



IOT BASED INTELLIGENT HOME MONITORING SYSTEM

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Abstract: This paper presents the development of a firmware for a Smart Switch, which can control the on-off of any electrical device at home by using internet. The Smart Switch is connected to internet via Wi-Fi, through a computer, smartphone, tablet or any device with internet access. In order to perform this connection it is necessary to write the IP pre-programmed into the Smart Switch in a web browser (Internet Explorer, Chrome, Firefox, etc.) with the purpose to load the Smart Switch server, which will open a configuration page to write the data of the user's network. Then, the user will select in automatic mode the network, the security type, and the user must have written a password. Once this information is uploaded and saved, it

is necessary to restart the Smart Switch in order to get access to internet, from which the user can control the Smart Switch simply sending a number one or a number zero to switch the electrical device, this process is done in principle via the internet, but it can be done without the use of internet, i.e. by using a local network.

KEYWORDS: Microcontroller, Smart home, Devices.

INTRODUCTION

The rapidly advancing mobile communication technology and the decrease in costs make it possible to incorporate mobile technology into home automation systems. In olden days we were not



monitoring the Office and Home appliances by sitting at one place. We had controlled those appliances manually; it takes more time to for controlling. This is disadvantage here like time consuming.

We can overcome the disadvantage of the existing method by Remote control via the Internet and it's a new feature and used in home automation systems. However, providing a mechanism for interaction between devices in this environment is quite challenging. The internet has been mostly used to connect personal computers so far, but shortly all kinds of appliances with embedded computers will exchange information over the Internet. A massive no of microcontrollers are available in today's devices which can be linked to the Internet. If these intelligent appliances could be connected to the Internet at low cost, the way we control and manage their functions would change entirely.

The embedded system requires a network interface such as Ethernet, a TCP/IP protocol stack, embedded web server software and static and dynamic web pages that form the user interface for that specific device. The system uses a compact circuitry

built around LPC2148 (ARM7) microcontroller programs are developed in Embedded C. Flash magic is used for loading programs into Microcontroller. Sirsath N. S, proposed a Home Automation system that employs the integration of multitouch mobile devices, cloud networking, wireless communication, and power-line communication to provide the user with remote control of various lights and appliances within their home.

This system uses a consolidation of a mobile phone application, handheld wireless remote, and PC based program to provide a means of user interface to the consumer [1]. Basil Hamed, described the design and implement a control and monitor system for smart house. Smart house system consists of many systems that controlled by LabVIEW software as the main controlling system in the paper. Also, the smart house system was supported by remote control system as a sub controlling system. The system also is connected to the internet to monitor and control the house equipment's from anywhere in the world using LabVIEW [2]. Deepali Javale, presents assist to 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 Mega 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 [3]. Mohammad El-Basioni, proposed a new design for the smart home using the wireless sensor network and the biometric technologies. The system employs the biometric in the authentication for home entrance which enhances home security as well as easiness of home entering process.

The structure of the system is described and the incorporated communications are analyzed, also estimation for the whole system cost is given which is something lacking in a lot of other smart home designs offers. WB-SH is designed to be capable of incorporating in a building automation system and it can be applied to offices, clinics, and other places. The paper ends with an imagination for the future of the smart home when employs the biometric technology in a larger and more comprehensive form. The paper ends with an imagination for the future of the smart home when employs the biometric

technology in a larger and more comprehensive form. [4] discussed about a project, in this project an automatic meter reading system is designed using GSM Technology. The embedded micro controller is interfaced with the GSM Module. This setup is fitted in home. The energy meter is attached to the micro controller. This controller reads the data from the meter output and transfers that data to GSM Module through the serial port. The embedded micro controller has the knowledge of sending message to the system through the GSM module. Another system is placed in EB office, which is the authority office. When they send "unit request" to the microcontroller which is placed in home. Then the unit value is sent to the EB office PC through GSM module. According to the readings, the authority officer will send the information about the bill to the customer. If the customer doesn't pay bill on-time, the power supply to the corresponding home power unit is cut, by sending the command through to the microcontroller. Once the payment of bill is done the power supply is given to the customer. Power management concept is introduced, in which during the

restriction mode only limited amount of power supply can be used by the customer.

