



VOICE CONTROLLED HOME AUTOMATION

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Abstract

In the past few years, technology has grown at high speed. Also human lives have become much more dependent on electronic devices and appliances. It has thus led to the idea of developing a home automation system. This project is about home automation system which would use a smart phone to enable any naive user to operate all the appliances. The project Voice Controlled Home Automation helps to control the electrical loads based on Bluetooth input signal. This system solves the issue by interfacing a unit with home appliances that switch-es these loads based on the input received from android device. The Android app also provides an effective GUI for providing this functionality. This system is especially beneficial in case of handicapped or aged people who find it difficult to walk and operate the electrical switches to turn on or off the loads. The main aim of the system development is to be low cost and scalable according to the requirements.

Keywords: GUI – Graphical User Interface, GSM – Global System for Mobile, ESCP – Espressif Smart Connectivity Platform, UART – Universal Asynchronous Receiver Transmitter, GPIO – General Purpose Input Output, DIP – Dual Inline Package, IC-Integrated Circuit, DC- Direct Current, SOC – System On Chip, GPS – Global Positioning System.

1. INTRODUCTION

Automation is today's fact, where more things are being completed everyday automatically, usually the basic tasks of turning on or off any devices and across, either remotely or in close proximity. The control of the appliances when completely taken over by the machines, the process of monitoring and reporting becomes more eventful. We are more and more

relinquishing the power for simple but routine tasks while we need to maintain as much as control as we can over the automated process. Automation is down the human judgement to the lowest degree possible but does not completely eliminate it. Depending on the location of its usage, automation differs in its name as industrial automation, home automation etc. In the past few years, technology has grown at a high speed. Also human lives have become much more dependent on electronic devices and appliances. It has thus led to the idea of developing a home automation system. This project is about home automation system which would use a smart phone to enable any naive user to operate all the appliances and it helps to control the electrical loads based on Bluetooth input signal. The Bluetooth device receives this input signal from android device. This system solves this issue as now the user just has to give voice commands to turn on or off the loads. Here four loads are used. All these loads can be individually turned ON/OFF or all loads at the same time. This system solves the issue by interfacing a unit with home appliances that switches these loads based on the input received from android device. The Android app also provides an effective GUI for providing this functionality. This system makes use of a microcontroller. The Bluetooth receiver is interfaced with microcontroller in order to accept the commands and then react accordingly. It operates the loads through a set of relays using a relay driver IC. Relays are used between loads and the control unit. This system thus can be used in many domestic applications and in industrial setups and is especially beneficial in case of handicapped or aged people who find it difficult to walk and operate the electrical switches to turn on or off the loads.

II. PROBLEM STATEMENT

The process of operating and controlling various electronic and electrical devices or components, industrial processes and other applications using automated techniques and also with less or no human intervention.

III. OBJECTIVES

1. To create a low cost platform of automation and to make it user-friendly.
2. To improve energy efficiency of whole system.
3. Authorization and authentication involved to improve security.
4. To make the option of changing systems password periodically.
5. To make the system eco-friendly which should require less maintenance and easy installation.
6. To make it usable for large scale areas.
7. To be used as a benefit for disabled and aged people who cannot help themselves moving around.

IV. EXISTING SYSTEM

IOT based home automation can be made using Raspberry Pi.

It can also be created using GSM modems, GPS modems, Bluetooth Technology, Zigbee Technology, etc. One of the technologies is by using Wi-Fi module. Espressif systems smart connectivity platform (ESCP) of high performance wireless SOCs, for mobile platform designers, provides unsurpassed ability to embed Wi-Fi capabilities within other systems, at lowest cost with the greatest functionality. ESP8266 offers a complete and self-contained Wi-Fi networking solution, allowing it to either host the application or to off-load all Wi-Fi networking functions from another application processor. When ESP8266 hosts the application, and when it is the only application processor in the device, it is able to boot up directly from an external flash. It has integrated cache to improve the performance of the system in such applications, and to minimize the memory requirements. Alternately, serving as a Wi-Fi adapter, wireless internet access can be added to any

microcontroller-based design with simple connectivity through UART interface or the CPU AHB bridge interface. ESP8266 onboard processing and storage capabilities allow it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. With its high degree of on-chip integration, which includes the antenna switch balun, power management converters, it requires minimal external circuitry, and the entire solution, including front-end module, is designed to occupy minimal PCB area.

