

Voice Controlled Smart Home Automation System

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Abstract— *This is fulfilled by the need to provide supporting systems for the old and the disabled, especially people who live alone. The automation project recognize of voice commands which is an Analog signal that uses low-power Bluetooth wireless communication modules which are relatively cheap. This system is designed to provide control of home appliances through mobile phone by dialing the designated number. Dialing can be done from the home phone or a call made to the number from outside. This system is designed by ARDUINO UNO but is based on digital logic using DTMF technology (Dual Tone multiple frequency) which receives the command from the phone to develop digital output. This digital signal is further processed to actuate switching mechanism through relay driver to turn on/off the loads/appliances. It can be used to switch appliances from anywhere, overcoming the limited range of other infrared and radio frequency type controls. The system home automation is used to control the appliances like fan ,light etc in a home or office using voice commands. The signals are received by the Bluetooth and sends the voice data to the Arduino controller and then the controller converts the voice into required format and then again send the data through the Bluetooth to the another Bluetooth and the devices are feely operated by the Microcontroller where they are interfaced to it. Based on the message it received it either turns ON/OFF the devices. The system Home Automation is used by the old and disabled people for an easy way of use that can be fully operated based on voice signals. A typical wireless system home automation allows one to control the house hold appliances from a control unit which is a wireless system. These appliances are particularly designed to be compatible with each other devices and with the control unit for home automation systems. The system receives the signals through Bluetooth transceiver and it performs the request function.*

I. INTRODUCTION

The world is moving as more and more process are being automated. Basically there are two main reasons for automating a process. First, humans tend to get bored repeating a process again and again. Second, as human beings they are prone to making errors. Automation solves both the problems. Home Automation is a Contrary to popular benefits home automation systems are very costly, by spending a small but reasonable fraction of the total cost of a newly constructed home; the home can be fully automated for the convenience of the user. In a world where electronic gadgets and gizmos are the order of the day and have made life easy, home automation has become a necessity. The proposed system has two set of modules, control unit and the relay unit. Both the units are connected wirelessly with each having separate microprocessors so that work of each microprocessor is defined separately. Also in this module there is a voice feedback as an acknowledgement for both vice controlled automation and automation through mobile. This will be of great help for the visually impaired user to ascertain the status of the device on issue of the command signal or the command word. Visually impaired people mainly rely on voice commands, voice menu or voice feedbacks for any control operation. Here we integrate voice features into home automation system.

II. LITERATURE SURVEY

The version of DTMF used for telephone tone dialing is known by the trademarked term Touch-Tone. Other multi-frequency systems are used for signaling internal to the telephone network. A machine that converts electrical power into mechanical power is called Motor. Power devices are used in speed control circuits of AC motors to get high Reliable operations at large currents. Various methods are available to

control the speed of the AC motor; here we Control the motor speed by applying the DTMF decoder technique. In this system our mobile signals are goes to DTMF decoder. And this DTMF decoder is interfacing with the embedded controller. The controlling device controls the speed of the motor. Here there are mobile keys, which serve the purpose of increasing or decreasing the speed of the motor. This speed of the motor varies in steps according to the selection of key over the particular range

III. METHODOLOGY

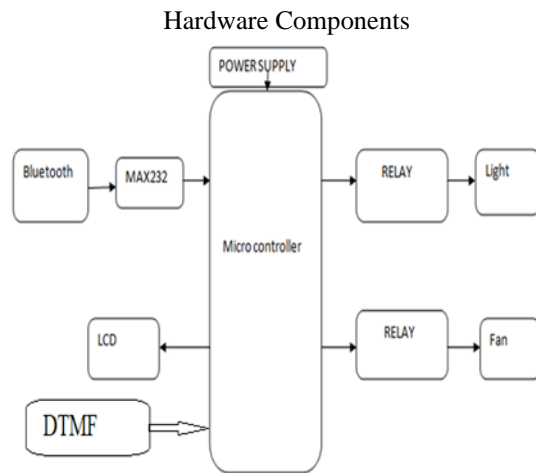


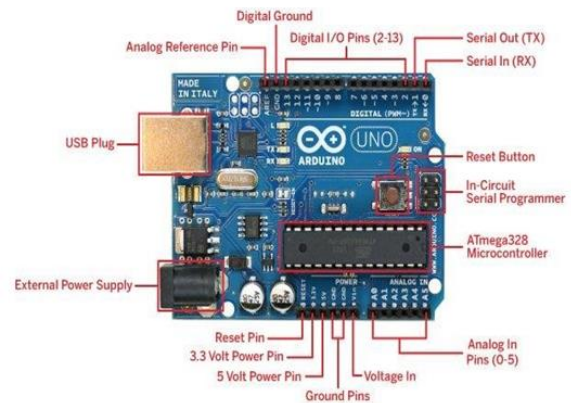
Figure 3. Hardware Specification

IV. MICRO CONTROLLER

A Microcontroller (or MCU) is a computer-on-a-chip used to control electronic devices. It is a type of microprocessor emphasizing self-sufficiency and cost-effectiveness, in contrast to a general-purpose microprocessor (the kind used in a PC). A typical microcontroller contains all the memory and interfaces needed for a simple application, whereas a general purpose microprocessor requires additional chips to provide these functions. A microcontroller is a single integrated circuit with the following key features: central processing unit - ranging from small and simple 8-bit processors to sophisticated 32- or 64-bit processors input/output interfaces such as serial ports RAM for data storage ROM, EEPROM or Flash memory for program storage.

