Voice inspired entrenched arrangement for electrical utilizations

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Abstract: The ultimate of this voice-controlled speech activated embedded system is to build a better companion for users. In this prototype was developed Remote control system for electrical appliance. This voice-controlled system will help in controlling different types of loads available. Voice controlled home appliances system that uses computers or mobile devices to control the appliances based on the command from mobile application. This application will enable a connection with any Arduino that involves a Bluetooth module. This technique of operating the home appliance is said to be safer one for the handicapped and aged peoples. Sprinkler controller which allows to connect to plant sensors and weather stations to help better manage of garden. This can be operate the appliances with less requirement of manpower.

Key words: Remote control system, Speech activated, Electrical appliances

1. Introduction
This paper explains the design and implementation of Arduino based Voice controlled embedded system for electrical appliance. Turn off the devices when not in use and to reduce the power consumption, which will reduce the e-bill. So voice control allow to control the appliances from the place [1-4]. Voice controlled home appliances refers to any devices, appliances or systems, which are connected to a common network that can be controlled remotely and independently [5-9]. This system are used for controlling indoor and outdoor lights, entertainment system and to control electrical and electronic appliances. This device can respond with speech and information is shown in the driver display.

2. Block diagram
The Arduino UNO acts as an integrated computer system and controls all subsystem activities. It is interfaced with a Bluetooth module, relay, and voice recognition Arduino application. The Arduino monitor the status of all devices regularly. If user voice is recognized, Bluetooth module will receive the user voice command and send the command Arduino UNO. The command matches with the code, there will be the output for that command.
Figure 1. Block diagram of proposed system

Figure 1 shows the conceptual system block diagram.

3. Circuit diagram

The proposed system used the following components
1. Arduino UNO
2. HC-06 Bluetooth Module
3. Arduino Bluetooth Voice Controller (mobile app)
4. Electrical appliances
5. Relay

Figure 2. Circuit diagram of proposed system
The supply voltage of ‘5V’ is given to Arduino via cables or adapter. Once, the Bluetooth module is on by supply given to the Arduino, switch on the Bluetooth in the mobile having Arduino voice controller application. In addition, pair with the corresponding Bluetooth source by giving the default password (“1234”). Tap the voice recorder option in the application in the mobile. Command the corresponding command to operate the home appliances. The command is sensed by the Bluetooth module, which is given as input control to the Arduino board. The output of Arduino is based on the input signal to the Arduino by the Bluetooth module. The output electrical signal is used to control the relay, which is an electronic switch. This is connected to the electrical appliances. Based on the voice command, the particular pin in the Arduino will generate the output electrical signal. This enable the relay to be act as switch. So that particular devices will be operated.

4. Flow chart

Figure 3 shows the flow chart of the proposed system. When the program is started, it will get the user voice command as input. Then it will check for the correct match. If the command is matched with the condition, body of the particular if statement is executed. That is, appliances is operated by user’s voice.
Figure 4 shows the hardware module of the proposed system.

5. Result & discussion

When the user’s command is said the particular devices connected to the system will turn on or turn off.

Figure 5. Sprinkler controller using proposed system
Table 1. Voice command

| VOICE COMMAND   | PIN ENABLED | OUTPUT                                      |
|----------------|------------|---------------------------------------------|
| Turn on all light | Pin – 2,3  | Appliance connected to pin 2,3 will be turned on. |
| Turn on a1      | Pin – 2    | Appliance connected to pin 2 will be turned on. Light 1 ON |
| Turn on a2      | Pin – 3    | Appliance connected to pin 3 will be turned on. Light 2 ON |
| Turn on all fans| Pin – 4,5  | Appliance connected to pin 4,5 will be turned on. Fan1 & Fan 2 ON |
| Turn on b1      | Pin – 4    | Appliance connected to pin 4 will be turned on. Light 1 ON |
| Turn on b2      | Pin – 5    | Appliance connected to pin 5 will be turned on. Light 2 ON |
| Turn on c1      | Pin – 6    | Appliance connected to pin 6 will be turned on. Motor ON |
| Turn off all light | Pin – 2,3 | Appliance connected to pin 2,3 will be turned off. Light 1 & Light 2 OFF |
| Turn off a1     | Pin – 2    | Appliance connected to pin 2 will be turned off. Light 1 OFF |
| Turn off a2     | Pin – 3    | Appliance connected to pin 3 will be turned off. Light 2 OFF |
| Turn off all fans| Pin – 4,5  | Appliance connected to pin 4,5 will be turned off. Fan1 & Fan 2 OFF |
| Turn off b1     | Pin – 4    | Appliance connected to pin 4 will be turned off. Fan1 OFF |
| Turn off b2     | Pin – 5    | Appliance connected to pin 5 will be turned off. Fan 2 OFF |
| Turn off c1     | Pin – 6    | Appliance connected to pin 6 will be turned off. Motor OFF |
| Turn off all    | Pin – 2,3,4,5,6 | All the appliance will be turned off. | Light 1, Light 2, Fan1, Fan 2, Motor OFF |

Table 1 show the voice command to control the electrical appliances of fan, light and motor. The command get executed the corresponding pin of the Arduino will give the output, while other will not. To control the devices using voice control, connect the devices to suitable pin of Arduino for that particular command. This allow the user to operate that appliance for that command only, if not some other appliance will be operated.

5.1 Advantages
Provides safety to us from electric short circuit while using the conventional switches to operate loads.

- The cost is said to be minimum and it is considered as reliable one.
- By using this type of systems, we can save much time to operate home appliances from anywhere.
It will enable the handicapped and old peoples to operate the electrical instruments easily. The manpower required for the operation of instruments is greatly reduced.

5.2 Disadvantages
- Limited to shorter distance only.
- Mostly voice recognition software will not put your words accurately on the input screen.
- If not maintain properly it may go wrong.

6. Conclusion
This voice controlled home control system will help in controlling different types of loads available. The major pros are man power reduction, cost efficient. This automation can be applied in various automation applications such as home automation, automatize military, industry automation, health care, transport...etc.

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