RESEARCH ARTICLE   OPEN ACCESS

Raspberry PI And Wifi Based Home Automation

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ABSTRACT:
The aim of this project is to develop a system that will provide remote control of home appliances and also provide security against intrusion when the home host is notat home. This paper is mainly concerned with the automatic control of light or any other home appliances using internet. It is meant to save the electric power and human energy. This project is made with the help of the microcontroller and Raspberry Pi. The various appliances are connected to the microcontroller and the sensor is connected using wireless network.

Keywords: Raspberry pi, PIR sensor, home automation

I.   INTRODUCTION

The provision for the user to automate homes remotely is the main target of this system. There was a need to automate home so that users can take advantage of the technological advancement in such a way that a person can send a control signal to the home control centre when he forget to turn off devices such as air conditioner instead of returning home. In addition to this home security has been a major issue and this issue is also dealt in this paper. Therefore this paper develops a system that allows user to control home appliances from wherever he is and whenever he wishes. Remote intelligent home system may include centralized control of lighting, HVAC (heating, ventilation and air conditioning), appliances and other security systems, to provide improved convenience, comfort, energy efficiency and security. The popularity of Remote intelligent home system has been increasing greatly in recent years due to much higher affordability and simplicity through internet connectivity. The concept of the "Internet of Things" is closely associated with the commercialization of Domestic/Industrial automation. As the number of controllable devices in the home rises, interconnection and communication between the devices becomes difficult. Remote intelligent home system can also provide a remote interface to Domestic/Industrial appliances or the system itself, via telephone line, wireless transmission or the internet, to provide control and monitoring via a Smartphone or browser. An example of remote monitoring , the Remote intelligent home system could be triggered when a smoke detector detects a fire or smoke condition, causing all lights in the house to blink to alert any occupants of the house to the possible emergency.

II.   WORKS RELATED TO THE PAPER:

GSM BASED HOME AUTOMATION SYSTEM: This system presents a completely unique, stand alone, cheap and versatile GSM-ZigBee primarily based home automation system. The complete system depends on an eight bit microcontroller named PIC (Peripheral Interface Controller) during this work. The information instrumentation designed around this Microcontroller and a GSM controller facilitates the guts of the system. This device is connected to a ZigBee Transceiver and it communicates with every and each node gift within our home. The GSM Controller facilitate for the information follow between user and microcontroller. The GSM Controller uses portable technology to speak. From the portable, command will be send via SMS to the Controller, that successively interprets the command so activates the specified 'switch' to regulate the electrical item. As long as there\'s GSM portable signal coverage, it\'s attainable to regulate all electrical things from anyplace within the world. The system is straightforward to work, and is secure in this solely pre-determined mobile numbers will operate the GSM Controller. The installation of the GSM Controller is comparatively straightforward and may be tailored for any existing home system. management of lights and geyser area unit done via the electrical distribution board (circuit breakers).

International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622
NATIONAL CONFERENCE on Developments, Advances & Trends in Engineering Sciences
(NCDATES- 09th & 10th January 2015)

III. SMS BASED HOME AUTOMATION SYSTEM:

This system presents style and model implementation of a basic home automation system based on SMS technology. The automation system consists of 2 main components; the GSM electronic equipment, which is that the communication interface between the house automation system and therefore the user. GSM electronic equipment uses SMS technology to exchange information, and signaling between users and residential automation system. The second module is the microcontroller, that is that the core of the house automation system, and acts because the bridge between the GSM network (the user) and sensors and actuators of home automation system. Sensors and actuators are directly connected to hardware small controller through appropriate interface. System supports a good vary of home automation devices; power management components, security, transmission applications, and telecommunication devices. System security supported user authentication of every SMS being exchange, as each SMS contains user name and Arcanum. User will simply tack together home automation System setting through RS232 protocol employing a user Friendly interface.

IV. PROPOSED SYSTEM:

Every user United Nations agency is full-fledged within the existing system might imagine of a system which will add additional flexibility and run with some common applications like humanoid. The projected system is meant in such how to avoid the restrictions of the prevailing system. The projected system supports additional flexibility, comfort ability and security. The projected home automation system is functioning with very hip humanoid phones. it's having chiefly 3 components; the humanoid enabled user device, a LAN router having a decent ascendable vary, and a raspberry pi board .Here the users have provision to regulate the house appliances through humanoid enabled device. this can improve the system quality since there's no would like for a wired association, net etc. The directions from the user are transmitted through the LAN network. The raspberry pi board is organized in step with the house system and it'll change the relay circuit as per user request. The relay circuits will management the house appliances additionally. We will add appliances to the system can also add extra security measures. The main objectives of the projected system is to style associate degree to implement an inexpensive and open supply home automation system that's capable of dominant and automating most of the house appliances through an humanoid device.

