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Smart Monitoring and Controlling of home Appliances using Internet of Things

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Abstract*: The main objective of this project is to overcome the disadvantages of current technology, that is, by means of switches. That is why we are building a smart network of home devices that can be used to control household appliances via internet. In our daily lives we always forget to switch off lights, TV, AC, fan and other electronic devices and waste unnecessary electricity. The proposed home automation device is to be integrated with approximately all devices and used to control them remotely in a simple and easy way. To save electricity, we implement it with IoT. Because IoT changes the way you live. The proposed system is divided in to two major blocks which are server and hardware interface. Here the server manages, controls and supervises the system locally (LAN) or remotely (Externally) by the home users whereas the hardware interface provides an adequate interface for the sensors and actuators to system.

Keywords: Internet of things, Home automation, Smart Network, Cloud.

I. INTRODUCTION

The houses of the 21st century can be converted into a large number of automotive and automatic because of the comfort it offers, especially when used in an extremely separate house. A home automation system [1] can be an effect with which users can manage appliances of diverse types. Several existing home automation systems measure a square cable connection. It does not cause problems until the system is planned in advance and implemented during the physical construction of the building. In addition to existing buildings, the execution price is extremely high. Distinctive wireless networks will be very simple for automation systems. Through the advancement in the field of wireless technologies such as Wi-Fi, and cloud networks, wireless networks are used directly every day.

II. EXISTING SYSTEM

The current systems are only compatible with GSM and Bluetooth devices. Recent improvements in technological aspects allow the requirements of Wi-Fi and Bluetooth [2] have led to completely diverse devices that have interconnection capabilities. Using a WLAN defense as a small Internet server to Arduino eliminates the necessity of cable connections in interfacing of Arduino with peripheral devices and PC reduce the price and make it look like a stand-alone device. Wi-Fi defense wants the link on the web from wireless access point [3]; this can ensure that Arduino entry speaks to the network. With this in mind, it is intended a home automation system that is mainly based on appliances.

III. PROPOSED SYSTEM

The projected system can be a distributed home automation system consisting of servers, sensors. The server [4] monitor and controls the diverse devices interfaced and is simply designed to handle many hardware connected modules (sensors). The automation system will be remotely accessed or belonging to the same information science of the LAN victimization server from any computer or portable mobile device with Internet browser through the science of real server information (Internet IP). Wi-Fi technology ensures the connection between server and the sensors [5]. Wi-Fi has been selected to increase security (via Wi-Fi secure for victimization) and also to improve system quality [6].

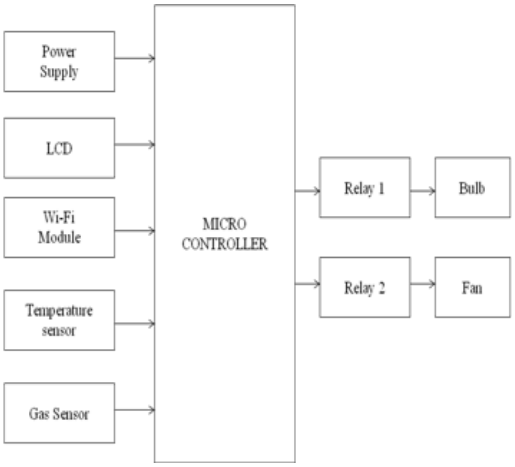

Fig.1: Block diagram of proposed system

IV. HARDWARE DESCRIPTION

A. ARDUINO UNO: Arduino Uno [7] is an ATmega328 compatible microcontroller board as shown in Figure 2. It has fourteen digital I / O pins (of which six pins will be used as PWM outputs), half a dozen analogue inputs, sixteen Mega Hertz frequency silicon oscillator, USB affiliate, influence socket, ICSP header associated and push button switch to reset.

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just connect this to your notebook using USB cable or connect it to the associated battery or AC-DC adapter to start the process.

Fig.2: Arduino Uno

B. Wi-Fi Module: The ESP2866 Wi-Fi module can be an independent SOC with a set of integrated TCP / IP protocols that offer any microcontroller to your Wi-Fi network [8]. ESP2866 can host associated applications or download all Wi-Fi features from another application processor. The ESP2866 module is pre-programmed with the AT code associated with the microcode, i.e. we can only connect to the Arduino device and get the amount of Wi-Fi that offers Wi-Fi protection. This module has a very effective price list with a growing and growing community. This module contains sufficient on-board process and memory capacity to amalgamate with sensors and various application-specific devices by means of their GPIO, with insignificant pre-development and insignificant load over the entire implementation period [9]. Its high level of hardware fabrication allows poor external electronic equipment, designed to occupy a negligible on board PCB area. ESP2866 supports APSD and Bluetooth coexistence, includes self-calibration RF. Wi-Fi module is shown in Fig.3.

Fig.3: Wi-Fi module

C. Gas Sensor: It is an easy-to-use liquefied rock (LPG) detection element to detect concentrations of LPG (mainly composed of fuel and butane) in the air. MQ-6 detects gas concentrations in a range of 200-10,000 ppm. This detection element incorporates more sensitivity and also fast reaction time. Sensor output is associated with analog resistance. All you have to do is connects supply to 5V, and the output to the ADC.

Fig.4: MQ-6 sensor

Temperature sensor: We will management the house temperature mechanically by employing a bound temperature sensing element LM35. The output temperature directly alters with the temperature marked in stargazer. It's an occasional self-heating capability that is apt for remote applications.

