SMART HOME APPLICATION: LOCHAN CONTROL SYSTEM

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Abstract

Smart Home Application is an emerging concept for uplifting society as well as a country in the direction of advanced technology that is called "Digital India". Lochan Control System is based on Home Automation Technique through which we can control all the electrical appliances that are connected in our home, offices as well as a company through an android application. Today's we can see must of the citizen of India uses a smartphone and which is based on an Android platform. If we adopt this proposed system on every citizen home then the concept of manual switching has been transformed into an Automatic Switching and people around there live their life more easily. This approach helps a disabled people as well as normal people to perform their respective task. Lochan Control System is based on Microcontroller Atmega328 with interfacing Bluetooth Module HC-05 as a serial communication with an android application. There is no any operating cost for this project but it has some amounts nearly 1500 INR for Initial installation. This project was successfully implemented with features of low manufacturing cost, compact size, high system response, voice controlled, less power consumption and no operating cost.

Keywords: Android Application, Atmega 328, Bluetooth Module HC-05, Lochan Control System, Smart Home.

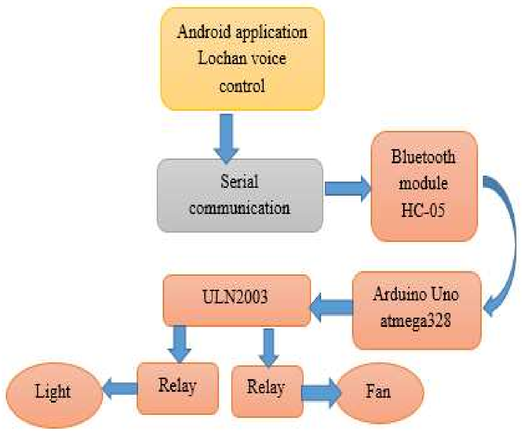

Fig. 1 System Architecture of Lochan Control System

Fig. 2 Android Application

Objectives

- Establishment of Smart Home.
- The Citizen of a country can live their life more easier.
- Transformation of manual switching into an automatic switching.

Virtual Simulation through Proteus 7

Before the hardware implementation, the proposed idea has been simulated first in the proteus 7 software. In order to simulate the proposed idea, the circuit was drawn on Proteus IDE after that .hex file was applied on the controller, which is generated after compilation of code in Arduino IDE through an option "Export compiled Binary". After completing this steps, virtual simulation can be performed.

Methodology

Voice recognition automation through an android application, which can control all the electrical appliances that are installed in our system through voice command. The input voice signal can be converted to text string through an android application and also displayed on the screen and is transmitted through Bluetooth as means of serial communication. The Bluetooth module HC-05 at the receiver end can receive the corresponding machine code of text string through Bluetooth and this string was checked conditionally on the program and also by the controller atmega328 which compares with predefined sets of voice commands already uploaded in the form of .hex file after compilation of code. If the condition is satisfied then the controller provides the digital high signal to respective digital pin from where the electronic control circuit is connected. This control circuit includes ULN2003, a relay driver IC and relays of 5v dc rating. The normally open (NO) terminal of relay is connected with an electric load because when a relay is activated then the switch transferred from NC terminal to NO terminal. Hence through this mechanism, a voice command can control the respective appliance within the range of 50 meters. Here in this project, a relay driver circuit is used to operate relay which controls AC 220V electrical appliances and also acts as an interface between DC and AC.

