SMART HOME AUTOMATION AND SECURITY SYSTEM BASED ON SENSING MECHANISM

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Abstract

The main aim of this research work is to provide an effective & efficient development for IOT in order to use for both monitoring as well as controlling the home appliances anywhere from the world through World Wide Web. Nowadays everything is getting automated because they can reduce the human interaction so that they are of said to be next generation. IOT can be viewed as advancement rather than an uprising. Generally Spontaneous systems are being preferred over physical system. The main intension behind our research work is to manage all the tasks of a home through an integrated control system .The surviving system in the market states that the execution of a security system that uses Machine movable procedures with the use of Bluetooth as a wireless link procedure. These systems allow handlers to lock and unlock a door, controlling light switches from a far-off location. In the proposed system we are going to design the home automation with some enlarged functionalities and using Wi-Fi as an Internet association protocol. The enlarged functionalities comprise of Alarm based smart lock, controlling household appliances from far-off Location, Mosquito sensing, smart water tank. This arrangement helps in decreasing the human exertions as it is automated.

Keywords: Alarm, Door lock system, NODE MCU, Internet of Things, Sensors (PIR, IR,WATER LEVEL).

I. INTRODUCTION

The advancement in the technology has made us to enter into a different world where we can interact with the objects. Nowadays,everything is becoming smarter and everyone wants to do smart things .To strive in this smarter world everyone has to do daily things in a smart way. To do the things in a smarter way the smart technologies now a days we are using are IOT & smart home automation. It comprises of everything which includes smart homes, smart cities, intelligent transportation, etc., IOT (Internet of things) is the communication between the humans and objects &also it is the interface of physical devices like electronics, software, sensors, actuators, and network connectivity that enables the devices to transfer the data. The human force, time and cost must be reduced. In IOT distance never matters. We can operate it anywhere from the world. This is the main reason why to use this technology in the project. Research studies estimate that will Internet of Things consists of almost 40 billion of objects by 2020. Automation performs an gradually crucial role in daily experience and global economy. Engineers strive to combine automated devices with mathematical and organizational tools to create complex systems for a gradually increasing range of applications and human activities.

Challenges of Home automation systems:

Home automation systems suffers from main challenges these are poor flexibility ,difficulty, manageability in achieving security & it is high cost .The main objective of this project is to design and implement a home automation system using IOT that is capable of controlling & monitoring the home appliances in an easy way through web interface .The proposed system has good flexibility, and no difficulty while using through Wi-Fi technology to connect with the different sensors to home automation system. This will decrease the cost gradually and will increase the ability of upgrading the system to be reconfigurable.

II. MOTIVATION

A number of essential technology changes have come together to enable the rise of the IOT in Home Automation which are listed below

- **Cheap sensors** – Sensor prices have dropped to very low prices in the past 10 years

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- **Cheap processing** – Similarly, processing costs has been decreased over the past 10 years, enabling more devices to be not just connected, but smart enough to know what to do with all the new data they are generating or receiving.

- **Smartphone's** – Smartphone's are now becoming the personal gateway to the IOT, it helps us to connect with the devices serving as a remote control or hub for the connected home, connected car, or the health and fitness devices consumers are increasingly starting to wear.

- **Ubiquitous wireless coverage** – With Wi-Fi coverage now there is a vast wireless connectivity is available for free or at a very low cost, given Wi-Fi utilizes unlicensed spectrum and thus does not require monthly access fees to a carrier.

III. LITERATURE SURVEY

1. Bluetooth based home automation system using Mobile:

In Bluetooth based home automation system the home appliances are connected to the Arduino BT board, by using the relay at input and output ports. A high level interactive C language is used for programming and can be dumped into Arduino BT board by using Bluetooth we made connection path available. The protection is provided by making use of OTP (One Time Password) so that the selected users are allowed to control the appliances. By using wireless Bluetooth communication we can establish the connection between Arduino BT boards and Mobile, it is portable and environmental friendly. To indicate the status of the device we can receive the feedback from the mobile by using the signals from the designed circuit.

2. Zigbee based home automation system using Mobile:

By making use of Zigbee the monitoring and controlling of home appliances can be designed and implemented. By using the network co-ordinators the device performance is recorded and stored. In this the Wi-Fi network is used with standard wireless ADSL modern Router. The security Wi-Fi parameter and the network SSID are saved previously. The message is sent to network device of the home only when it is to be declared safe and it is re-encrypted. By using Zigbee network the Zigbee controller sent messages to it. The virtual home algorithm receives the security messages. In Zigbee communication we can decrease the cost of the system.