Fig.5: Temperature sensor LM-35

V. SOFTWARE IMPLEMENTATION

Arduino's integrated development environment (IDE) is a multiplatform application (for Windows, Mac-os, Linux) written in the Java programming language. It is used to writing and transferring programs on compatible Arduino boards, but also, with the help of third party kernels, several merchant development boards.

Arduino IDE supports special rules for structuring the C and C ++ language code. The Arduino IDE provides a library of codes for the Wiring project that provides several common entry and exit procedures. The code written by the programmer requires 2 basic functions, to start the sketch and also the cycle of the main program, that unit of area compiled associated with a main program loop() in a cyclical executive program feasible with the Chain of GNU tools, also included with the IDE distribution. Arduino IDE uses the compatible program to convert executable code to a hexadecimal text file that is loaded onto the Arduino plate for a load program on the firmware of the board.

FLOW CHART:

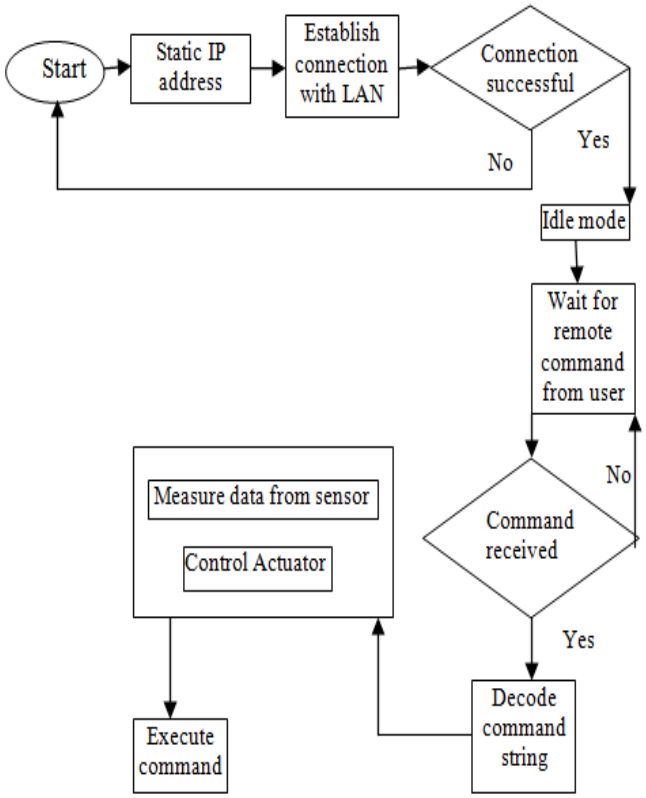

Fig.6: Flow chart of project

In these project the electronic devices in home like light, fan, etc.., can be controlled from anywhere in the world using internet. Firstly, it compares the IP address if the IP address matches it establish a connection through LAN. We can easily on and off the home appliances and by using temperature sensor we can able to know the temperature in our home. And by using a gas sensor in kitchen it detects the leakage of the gas. We can able to monitor [10] and control our home and the data is stored in cloud network [11] with time and date.

VI. RESULTS

The below fig.7.shows the results of the home appliances which are controlled by the data entered in web server. In this system Arduino is connected with wi-fi module and appliances through relay module. Relay is acting as two-way switch between AC and DC supply. With the graphical user interface from cloud platform the appliances can be controlled.

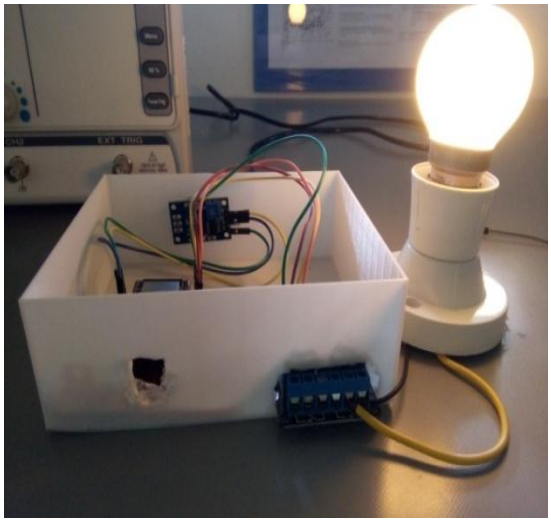

Fig.7: Hardware implementation

Whenever an operation is done the related data is stored in cloud with time and date. The value 1 represents the on status and the value 0 represents the off status as shown in fig.8.

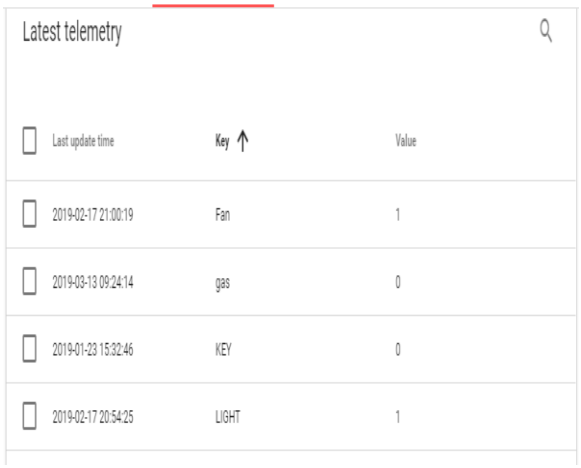

Fig.8: Data stored in cloud

VII. CONCLUSION

This article has shown that home automation with Internet of Things works satisfactorily by connecting simple devices and that devices have been remotely operated online. The designed system records sensor data, which are temperature, light, gas, fan and also controls the devices according to the requirement. It also saves time the parameters of the sensor in the cloud. This information will help the user to analyze the state of several parameters of the home at anytime from anywhere.

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