinouno is a hardware device consists of 14 pins out of which 6 pins are used as input and 6 pins are used as output. It contains everything needed to support the micro controller; simply connect to a computer with an usb cable or power it with an AC-to-DC adapter to get started.

Ehernet shield: which is used to connect your arduino to the internet this can be done by simply place it on the arduino.

Relay board: Relay board is a hardware device which is used to control the high voltage from main power and protect the arduino without damage.

II. PROPOSED METHODOLOGY

A low cost and efficient smart home system is presented in our design. The advantage of our model is that the functionality of electrical and electronics devices can be controlled with ease. Sometimes the busy life and traffic make it difficult for us to be at work and to be at home at the same time. One of the features of our model makes it possible as it provides home system accessing remotely saving a lot of time. Another feature of our proposed model is that turning of lights and fans and other electronics and electrical devices remotely if they are not in use helping to manage the energy consumption of that home. To control these appliances remotely smart devices needs to be synchronized with the main server. The user may use the login id and password to change the status of any appliances saving time, energy and money.in addition to that our proposed model provides absolute security. If the user is not sure switching OFF the T.V/P.C then the user may check the data on-line from the database present and change the status accordingly. Altogether our HAS provides 100% efficiency as it saves time, helps to manage energy consumption which in turn saves money and provides optimum security to the user making the user's home a safety and a smarter place to live in.

2.1 ALGORITHM

Input: MQ2 sensor, LDR sensor, Temperature sensor, PIR sensor.

Output: alarm, LDR measures, temperature measures, status.

Notation:

s1, s2, s3 → Sensor value
 t1, t2, t3 → Threshold value
 a1 → Alarm

Step 1: Begin the process.

Step 2: if MQ2 s1 ≥ t1

Then start al

Else keep sensing

End if

Step 3: if motion sensed by the PIR sensor

Then turned on light

Else

Keep sensing

End if

Step 4: if temperature s2 ≤ t2

Then turned OFF cooler

Else

If temperature s2 ≥ t2

Then turned ON cooler

End if

End if

Step 5: if LDR s3 ≥ t3

Then the light is on

Else

Light is off.

End if.

2.2 Working of proposed system

As we can see in fig1 the proposed HAS. We will make connections as shown in the block diagram. Then Upload the code in the arduino software. After running the code the project will start executing.

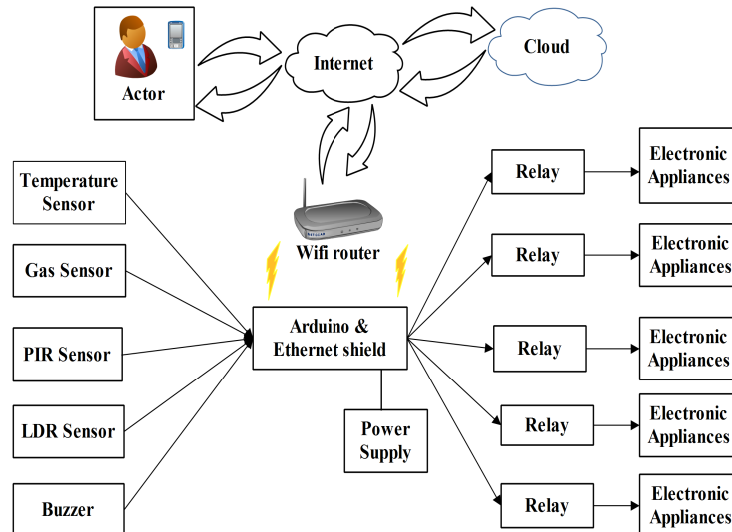


Figure 1: Proposed Model of Home Automation System

The model consists of different sensors like, temperature, gas, PIR, LDR and sensors. Initially the arduino is connected to the wifi through the Ethernet shield. When the connection is established it will start reading the parameters of sensors like s1, s2, s3 etc. The threshold data levels for the required sensors are set as t1, t2, and t3 etc. The sensor data are sent to the web server and stored in the cloud. The data can be analyzed anywhere anytime. If the sensor parameters are greater than the threshold level then the respective alarm will be raised and the required actuation is done for the controlling of the parameters. At the door of the house a motion sensor is fixed to detect any movement near the door. Light will turn on automatically when the light sensor detects the room darkness. A cooler/fan will automatically turn ON/OFF when the room temperature exceeds the threshold value and vice versa.



A smoke detector is placed in kitchen if it detects any smoke then the alarm will be raised. and relay is used for the light, fan, PIR and MQ2. For example: The temperature value is sensed and stored in cloud for analysis. If the temperature exceeds the threshold level then the cooler will turn on automatically and it will off when the temperature comes to control and this can be done by the user through simply typing the IP address and login on the server and make changes. HAS home server page will show us the room temperature and motion state and also the status of the electrical appliances of like light, fan, T.V. If the required data is stored in the cloud and user can see and change the status of the device. And user can refer that data anytime, anywhere remotely.

III. CONCLUSION

In this paper, we have proposed an automated system to monitor the temperature of the room and status of the room light, gas leakage in the home, any intruder near the door, and water level in the tank using various control system remotely. The proposed system is tested for its correctness and completeness by testing with different input values.

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