Advantages of projected System:
The new system should give the subsequent options
*   It permits additional flexibility through humanoid device.
*   It permits a decent vary of quantifiability.
*   It provides security and authentication.
*   Additional vendors may be simply superimposed.

V. SYSTEM OVERVIEW:

Home appliance network (home automation) is needed to be while not new wiring and to be terribly simple installation. Field of household appliance network continues to be young, several initiatives and standardization efforts have already been created. The new reasonably system brought Google and raspberry-pi into home automation implementation. The projected system architectures usually incorporate a raspberry-pi pc for the needs of network management and provision of remote access .raspberry-pi are often designed in step with our home system. The user can communicate to raspberry-pi through local area network. The system is versatile and climbable, permitting further home appliances designed by multiple vendors, to be firmly and safely adventitious to the house network with the minimum quantity of effort. The local area network ought to be having adequate strength additionally. We will use a local area network-modem for steeping a wi-fi. The user will have a pleasant golem interface for mistreatment the system. The serial knowledge coming back from local area network unit is connected to raspberry-pi circuit. The core of the house automation system consists of raspberry-pi board. it are often viewed as a mini PC capable of doing several functions. The raspberry-pi board is designed for every home appliances .so in step with user intervention the matched out can build high and therefore the corresponding relay can turn on and device begin operate. The system is climbable and permits multi-vendor appliances to be adventitious with no major changes to its core.
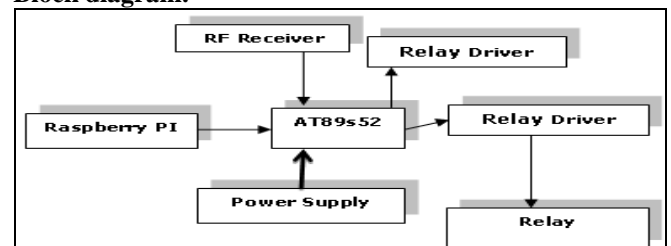
Block diagram:

Fig a: Control unit

International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622
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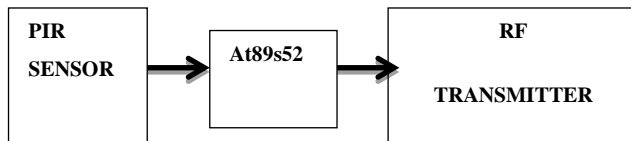| PIR SENSOR | → | At89s52 | → | RF TRANSMITTER |

Fig b: Wireless Sensor Unit

RASPBERRY PI

The Raspberry Pi is of a credit card-size, single-board computer launched in the United Kingdom by the raspberry pi foundation. The main objective of this is to encourage basic computer teaching in institutes.

The Raspberry Pi has a broad com BCM2835 SoC, which comprises of an advanced RISC Machine 76JZF-S 700 MHz processor, video core IV GPU, and was originally distributed with 256 megabytes of RAM, later it is improved (Model B & Model B+) to 512 MB. It does not contain any built-in hard disk or solid-state drive, but it uses an SD card for booting and persistent storage, with the Model B+ using a Micro SD.

The Raspberry Pi Foundation provides Debian and Arch Linux ARM distribution for downloading. Besides tools are available for Python as the main programming language, with support for **BBC CLONE** (via the RISC_OS image or the Brandy Basic clone for Linux), C, C++, Java, Ruby and Perl.

METHODOLOGY

The methodology of this project design can be divided into two sections; hardware and software implementations. The hardware implementation consists of the development of the main controller, sensor networks and the smart home while the software implementation focuses on the programming of the microcontroller using Embedded C.

A. Hardware Implementation

Main controller is the most important part of the system in this project. Main controller will be the interface between the user and the system.89C52 microcontroller is used as the 'brain' of the main controller. It has 32 general I/O port and the clock speed can be up to 24 MHz .This microcontroller is a CMOS technology IC which enable the low power consumptions.

