



Home Computerization Monitoring System with Google Supporter

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ABSTRACT

In this paper, the control of home appliances is provided using Google voice assistant with Node MCU controller to control the loads, using relay. In this paper, the sensor data are monitored, when the sensor data is high instead of the threshold level, the Arduino has sent a signal to the MCU Node, then it will send an alert mail. The aim of this paper was to suggest a cost-effective voice activated home automation (Google Supporter) controlling general appliances found in one's home. The solution discussed in the paper was successful with the successful implementation of Google supporter Powered Home automation design.

Key words: Arduino, nodemcu, relay, sensors, power supply, adapter, GSM.

1. INTRODUCTION

The goal of the paper is to develop an advanced home automation system using the standard web server and Wi-Fi. The machines can be turned ON / OFF, and sensors can be read by Wi-Fi using a Personal Computer (PC). In the field of electronics automation is the most frequently spelled term. In current technologies, the search for automation brought several revolutions. Because of its user-friendly existence it had greater significance than any other technologies [1]. This can be used as a substitute for existing switches in the home that create sparks and, in a few cases, even result in fire accidents. Considering the benefits of Wi-Fi, the house developed an advanced automation system to monitor the appliances.

Everyone now days has a mobile phone and wants to manage anything from a mobile phone. Everyone knows how to operate mobile phone so it's easy to understand and use. Using arduino, lighting, fan, switches and refrigerator are operated via Bluetooth based remote. Home automation design will become easier and more common since now days, most people are using smart phones [2]. We use Arduino in this computer which is most widely used for automation systems. Arduino is a hardware that links the machine and the project

model, so that we can monitor it with Arduino code. Arduino is a microcontroller who processes information just like the human brain and then performs some logical and mathematical operation on that information. Arduino is connected to the Bluetooth module which receives user information[3]. Arduino also attached relay, which receives Arduino information and executes the operation as switch. Bluetooth technology is short distance wireless radio transmission providing the technology needed to create intelligence and controllability. This creates personal area network in home environment where all of these devices can be interconnected and controlled using a smartphone microcontroller with Arduino. Home automation involves a degree of automatic or computerized control over certain electrical and electronic systems in a building [4].

2. RELATED WORK

There is currently no system at cheaper rates according to our survey. Different systems are difficult to install, and difficult to use and maintain. Present systems are usually proprietary and locked, and are not very user-friendly.

N.Sriskanthan et al's work shows how a home automation system is implemented with Bluetooth. They use a host controller connected to a microcontroller-based sensor and system controller, which is implemented on a PC. Home Automation Protocol (HAP) is proposed to allow inter device communication. The system provides for the connection of more than one device controller to the host controller [5].

M.S.H Khiyal et al.'s research suggests a home protection system based on SMS, called the SMS-enabled Wireless Home Appliance Control System (HACS). In their work a homeowner can use SMS messages from a preset registered mobile number to control their home. If the SMS does not come from a legitimate mobile number, the system will ignore that message. The appliance control subsystem and security subsystem in the proposed system informs the owner via SMS in case of an intrusion [6].

M. Danaher and D. Nguyen proposes the use of GPRS for a home security system. The research uses a camera to display video and home images via GPRS to the mobile owner's. The webcam senses motion by comparing frames for variations, including the strength of light. Video streaming of the

proposed work is performed using the link to the home internet, not the GSM modem [7].

Prof. Jitendra R. Rana, Prof. S.N.Pawa proposed home automation based on Zigbee technology. ZigBee Based Home Automation Wireless Sensor Network is a useful project for adults and physically handicapped persons who are unable to do various activities efficiently when they are at home and need one assistant to perform those tasks. In case of wired automation, we can remove the problem of cabling with the ZigBee network [8].

Actual System

Household appliances are operated in the existing system via Bluetooth, Zigbee and other devices. Yet they are limited to different areas. We are moving to the proposed system to resolve the issue. Limitations of current device using Bluetooth in ideal conditions has a limited contact range of 100 m [9]. In a home setting more can be expected. Bluetooth communication has comparatively high-power consumption so system batteries need to be recharged or replaced regularly. Compared with Wi-Fi the bandwidth is lower. When Bluetooth is OFF powered, battery consumption is more comparable with condition. ZigBee requires short range, low complexity and low velocity. Current device limitations using Zigbee It is not safe like a wifi-based, encrypted network [10,11].

MARKET NAME	ZIGBEE	GPRS /GSM	WIFI	BLUETOOTH
APPLICATION FORCES	MONITORING AND CONTROL	WIDE AREA NETWORK	WEB,EMAIL	CABLE REPLACEMENT
SYSTEM RESOURCES	4KB-33KB	+16MB	1MB+	250KB
BATTERY LIFE	100-1000+	1-7	5-5	1-7
NETWORK SIZE	UNLIMITED	1	32	7
BANDWIDTH	20-250	64-128+	11000+	720
TRANSMISSION RANGE	1-100+	1000+	1-100	1-10+
SUCCESS METRICALITY	RELATIVITY	QUALITY	SPEED FLEXIBILITY	COST CONVENIENCE

3. DESIGN METHODOLOGY

The proposed system in Figure 1 presents friendly expense design and home automation implementation to unlock the door with authentication by voice command or pin via smartphone app.