V. SYSTEM SETUP

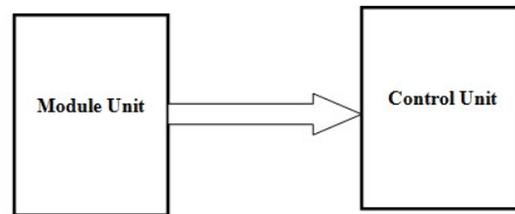


Fig. 1. Block diagram of Proposed System setup

A. Module Unit:

The Bluetooth module HC-05 is an easy to use SSP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. It is a master/slave module. By default the factory setting is slave. The role of the module (master/slave) can be configured only by AT commands. The slave modules cannot initiate a connection to another Bluetooth device, but can accept connections. Master module can initiate a connection to other devices. In our system, we have used it for a serial port replacement to establish connection between micro-controller and itself. Slave default baud rate is 9600, data bits is 8. Works on supply voltage in the range of 3.3V to 5V. It receives the data from a device which is connected or paired to it and then it sends this data through serial communication to the control unit which is the micro-controller.

B. Control Unit:

Control unit is the vital part of the system where it actually controls the most hardware. In our

system, the control unit is the PIC16F877A micro-controller. It is a 8 bit micro-controller with 40 pin DIP. It has wide operating range of 2V to 5.5 V. Our system uses serial communication where data is received bits by bits from the module unit. The control unit does not send back any data to the module unit thus making our system a simplex communication. Once the data has been received by the micro-controller, it then performs the further procedure or say executes set of instructions. Due to this, the hardware connected to the control unit is controlled.

VI. FLOW CHART

Start the application on android device. Bluetooth module is paired with the android device and connection is established. If the connection is not established, then the module waits for the device for successful connection. If the connection is established successfully, then user response is send to controller otherwise waiting for response. When controller gets the response it gives output according to it otherwise it will wait until it gets the response.

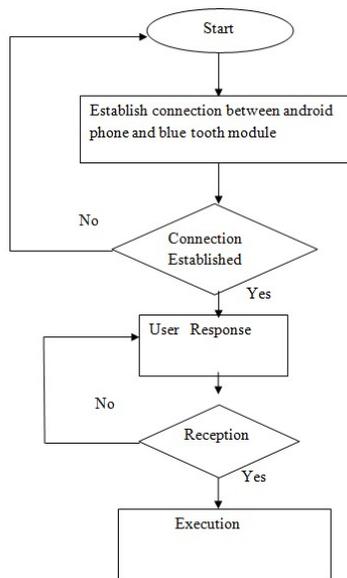


Fig. 2. Flow chart of proposed project

VII. SYSTEM HARDWARE

The system hardware consists of the blocks which are discussed in detail.

A. The system block diagram

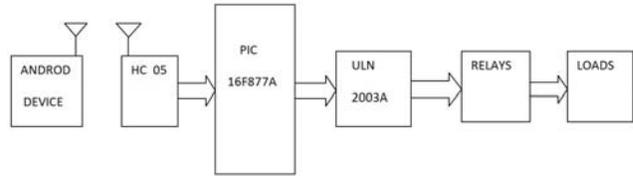


Fig. 3. Block diagram of proposed project

The above figure indicates in short the idea of the project. The heart of the system is the micro-controller PIC16F877A. It is a 8-bit power full controller that does all the controlling. Firstly, this system needs an android device to send the voice signal as a string over Bluetooth to the Bluetooth module HC05. This module further sends this data to the micro-controller. In accordance with received data, the micro-controller controls the relay driver ULN 2003. Relays are driven by the relay driver IC as they are connected to it. Thus, respective loads are being made turn on or off which are connected to the relays.

B. Power Supply

The supply can be given from a.c. mains. The system consists of the regulated power supply. The regulated power supply is the vital section of the system. The supply from a.c. mains is stepped down to unregulated 15V D.C using a transformer and then it is regulated by using 7812. The 7812 is a standard 12 V regulator IC which generates an output of 12 V D.C. The output of 7812 is given to the 7805 regulator. The 7805, a 5V regulator is used to get a 5V D.C supply.

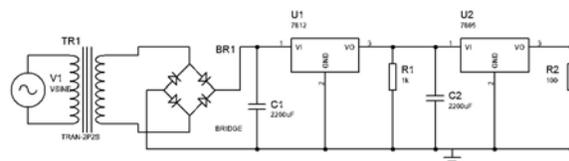


Fig. 4. Power Supply Circuit Diagram

VIII. ADVANTAGES AND DISADVANTAGES

A. *Advantages*

Replacing human operators in tedious tasks. Reducing human efforts. Sometimes and some kinds of automation implies improves in economy of enterprises, society or most of humankind. Making tasks that are beyond the human capabilities such as handling too heavy loads, too large objects, too hot or too cold substances or the requirement to make things too fast or too slow.

B. *Disadvantages*

Technology limits. Current technology is unable to automate all the desired tasks. Unpredictable development costs. The research and development cost of automating a process is difficult to predict accurately beforehand. Initial costs are relatively high. The automation of new product requires a huge initial investment in comparison with unit cost of the product.

IX. CONCLUSION

This system is efficient and helps in reducing human efforts. This idea will help towards the smart office concept in the Government. It helps towards the automation in the lab and the problem of lab caretaker will be solved regarding to the computer shut downs. Overall, it seem that this system can be very useful and a convenient way to save electricity.

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