B. Software Implementation

The software part consists of programming 89C52 microcontroller using Embedded C using Keil μVision. The Graphical User Interface is designed by using PHP.

PIR SENSOR

IR sensors allows to sense motion, and detect whether an object hasmoved in or out of the range. They are inexpensive, low-power, small, easy to use. So they are normally found in appliances and devices used in households or trades. They are frequentlymentioned to as PIR, "Passive Infrared", "Pyro electric", or "IR motion" sensors.
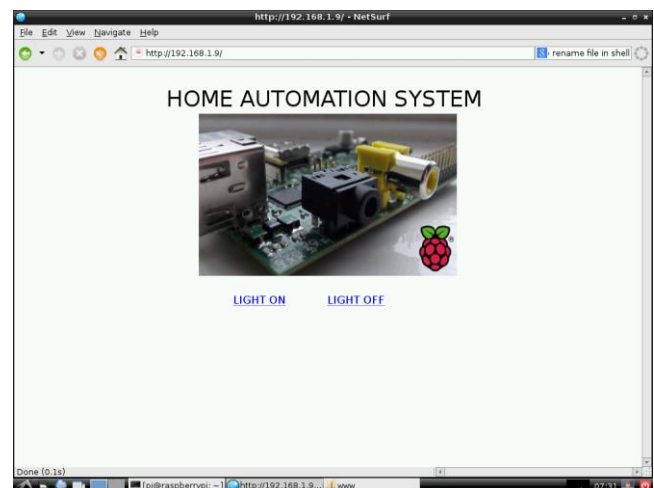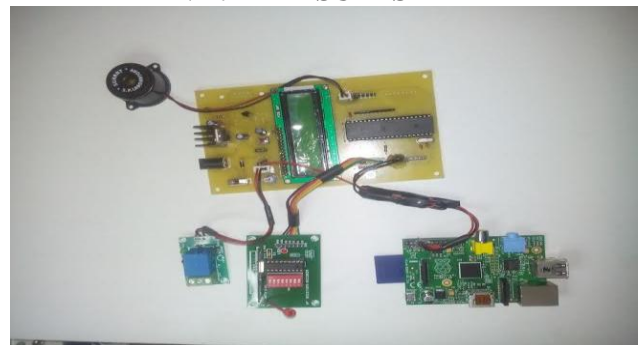
SYSTEM IMPLEMETATION

This project offers an important feature of home automation. [1] In home automation system, user can control their house by using the Graphical User Interface. Figure a show the operation of the home automation system for the house. Figure b shows the Circuit Diagram of the system.

VI. CONCLUSION

This paper describes raspberry pi module and presents its potential deployment in smart home environment. Examples of prototype applications in home automation utilizing a pir wireless sensor network are illustrated. This system has attractive features such as intruder alerts. In this perspective, raspberry pi is emerging network technology and is capable to satisfy such requirements.

VII. RESULTS

International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622
NATIONAL CONFERENCE on Developments, Advances & Trends in Engineering Sciences
(NCDATES- 09th & 10th January 2015)

References:

[1] Remote-Controlled Home Automation Systems with Different Network Technologies.

[2] Home Automation using ZigBee Protocol

[3] Laur I., "Microcontroller based home automation system with security", International Journal of Advanced Computer Science and Applications, vol. 1, no. 6, pp. 60-65, 2010.

[4] N. Sriskanthan and Tan Karande, "Bluetooth Based Home Automation Systems," Journal of Microprocessors and Microsystems, 2002, Vol. 26, pp. 281-289

[5] Kwang Yeol Lee & Jae Weon Choi, "Remote- Controlled Home Automation System via Bluetooth Home Network" in SICE Annual Conference in Fukui, 2003, Vol. 3, pp. 2824-2829

[6] S. Ok and H. Park, "Implementation of initial provisioning function for home gateway based on open service gateway initiative platform", The 8th International Conference on Advanced Communication Technology, pp. 1517-1520, 2006.

[7] Mitchell, Gareth. "The Raspberry Pi single-board computer will revolutionise computer science teaching [For & Against]." Engineering & Technology 7.3 (2012): 26-26.

[8] J. Bray, C. F. Sturman, "Bluetooth 1.1: Connect without Cable", Pearson Education, edition 2, 2001.