V. ARDUINO UNO BOARD

Arduino/Genuino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again. "Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.






ATMEGA 328P FEATURES

Microcontroller	ATmega328P
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
PWM Digital I/O Pins	6

Analog Input Pins	6
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328P) of which 0.5 KB used by bootloader
SRAM	2 KB (ATmega328P)
EEPROM	1 KB (ATmega328P)
Clock Speed	16 MHz
Length	68.6 mm
Width	53.4 mm
Weight	25 g

VI. BLUETOOTH

The Bluetooth logo  is a bind rune merging the Younger Futhark Runes  (*, Hagall) and  (Bjarkan), Harald's initials. Bluetooth exists in numerous products such as telephones, speakers, tablets, media players, robotics systems, laptops, and console gaming equipment as well as some high-definition headsets, modems, hearing aids [36] and even watches.



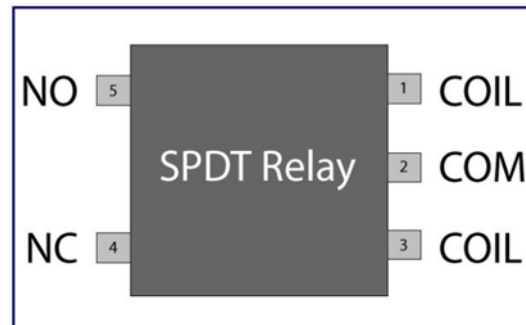
Features

- Less Complication

- Less power Consumption
- Available at cheaper rates
- Robustness

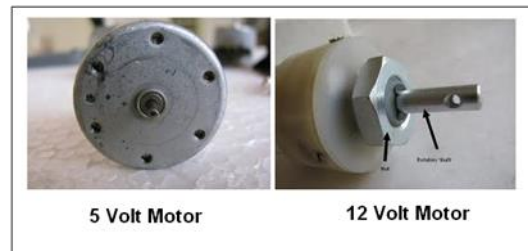
VII. RELAY

Relay is an electromagnetic device which is used to isolate two circuits electrically and connect them magnetically. They are very useful devices and allow one circuit to switch another one while they are completely separate. They are often used to interface an electronic circuit (working at a low voltage) to an electrical circuit which works at very high voltage. For example, a relay can make a 5V DC battery circuit to switch a 230V AC mains circuit. Thus, a small sensor circuit can drive, say, a fan or an electric bulb.



VIII. DC MOTOR

An electric motor is an electromechanical device that converts electrical energy into mechanical energy.



Electric motors are found in applications as diverse as industrial fans, blowers and pumps, machine tools, household appliances, power tools, and disk drives.

IX. DTMF

Dual-tone multi-frequency signaling (DTMF) is a telecommunication signaling system using the voice-frequency band over telephone lines between telephone equipment and other communications devices and switching centers^[1] DTMF was first developed in the Bell System in the United States, and became known under the trademark Touch-Tone for use in push-button telephones supplied to telephone customers, starting in 1963. DTMF is standardized as ITU-T Recommendation Q.23.^[2] It is also known in the UK as *MF4*.

The Touch-Tone system using a telephone keypad gradually replaced the use of rotary dial and has become the industry standard for landline and mobile service. Other multi-frequency systems are used for internal signaling within the telephone network.



DTMF keyboard

X. MAX232

Max232 is designed by Maxim Integrated Products. This IC is vastly used in RS232 Communication systems. Here it conversion of voltage level is required to make TTL devices to be compatible with PC serial port and vice versa. This chip consists of some voltage levels which can be converted to Desired Level. This device is powered by a single +5 volt power supply and its output can reach +7.5 volts. MAX232 comes in 16 Pin Dip and many other packages and it contains Dual Drivers. It can be used as a hardware layer convertor for 2 systems to communicate simultaneously. Max232 is one of the versatile IC to use in most of the signal voltage level conversion problems. Premier MAX232 is used in Serial communication. Problem arises when we have to

communicate between TTL logic and CMOS logic based systems. RS232 is internationally defined standard named as EIA/TIA-232-E and in this standard logic 0 is the voltage between +3 to +15 and logic 1 is defined as the voltage between -3 to -15. In TTL logic 0 is defined is by 0 volt and 1 is defined by 5 volt so in this scenario this is a very handy IC to be incorporated.

CONCLUSION

DTMF Based Home Automation has been designed and setup. It has been possible to control all home appliances automatically using our own mobile phones. The control of all appliances is possible even from a wide range. Bluetooth technology has been used for the mobile control. Voice feedbacks which are very much essential for the acknowledgement of control action has been developed for the visually impaired and physically challenged people.

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- [2] Andreas Roendhal , J. Felix Hampe and GeotzBotterweek, “Mobile Home Automation – Merging Mobile Added Services and Home Automation Technologies”, Sixth International Conference on the Fig.8 (a) Control unit Fig.8 (b) Relay unit CM8870 Module Transmitter & Receiver Unit HM2007 Module APR 9600 Module PIC 16F877 Microcontroller M1 PIC 16F877 Microcontroller M2 Transmitter & Receiver Unit Relays International Journal of Computer Applications (0975 – 8887) Volume 41– No.18, March 2012 39 Management of Mobile Business (ICMB 2007), Page(s): 31-31.
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