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Research Article

Interactive Iot-Based Speech-Controlled Home Automation System

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Abstract

To enhance the lifestyle of people through the provision of different services, smart home or automated home comes into picture. The main objective of this project is to operate home devices smartly through an android app using IoT (Internet of Things). IoT is the network of "things" or physical objects which includes electronics, software, sensors, actuators and network connectivity. All these things collect and transfer data between themselves. IoT has increased significantly in the last few years since it has added a new dimension to the world of information and communication technologies. For digitalizing home appliances such as lighting, heating, security, audio, video etc. IoT in home automation is the best commercial solution these days. With the increasing use of personal computing, media players, android mobile phones etc. people have more knowledge about these technologies and are more comfortable with its use. Thus home automation will be easily accepted by the people.

Keywords : Arduino Uno, HC-05 Bluetooth Module, Home Automation, Smartphone, Voice Controler

Introduction

Home, it is the place where one fancies or desires to be after a long tiring day. People come home exhausted after a long hard working day. Some are way too tired that they find it hard to move once they land on their couch, sofa or bed. So any small device/technology that would help them switch theirs lights on or off, or play their favorite music etc. on a go with their voice with the aid of their smart phones would make their home more comfortable. Moreover, it would be better if everything such as warming bath water and adjusting the room temperature were already done before they reach their home just by giving a voice command. So, when people would arrive home, they would find the room temperature, the bath water adjusted to their suitable preferences, and they could relax right away and feel cozier and rather, feel more homely. Human assistants like housekeepers were a way for millionaires to keep up their homes in the past. Even now when technology is handy enough only the well to do people of the society are blessed with these new Smart home devices, as these devices costs are a bit high. However, not everyone is wealthy enough to be able to afford a human assistant, or some smart home kit. Hence, the need for finding an inexpensive and smart assistant for normal families keeps growing.

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Embedded system implementation Introduction

An embedded system is one kind of a computer system mainly designed to perform several tasks like to access, process, and store and also control the data in various electronics-based systems. Embedded systems are a combination of hardware and software where software is usually known as firmware that is embedded into the hardware. One of its most important characteristics of these systems is, it gives the o/p within the time limits. Embedded systems support to make the work more perfect and convenient. So, we frequently use embedded systems in simple and complex devices too. The applications of embedded systems mainly involve in our real life for several devices like microwave, calculators, TV remote control, home security and neighborhood traffic control systems, etc.

User interface
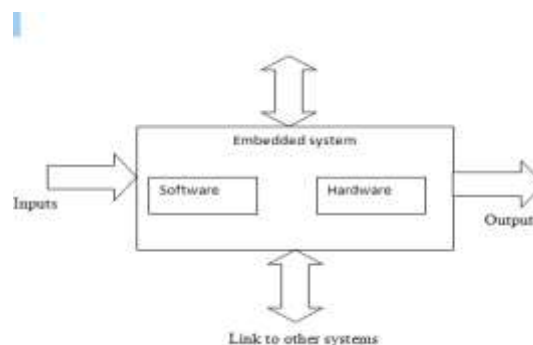
Literature Survey

Bluetooth based home automation system using cell phones:

In Bluetooth based home automation system the home appliances are connected to the Arduino BT board at input output ports using relay. The program of Arduino BT board is based on high level interactive C language of microcontrollers; the connection is made via Bluetooth. The password protection is provided so only authorized user is allowed to access the appliances. The Bluetooth connection is established between Arduino BT board and phone for wireless communication. In this system the python script is used and it can install on any of the Symbian OS environment, it is portable. One circuit is designed and implemented for receiving the feedback from the phone, which indicate the status of the device.

Zigbee based home automation system using cell phones:

To monitor and control the home appliances the system is designed and implemented using Zig bee. The device performance is record and store by network coordinators. For this the Wi- Fi network is used, which uses the four switch port standard wireless ADSL modern router. The network SSID and security Wi-Fi parameter are preconfigured. The message for security purpose first process by the virtual home algorithm and when it is declared safe it is re-encrypted and forward to the real network device of the home. Over Zigbee network, Zigbee controller sent messages to the end.