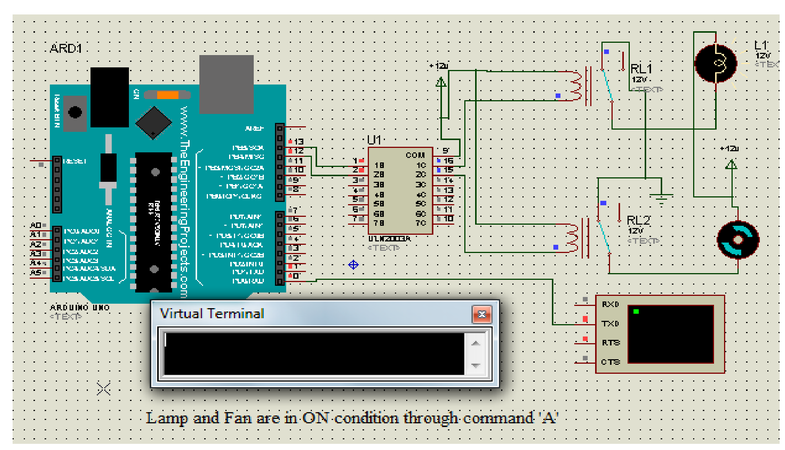

Fig. 5 Virtual simulation through proteus in ON condition

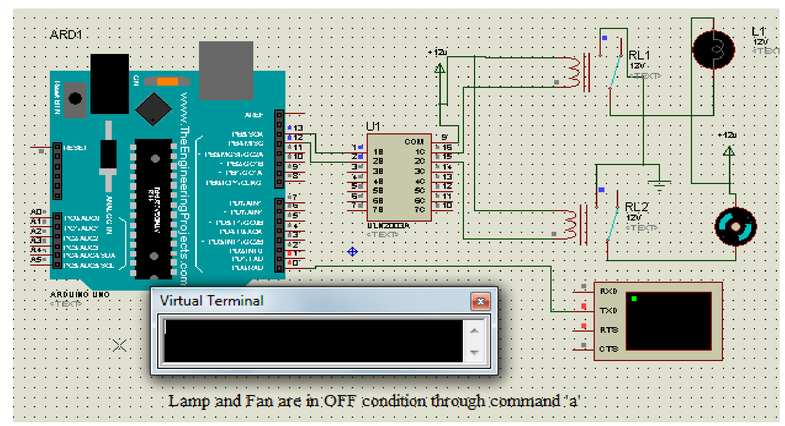

Fig. 6 Virtual simulation through proteus in OFF condition

Control Circuit

In this project control circuit refer to the combination of Relay and ULN2003 (Relay driver IC). Relay is the electromechanical switch which is used in electronic devices and circuits for driving the load whether in DC or in AC. It also has the capacity to control high current and voltage. Normally, transistor circuits or ULN2003 IC is used to drive relay. Relay has 5 pins in which two pins for the dc supply through coil, one for common terminal and rest 2 terminals for normally close (NC) and normally open (NO). In this project, normally open (NO) terminal has been used for connecting electric load.

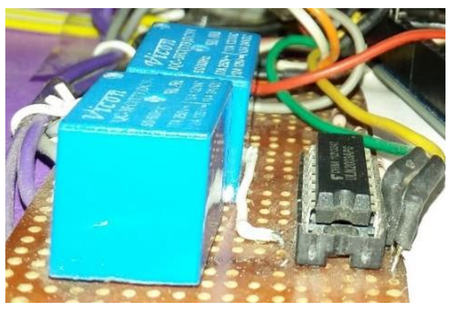

Fig. 3 Control Circuit

Fig. 4 Arduino with other interfacing circuit

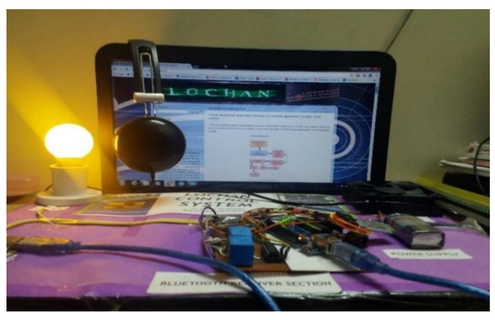

Fig. 7 Hardware Implementation light ON Condition

Fig. 8 Hardware Implementation light OFF Condition

Conclusion and Future Work

"Smart Home Application Lochan Control System" was a project based on a microcontroller with an Android platform. So, it reduced the more hardware requirement and voice recognition module. This project was successfully developed with the features of low manufacturing cost, compact size, high system response, less power consumption and no operating cost. Hence it would be concluded that the required goals and objective of this project has been achieved and the implementation of this project will help to an entire citizen to live their life more easily. As discussed the future scope of this project, This technique can be applied to robotics and industrial automation with the applications of artificial intelligence and Internet of things (IoT).

Acknowledgment

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