So, it is not only the smartphone application's open button that anyone can control, but also a speech command or pin interface is added that can also be useful as security. Users can change the password which they use on their own. So, it is only users who know the password who can control unlocking the door.

The mobile application designed to make it easier for users to select between speech commands or pin authentication. Users can quickly open the door by saying so in speech order. Another attempted work is to open the door with a pin. It can help handicapped people with speech impairment still be able to use the app.

The design of the proposed method is based on Android Smartphone household appliances Natural language voice commands are given to the Google Assistant and, with the help of the IFTTT (If This Then That) application, the microcontroller controls the relays connected to the Google Assistant as required, turning the device connected to the respective On or OFF relay as requested by the users. The microcontroller used is NodeMCU (ESP8266), and communication is formed via Wi-Fi(Internet) between the microcontroller and the application.

Using the Arduino microcontroller to track the sensor data, if any sensor value reaches the threshold level, an input will be sent to the NodeMCU..

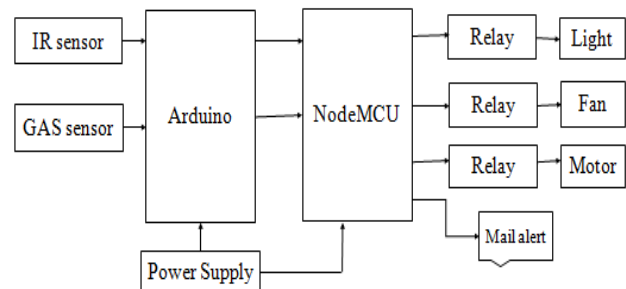


Figure 1: Proposed system Block diagram

3.1 Obligation to supervision to control this home computerization

Arduino

A basic but efficient single board device that has gained considerable popularity in the hobby and the business worlds is the Arduino microcontroller represented in Figure 2. The Arduino is an open source, meaning that hardware is relatively pricey and software is free to build. A condensed version of C / C++ is the Arduino programming language. If you know C, you should learn how to program Arduino. If you don't know C, you don't have to worry about that, as only few commands

are required. The Arduino's important feature is that the control software can be created on the host Computer and downloaded to Arduino and run automatically [12].



Figure 2: Arduino kit

NodeMCU

NodeMCU is a firmware based on open source LUA, developed for Wi-Fi chip ESP8266. NodeMCU firmware comes with ESP8266 Development Board / Kit by exploring functionality with ESP8266 chip. Development board NodeMCU.

NodeMCU Dev Kit / board consists of Wi-Fi chip enabled by ESP8266 as represented in Figure 3. The ESP8266 is a low-cost, TCP / IP protocol Wi-Fi chip developed by Espressif Systems. For further information on ESP8266, please refer to ESP8266 Wi-Fi Module [13].



Figure 3: Node MCU

IR Sensor

An infrared sensor is an electronic system that emits certain elements of the atmosphere to be sensed. An IR sensor represented in figure 4 can measure an object's heat and can also detect the motion. These types of sensors only measure infrared radiation instead of emitting it as a passive IR sensor. Usually all objects radiate some form of thermal radiation in the infrared spectrum. Such forms of radiation are invisible to our eyes, but an infrared sensor can detect. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply a sensitive IR photodiode of the same wavelength as that emitted by the IR LED. As IR light falls on the photodiode, the resistors and these output voltages change proportionally to the magnitude of the obtained IR light [14].



Figure 4: IR Sensor

GAS sensor

A gas sensor is a device that senses the presence or concentration of the atmospheric gases. The sensor which represented in figure 5 generates a corresponding potential difference depending on the gas concentration by adjusting the resistance of the material within the sensor which can be calculated as output voltage. The type and concentration of the gas can be calculated based on the voltage value.



Figure 5: GAS sensor

Relay

Relay consists of an electromagnet and a unit of contact as represented in figure 6. The concept is: to activate the contact device using electromagnetic attraction generated when electrical current exceeding the defined value flows to the electromagnet; the voltage and current (input signal) applied to the coil opens or shuts the contact.



Figure 6: Relay

Wi-Fi

Wi-Fi is a wireless local area networking technology with devices based on IEEE standards 802.11 as represented in figure 7. Wi-Fi is a Wi-Fi Alliance trademark which restricts the use of the term Wi-Fi Certified to products which successfully complete certification testing for interoperability.

Personal computers, video game consoles, phones and tablets, digital cameras, smart TVs, digital audio players and

electronic printers include gadgets that can use Wi-Fi technology. Wi-Fi compatible devices can connect via WLAN and a wireless access point to the Internet. Such a point of access (or hotspot) has an indoor range of about 20 meters (66 feet) and an outdoor range greater. Hotspot coverage can be as small as using multiple overlapping access points as a single room with walls that block radio waves, or as large as many square kilometers reached.