GSM based home automation system using cell phones

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Because of the mobile phone and GSM technology, the GSM based home automation is lure to research. The SMS based home automation, GPRS based home automation and dual tone multi frequency (DTMF) based home automation, these options we considered mainly for communication in GSM. In figure shows the logical diagram the work of A. Alheraish, it shows how the home sensors and devices interact with the home network and communicates through GSM and SIM (subscriber identity module). The system use transducer which convert machine function into electrical signals which goes into microcontroller. The sensors of system convert the physical qualities like sound, temperature and humidity into some other quantity like voltage.Select appropriate communication method among SMS, GPRS and DTFC based on the command which received GSM module.

Existing system

In the existing system, home appliances are controlled through Bluetooth, Zigbee and other devices. But they are limited to certain area. In the proposed system we have designed so as to control home appliances from anywhere in the world.

Proposed system

The idea of the project is to integrate the concept of Google Assistant into Node cu and control the appliances in the home that the device is installed. Google released an API for Google Assistant. This system works based on the Google Assistant. The device is first registered in the Cloud console of the users Google account. A sound is played to acknowledge that the Google assistant is up and running.

Block Diagram
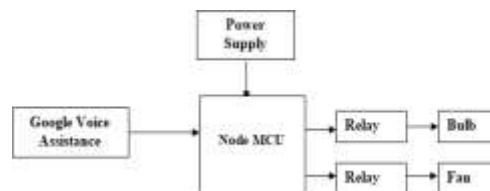
Results

The AT mega48PA/88PA/168PA/328P provides the following features: 4/8/16/32K bytes of In System Programmable Flash with Read-While-Write capabilities, 256/512/512/1K bytes EEPROM,

512/1K/1K/2K bytes SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible Timer/Counters with compare modes, internal and external interrupts, a serial programmable USART, a byte-oriented 2- wire Serial Interface, an SPI serial port, a 6- channel 10-bit ADC (8 channels in TQFP and QFN/MLF packages), a programmable Watchdog Timer with internal Oscillator, and five software selectable power saving modes. The Idle mode stops the CPU while allowing the SRAM, Timer/Counters, USART, 2-wire Serial Interface, SPI port, and interrupt system to continue functioning. The Power-down mode saves the register contents but freezes the Oscillator, disabling all other chip functions until the next interrupt or hardware reset. In Power-save mode, the asynchronous timer continues to run, allowing the user to maintain a timer base while the rest of the device is sleeping. The ADC Noise Reduction mode stops the CPU and all I/O modules except asynchronous timer and ADC, to minimize switching noise during ADC conversions. In Standby mode, the crystal/resonator Oscillator is running while the rest of the device is sleeping. This allows very fast start-up combined with low power consumption.
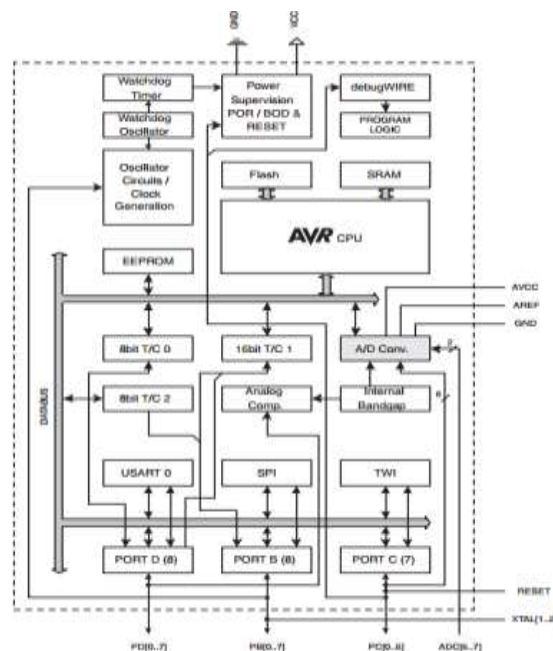
Conclusion

In this project, we have presented the step-by- step procedure of smart home automation controller unit. With the help of the design control unit, home appliance can be converted into a smart and intelligent device using IoT. The working of the proposed model was experimentally shown with help of connecting the three bulbs. Proposed system has two advantages. First, using the IoT connectivity, we can monitor and access our smart home easily from anywhere, which will definitely will prove to be energy efficient. Secondly, it act has a helping hand for the old age and differently abledperson.

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