Survey on smart home using Innovative Technology

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ABSTRACT:
Today we are living in 21st century. It is necessary to control the home from desire location. Home automation is the control of any electrically and electronics device in our home and office, whether we are there or away. This Home automation system provide the user with android application to control various lights and appliances within their home. This system is designed to be low cost and expandable allowing a variety of devices to be controlled. Home automation and benefits will be focus on and how this can be achieved through the use of the raspberry pi.

KEYWORDS: Raspberry pi, Home appliances, Ethernet, Relay,

INTRODUCTION:
Raspberry Pi is a credit-card sized computer manufactured and designed in the United Kingdom by the Raspberry Pi foundation with the intention of teaching basic computer science to school students and every other person interested in computer hardware, programming and DIY-Do-it Yourself projects. There are many method by which we can implement home automation system. Some of the method are listed below:

Home Appliances Control Using A Remote Control
Home Appliances Control Using DTMF
Home Appliance Control Using Free Hand Gesture
Home Appliance Control Using Internet And Radio Connection
Wireless Browser Based Device Control Using Raspberry Pi

As of February 2014, about 2.5 million boards had been sold. The board is available online in India at a price of Rs. 3000.

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- Wireless Browser Based Device Control Using Raspberry Pi

Home Appliances Control using a Remote Control:
The lights, fans can be automatically turned on/off with the help of a remote where there will be a sensor instead of going near to a switch board and putting on/off the switch. Companies like Legrand and Gold Medal already started these kinds of control system and they are at present available in the market.
Home Appliances Control using DTMF:
In this method, the control of home appliances can be done even though when we are elsewhere just by using the DTMF tone generated when the user pushes mobile phone keypad buttons or when connected to a remote mobile.

Home Appliance Control Using Free Hand Gesture:
The lights, fans can be automatically turned on/off with the help of a remote where there will be a sensor instead of going near to a switch board and putting on/off the switch. Companies like Legrand and Gold Medal already started these kinds of control system and they are at present available in the market. This is a type of home appliance control system where the person must be present in sight to the appliance that is needed to be controlled and a predefined gesture must be used to turn on the device and another gesture must be used by us to turn off the device. The performance of the proposed system is done with a hardware embedded in that particular device.

Home Appliance Control Using Internet and Radio Connection:
In this system, the control of home appliances can be done from a remote are with an option from a local server, using the Internet and radio connection. This system is accomplished by personal computers, interface cards, radio transmitters and receivers, microprocessors, ac phase control circuits, along with window-type software and microprocessor control software.

Wireless Browser Based Device Control Using Raspberry Pi:
We can observe this research paper that the appliances controlling through the web browser Integrated with the ARM11 microcontroller. The Raspberry Pi is a credit-card-sized single-board computer developed in the UK by the Raspberry Pi Foundation with the intention of promoting the teaching of basic computer science in schools. The Raspberry Pi has a Broadcom BCM2835 system on a chip, which includes an ARM1176JZF-S 700 MHz, Video Core IV GPU, and was originally shipped with 256 megabytes of RAM, later upgraded to 512 MB. It does not include a built-in hard disk or solid-state drive, but uses an SD card for booting and long term storage. In this system, we use the raspberry Pi model as a controller. The Raspberry is a credit card sized minicomputer. There are different types of raspberry pi model available in the market, Such as Model A, Model B, Model B+ out of which we uses Model B+.

PROPOSED SYSTEM:
1) SYSTEM DESIGN-
The designing part includes basically two sections as follows.
- Hardware design
- Software design

Hardware Design
- It includes Raspberry Pi 2B model.
- Temperature sensor, humidity sensor & pressure sensor, I2C (Inter Integrated Circuit).