Figure 7: Wi-Fi (ESP8266)

GSM/GPRS Module

A GSM modem is a specialized modem type that accepts a SIM card, and functions like a cell phone over a subscription to a mobile operator as represented in figure 8. In the view of mobile operators, a GSM modem just looks like a cell phone. A GSM modem exposes an interface which allows applications like NowSMS to send and receive messages over the interface of the modem. The mobile operator pays for the sending and receipt of this message as if it were carried out directly on a cell phone. A GSM modem must support a –extended AT command set for sending / receiving SMS messages as specified in the specifications of ETSI GSM 07.05 and 3GPP TS 27.005 for performing these tasks. GSM modems can be a fast and efficient way to get started with SMS, as a special SMS service provider subscription is not needed. GSM modems are a cost-effective solution for receiving SMS messages in most parts of the world, because the sender pays for the delivery of the message.



Figure 8: GSM module

4. RESULTS AND DISCUSSIONS

We observed the project's performance, when we sent commands from mobile phone to WIFI then the light is

switched on / off automatically and the fan is switched on. & if the person is outside the home then send a message via GSM module remotely. Here another application like risky action functions whenever the Fire accidents or Gas leakage occur it may give alerting signals like continuous buzzer indication; another feature of this project is we can control Curtain doors also by sending commands through WIFI module.

The outcome was positive, and the system was responding well. The following figures 9, 10 and 11 shows the complete implementation of the proposed system by prototype

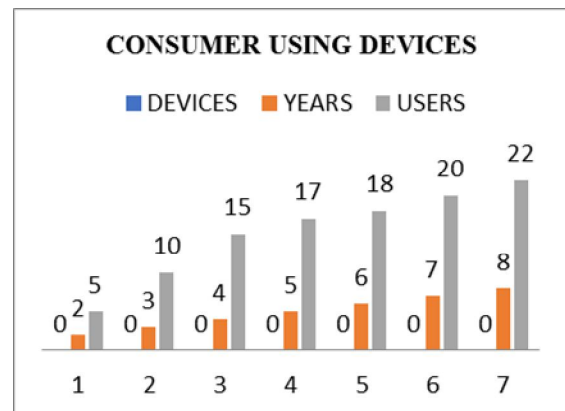


Figure 9: Smart Home Users

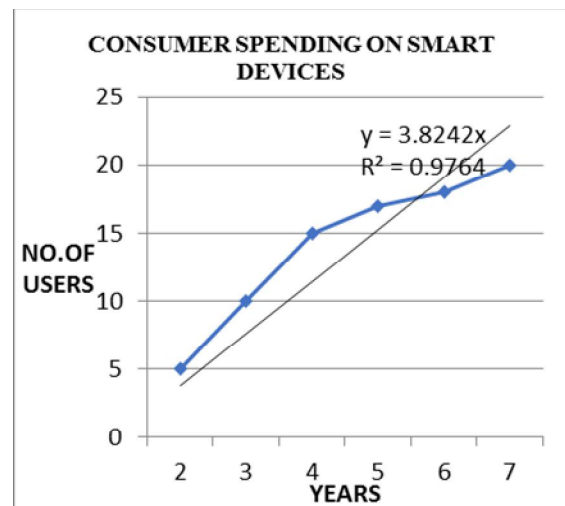


Figure 10: Smart Home Statistics

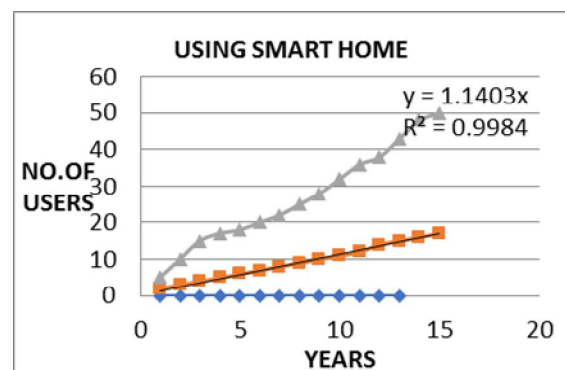


Figure 11: Home Automation Survey

5. CONCLUSION AND FUTURE SCOPE

This work introduces a security system for smart home automation, with mobile communication support from GSM. The system proposed will be compared with related field integrations. Smart Home System offers connectivity between various types of home appliances and electrical equipment such as windows and fans etc. It provides control and user-friendliness of the devices as required. After analyzing other existing systems, we propose the novel technique for better human interaction and for better android and arduino utilization. We can control cost, flexibility and energy-efficient smart homes by using Home automation system.

The scope for future Home Computerization can be huge. There are several factors to improve on Home Computerization to make home automation more efficient, smarter, scalable and to improve overall. For example, a greater number of devices can be incorporated to regulate the fan speed, such as a coffee machine, air conditioner etc. It is possible to build own private Blynk server to make the device react faster. Well, there is no ever perfect system. There is still space for change there. One just has to put on a cap of thought and try to make the system better.

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