Enhanced Intelligent Smart Home Control and Improved Security System

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ABSTRACT

In this technologically developed era, security is the most significant feature which provides safe and secure living for the people. In this paper, we have designed and developed a smart and intelligent home automation system that is connected with Mobile Applications. The designed system and the application aremade to interact with each other with the help of Wi-Fi technology. Commands from the user to turn on and off the electrical devices like lights, air conditioners and fans etc. and the phenomena of fixing the timer in our homes or in any organization can be carried out securely and quickly from our mobile through the help of a simple GUI application which is programmed and developed, hence it provides much more comfort for normal users to handle them. The proposed system acts accordingly to the information received and immediately responds to those commands by proceeding with proper actions and provides the user with appropriate results. The main objective of this proposed system is that it allows the user to watch and monitor the corresponding results in theMobile application within the fixed range by employing Wi-Fi. Henceit is taken as the best choice to construct the home automation for providing much more comfort life. This paper explains the cost effective and flexible home control and monitoring system. It employs Raspberry Pi for processing the input data with appropriate sensors for monitoring and measuring the values which are connected through the internetin order to access and implementing respective control remotely. To discuss the technical feasibility and productiveness of this system, equipment namely lights,ultrasonic sensor, switches, gas sensor, temperature sensorand

motion sensors should be properlydesigned and integrated with the central control system. As a result, the proposed system can be successfully constructed and properly implemented in real time.

I. INTRODUCTION

Internet of Things is a broad field in which each and every device connectedare assigned with an IP address and with the help of that IP address anyone can identify and control themthrough the internet. The recent studies have estimated that there will be anenormous growth in the number of thingsor devices that are connected to the Internet. This type of integrated network is known as the 'Internet of Things'. The current developments and upgradations in technology allows us make use of Bluetooth and associated communication devices. Wi-Fi have made many devices toconnect with each other for effective working. Employing a WIFI shield to work as a Micro web server for the processing of Arduino, helps us to avoid the need for wire communication in between the Arduino board and computer instead, helping us to design and implement wireless communication system which reduces cost and helps to work as anindividual device simultaneously enhancing the flexibility of the system. The Wi-Fi shield requires a connection to the internet with the help of wireless router or any wireless hotspot and this paves as the gateway for the Arduino to connect and communicate with the internet. In this aspect, an internet connected home automation system is designed and implemented for remote monitoring and control of home appliances.

Nowadays, development and upgradationsin technologies is reaching its peak as well as lots improvement are incorporated to make the living standards of the common people a bit higher in evert aspect. The mobile devicesare the most essential part and parcelin the lives of the people today.With the aid of this intelligentdevice human has the capability to carry out many activities with as well as without internet. Further we can enable our home or organization much smarteras well as intelligent. In this paper we proposed a different technology, in which mobile phones can be employed to connect and communicate with the devices and control the electrical devices such as Fans, A.C., Lights etc. by employing Android Applicationconnected through Wi-Fi module. The transmitting part of Wi-Fi helps to transmit the data provided by the application by employing radio waves. The Wi-Fi works with the help of radio waves technology, here the data which is passed through the Wi-Fi is transformed into the electromagnetic signal which is furtherpassedwith the help of the antenna. Thisoutput signal from the antenna is furthertransmitted to the Arduino controller. The Arduino thenperforms its task on the received information and begin to carry out the required operations. This Arduino controller is connected to the Relays of various switches which is use totransmit the current aftergenerating the magnetic field. In the near future, we can employ router for wide range of works such as utilizing for the developing Smart City based projects. New devices can be connected to the central system, which provides much more reliability of the system.

The developments in the field of automation havebrought up many revolutions and upgradations in the existing technologies. They possess much moresignificancecompared to other technologies becauseof its user-friendly and flexible operational tendency. They can beemployed as a substitution for the existing switches in

home which produces sparks and may also produce fire accidents in certain case situations. On taking the merits of Wi-Fi, an advanced automation system was developed to monitor and control the device in the house.

RELAY

Relay is an electromagnetic switch and it is employed to open and close the electric circuit. Relay helps the circuit to switch another electric circuit when they are separated. Relay is employed when we wish to make use of a low voltage circuit to switch ON as well as OFF the device which requires high voltage for its working. A 5 volts supply which is connected to the relay is required to operate the device which works on on 230V AC supply. Relays are present in different types based on operating voltages such as 6 volts, 9 volts, 12 volts, 24 volts and so on. Relay is comprised of two parts, that is input and the another is output. In the Input side, it consists of a coil which produce magnetic field when small input supply is provided to them. Relay consists of three contactors namely Normally closed denoted as NC, normally opened denoted as NO and the last common which is denoted as COM. By employing the certain combinations of the present contactors can turn on and off the electrical devices.

LIGHT SENSOR

A Light Sensor is works like a robot which is used to detect the present ambient level of light that is how bright or dark it is. There are wide range of various types of light sensors available such as Photo resistors, Photodiodes, and Phototransistors to detect and measure the ambient light.

Figure 1: Light Sensor

TEMPERATURE SENSOR

This sensor is connected to the system which helps to measure the value of temperature in the particular room in a home or in any organisation. LM35 is the temperature sensor which we employ here that is used to measure the temperature in the range of -55 degree Celsius to 150 degrees Celsius. It consists of 3-terminals that generate analog voltage which is proportional to the temperature present in the particular place. Node MCU along with ADC can be utilised to measure analog voltage from the sensor LM35 and so the temperature will be in proportion with the analog voltage.

Figure 2: Temperature Sensor

II. PROPOSED SOLUTION

Real Time clock-based home automations one of the advancedprojects to monitor and control the devices in specific time as well as works in systematic way. These devices can be controlled in wireless manner from variousregion with the help of wireless technology. This designed project is a concept to implement real time automation in the industry, organisationas well as in homes. All the connected devices will be controlled and automated with the help of developed mobile application which is coded and programmed in Java. The devices in the industry or home will be connected with centralized micro controller NODE MCU for the proper and efficient working. The designed RTC and EEPROM device which is present in the micro controller will be enabled for its operation. The controller is also connected with WIFI in order to receive the commands from the Wi-Fi shield.

Figure 3: Proposed System Design

The user will be given with the Mobile applicationwhich is connectedwith Wi-Fi. If the user wishes to switch on the Light or to turnit off, he should switch the control button which isdesigned in that application. Once he turn on thethe Wi-Fi, it will send the data through the Wi-Fi present in the microcontroller. Once the request is sent and received, the microcontroller enables the RTC and the EEPROM and according to the request

received the work will be carried and completed.Like the same method all other devices which are connectedwill be controlled.

III. CONCLUSION

In this proposed project, it is designed such that the user can control the home appliancesconnected to the central system. With the implementation, this work can be made cost effectivewith the help of locally available devices. They are utilized to control various home appliances starting from the security lamps and lights, the television to the air conditioning system and also the overall home lighting system. All over, the components which are required are comparatively small as well as compact and some of them can be packed into a small container. This proposed home automation system once developed, is tested in many environment and hance it is certified to monitor and control variousdeviceswhich are utilised in the lighting system, air conditioning system, and many more.

IV. FUTURE SCOPE

This developed system can be further made into advanced system with the incorporation of certain improvements such asincorporating Bill functionality into this home automation system which can measure and compute the bill for certain period of time. Gas leakage control system as well as light dimming functionality can be incorporated and connected to the central system in near future in order to build and set up a complete home automation system which is completely operated by human.

V. REFERENCES

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