3. Home automation using RF module:

The main aim of Home Automation is to develop a home automation system using RF controlled remote. Now technology is increasing so that homes are getting smarter with these new technologies. Modern homes are changing from switches to centralized control systems which contain RF controlled switches. In every house there are traditional wall switches in various parts of the home it makes difficult for the users to go near them to control and operate. It becomes difficult for the old people and for physically handicapped people to do so. Home Automation using remote implements an easier solution with RF technology. For this RF remote is combined to the microcontroller on transmitter side that sends ON/OFF signals to receiver where the devices are connected.

4. GSM based home automation system using Mobile:
GSM based Home automation become an attractive due to the Mobile phone and GSM technology. In GSM communication can be done by considering the SMS based home automation, GPRS based home automation and dual tone multi frequency (DTMF) based home automation. To convert machine signals into electrical signals a device named transducer is used and these signals are given as inputs to the microcontroller. The physical quantities like sound, temperature and humidity can be converted into other quantities like voltage and current by using sensors. Since the GSM module can understand only commands so that microcontroller converts signals into commands. Based on the command which is received by the

GSM module anyone of the communication method can be selected among the SMS, GPRS and DTFC.

IV. PROPOSED METHOD
WORKING OF SENSORS:

- **Node MCU:**
  It is an open source of IOT platform. It includes firmware which runs on ESP8266 Wi-Fi from Espressif systems.
  FEATURES:
    - Open source
    - Interactive
    - Programmable
    - Low cost
    - Simple & smart
    - Wi-Fi enabled.

- **PIR SENSOR:**
  PIR sensor is a pyroelectronic device that detects motion by measuring changes in the infrared levels emitted by surroundings objects.
  FEATURES:
    - Its range is up to 15 to 20 feet and 360 degrees cone angle.
    - Single bit output
    - Small size makes easy to control.

- **IR SENSOR:**
  IR sensor is used to detect the obstacles as well as it can measure the heat of an object based on different application.
  FEATURES:

- Its ranges up to 5 to 12 m.
- Small size & low cost
- Output goes to low logic level(i.e,0)when it detects the obstacle.

- **WATER LEVEL SENSOR:**
  It is an electronic device which is used to detect the percentage level of water in the water tank and to provide an alert time to allow the leakage prevention. The main applications of this sensor are automobiles and nuclear power plants.

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- **RELAY:**
  In this the relay is a high quality 8 channel board. It is used to control power appliances from the micro controllers or low voltage circuits.
  FEATURES:
    - High voltage outputs :50v
    - Inputs compatible with various types of logic

V. WORKING OF PROPOSED METHOD

In this paper home automation is used for controlling as well as monitoring the home

appliances and also to provide the security to home. Mobile is one of the most important components used in this system. An application is developed and it is mounted in the mobile .The communication interface between the application and mobile is by providing through a Wi-Fi module i.e., ESP8266.

1. PIR SENSOR is used in this system which will be used to sense the motion of mosquitoes and to turn ON ALLOUT spontaneously.

2. IR SENSOR is used to detect the obstacles and whenever any obstacle is found while locking or unlocking the door immediately it will turn will ON the buzzer.

3. WATER LEVEL SENSOR is used to find the percentage of water level in the tank and whenever the water level goes down to that percentage the motor will be turn ON automatically.

4. RELAY: The relays used in this system are for controlling the home appliances .It's just acts like switches to turn ON & OFF the devices we can make use of the relays.

VI .ADVANTAGES & APPLICATIONS:
Advantages:
- Less man power
- Controlling can be done easily
- We can monitor the status of devices anywhere from the world.
- Time as well as power saving.
- Secured.

Applications:
- Street lights controlling system
- Home & office automation

VII. CONCLUSION
Based on NODE MCU microcontroller as central controller and a Wi-Fi module ESP8266 we design concept for a wireless real-time home automation system has been obtained. We discuss mainly 2 modes in this system .The first one is to monitor the status of the sensors anywhere from the world through their mobile phones or even in home by using Wi-Fi connection. The second mode is a self-automated mode that we can control the devices from far-off locations. Hardware implementation of the system was carried out in order to verify the system reliability. The system which is implemented was a simple, low cost and flexible that can be expanded and scaled up. Using wireless sensor technologies for the proposed system future improvement can be applied. The proposed system can also be used to detect whether the door is locked PROPERLY or NOT.

VIII. FURTHER EXTENSION
In further extension we can place different devices to smart home automation in order to get more advantages. identifying the problem and collecting a different solutions to the initial system will helps us to provide more flexibility .when the smart home automation concept came into our idea we first think about security.in order to increase the security level to maximum extent we can place a camera module at the entrance point to capture the image.by placing this feature we can easily identify the robs and can take the preventive measures as early as possible .Finally a review was sent to the customer with the help of application so that the impact of environmental , economical and social effects will be calculated.

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