Raspberry Pi
The Raspberry Pi is a credit-card-sized single-board computer developed in the UK by the Raspberry Pi Foundation. It has a Broadcom BCM2835 system on a chip (SoC), which includes an ARM1176JZF-S 700 MHz processor, Video Core IV GPU. Its GPU provides OpenGL ES 2.0, hardware-accelerated Open VG, and 1080p30 H.264 high-profile decode which is capable of 1Gpixel/s, 1.5Gtexel/s or 24GFLOPs with texture filtering with 512 MB RAM. It does not include a built-in hard disk or solid-state drive, but uses an SD card for booting and persistent storage. It has 10/100 Base T Ethernet socket.
The Raspberry Foundation provides Debian and Arch Linux ARM distributions for download. Tools are available for Python as the main programming language, with support for BBC BASIC (via the RISC OS image or the Brandy Basic clone for Linux), C, C++, Java, Perl and
Ruby. The video controller is capable of standard modern TV resolutions, such as HD and Full HD, and higher or lower monitor resolutions and older standard CRT TV resolutions. Below figure shows advance specification of RASPBERRY PI.

SPECIFICATIONS:

- **SOC:** Broadcom BCM2836(CPU,GPU,DSP,SDRAM,one USB port)
- **CPU:** 900 MHz quad-core ARM Cortex-A7
- **Memory(SDRAM):** 1GB (shared with GPU)
- **USB 2.0 ports:** 4
- **On-Board storage:** MicroSD slot
- **Low level peripherals:** 17*GPIO plus the same specific functions, and HAT ID bus
- **Power Ratings:** 800mA(4.0W)
- **Power source:** 5V via MicroUSB or GPIO header
- **Weight:** 45g (1.6 oz)

Applications of Raspberry pi

1. **Cyber Based Home Automation:** Cyber Automation refers to „Automation on Internet“. It uses the concept of „Internet of Things“ for automating the home equipment. This means that a user of this automation system can exclusively control the home equipment from anywhere in the world provided an internet connection.

2. **E-Book Reader:** Any device that can display text on a screen may act as an e-book reader, but specialized e-book reader designs may optimize portability, readability (especially in bright sun) and battery life for this purpose. A single e-book holds the equivalent of many printed texts with no added mass or bulk.

3. **Internet radio:** Internet radios still cost a pretty penny, so why not pair up the Pi with a low-cost LCD screen, some speakers and create your own. Various Pi-based internet radio projects already exist and are piecing together the components and code needed to create a Pi-based internet radio, and it seems only a matter of time before this becomes a reality.

Software design

It includes Raspbian OS and Python language.

1. **Raspbian OS**
Raspbian is an unofficial port of Debian Wheezy arm hf with compilation settings adjusted to produce code that uses "hardware floating point", the "hard float" ABI and will run on the Raspberry Pi. The port is necessary because the official Debian Wheezy arm hf release is compatible only with versions of the ARM architecture later than the one used on the Raspberry Pi.

2. **Python Language**
Python is a widely used general-purpose, language. Its design philosophy emphasizes code readability, and its syntax allows programmers to express concepts in fewer lines of code than would be possible in languages such as C++ or Java. The language provides constructs intended to enable clear programs on both a small and large scale. Python supports multiple programming paradigms including object-oriented imperative and functional programming and procedural styles. It features a dynamic type system and automatic memory management and has large and comprehensive standard library.
2) BLOCK DIAGRAM

Figure Shows the basic block diagram of the system. With the help of this system we can monitored and controlled the various equipment that are connected to therelay circuit via the input from raspberry pi model as well as from theWEBIOPI. Whenever the system is turned on, the current lighting data of the home are read and written to the data base and then transferred to the user interface. So, one can easily know the current situation of rooms and change in the state of the lights. A Relay is electrically operated switches, which allow low power circuits to switch a relatively high voltage or current on/off. For a relay to operate a suitable pull in and holding current should be passed through its coil. Relay coils are designed to operate from a particular voltage often its 5V or 12V. The function of relay driver circuit is to provide the necessary current energize the relay coil, when a LOGIC 1 is written on the PORT PIN thus turning on the relay. The relay is turn off by writing LOGIC 0 on the port pin. In our system four relays are used for device control.

ADVANTAGES:

- Low cost and expandable allowing a variety of devices to be controlled
- Saves money and energy
- All in one user friendly system
This system contain Raspberry pi as a controller so the system contain all the advantages of it.

This is noise free system.

CONCLUSION:

These kinds of home automation systems are required because human can make mistakes and forgot to switch off the appliances when there is no use and in this case, they are useful in order to utilize the power effectively and also in a secured manner.

REFERENCES:


www.iosrjournal.org Voice Recognition Wireless Home Automation System Based On Zigbee

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