PROPOSED SYSTEM

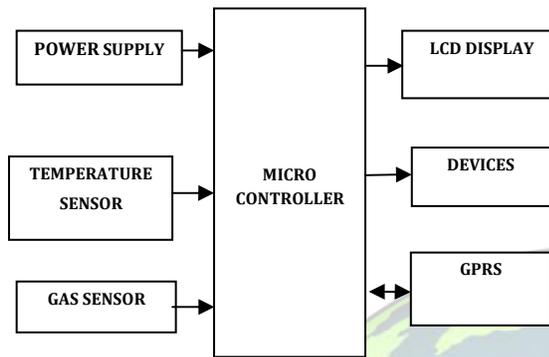


Fig.1:Block diagram

METHODOLOGY

Micro controller: This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

ARM7TDMI: ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much

simpler than those of Complex Instruction Set Computer (CISC) designs.

Liquid-crystal display (LCD) is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock.

GPRS:

GPRS (general packet radio service) is a packet-based data bearer service for wireless communication services that is delivered as a network overlay for GSM, CDMA and TDMA (ANSI-I36) networks. GPRS applies a packet radio principle to transfer user data packets in an efficient way between GSM mobile stations and external packet data networks. Packet switching is where data is split into packets that are transmitted separately and then reassembled at the receiving end. GPRS supports the world's leading packet-based Internet communication protocols, Internet protocol (IP) and X.25, a protocol that is used mainly in Europe. GPRS enables any existing IP or

X.25 application to operate over a GSM cellular connection. Cellular networks with GPRS capabilities are wireless extensions of the Internet and X.25 networks.



Fig.2: GPRS module

Temperature sensor:

A thermistor is a type of resistor whose resistance is dependent on temperature. Thermistors are widely used as inrush current limiter, temperature sensors (NTC type typically), self-resetting over current protectors, and self-regulating heating elements. The TMP103 is a digital output temperature sensor in a four-ball wafer chip-scale package (WCSP). The TMP103 is capable of reading temperatures to a resolution of 1°C.



Fig.3: Temperature sensor

Co2 sensor:

They are used in gas leakage detecting equipment in family and industry, are suitable for detecting of LPG, i-butane, propane, methane, alcohol, Hydrogen, smoke. The surface resistance of the sensor R_s is obtained through effected voltage signal output of the load resistance R_L which series-wound. The relationship between them is described:

$$R_s \backslash R_L = (V_c - V_{RL}) / V_{RL}$$

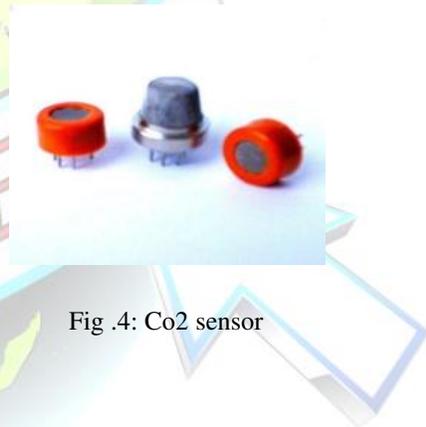


Fig .4: Co2 sensor

RESULTS



Fig 5 Hardware kit

Fig 5 depicts the hardware representation of this project. It comprises the components that connected to microcontroller.



Fig 6 depicts connected appliances to switch
Fig 6 represents the devices connected to electrical switch can be controlled over internet. That is switching of the devices happens through smart switch.



Fig 7 depicts parameters displayed on LCD.
Fig 7 represents the physical device parameters are displayed on LCD which they are interfaced through microcontroller.

CONCLUSION

Home networking and architecture design are very important for a smart home automation system. The interfacing of sensors and devices to microcontroller successfully simulated and tested for all smart nodes along with feature of remote controlling using Android application. With successful design and testing of hardware, this project proves to be very useful in daily home management with increased smartness with usage of smart devices.

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