Touchscreen Based Home Automation System

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Abstract

In the recent years, the use of touchscreens has been increased drastically. How convenient it would have been if our homes did things themselves. Today's home automation goes beyond simple programmable thermostats to systems that tell us when our carpets need cleaning. If we can imagine it, computers can program it. Home automation system is basically a home control system which uses touch screen panel or remote control to control various home appliances, temperature control and video surveillance. Home Automation is a way to have things around our home happen automatically. We have designed and implemented such a system using a resistive touch screen. In order to achieve this, a touch panel is interfaced to the microcontroller on transmitter side which sends ON/OFF commands to the receiver where loads are connected. By touching the specified portion on the touch screen panel, the loads can be turned ON/OFF remotely through wireless technology.

Keywords

Touch screen, home automation and wireless.

I. Introduction

Home automation has been a feature of science fiction writing for many years, but has become practical in the early 20th Century with the widespread introduction of electricity into the home and the rapid advancement of information technology. Home automation systems (HAS) make our home environment safer, energy efficient, cheaper to maintain and hopefully saving our time. It can also be useful for elderly people and physically handicapped people. However, in most home today, you can easily find some simple forms of automation such as: Garage door openers, Irrigation or sprinkler control systems, Remote Controls, Motion activated lights, Security systems, Programmable thermostats, Programmable light timers and many others. If we want to keep going, we can throw in dishwasher, clothes washers and dryers, ovens, microwaves, cars, lights and switches. The list goes on and on. The full list is limited to imagination and a family's lifestyle. HAS has many names like "smart homes" , "intelligent homes" and "domotics".

The main objective of this project is to develop a home automation system with a touch screen based control panel. As technology is advancing so home are also getting smarter. Modern home are gradually shifting from conventional switches to centralized control system, involving touch screen switch. Presently, conventional wall switch located in different part of the house make it difficult for the user to go near them to operate. So the proposed technology can be useful for the elderly or physically handicapped people . Home automation system provides a simpler solution with touch screen technology. Touch screen control panels are also designed for commercial, industrial and medical systems.

II. Methodology

In this project, resistive touch screen is used as they are typically cheaper to produce, less sensitive, robust and has reduced visual clarity than their capacitive counterparts. Resistive touch display distinguish and sense specific touch location when the two electrically-charged layers of the touchscreen are pressed together with physical force at a specific point. Fig1. is the touchscreen will be used in this project. As shown in fig. 1, features like child lock ,switch on\off and reset button are there. Many modes have been described like morning, lunch, evening and night(this can be defined according to family usage). Then the lighting control, fan,

switches, lamps, entertainment (TV and music) and temperature control . As shown in fig.1, there is a volume up/down button also .One more feature that can be added is a kitchen control, which can tell us to refill our groceries, medicine and toiletries when required.
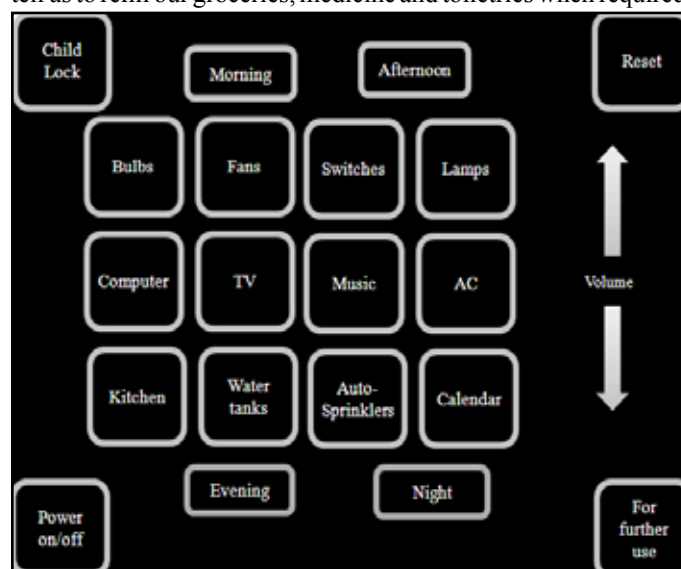

Fig 1: Features on the touch- screen.

One can even monitor water tanks, when the water level falls below a particular level, it will automatically fill the tank and stop , when filled. Auto-sprinklers can be used, they shut-off when they sense rain or dampness in the soil of your garden. We can even have a automated voice- controlled calendar, which reminds us about meetings, birthdays and anniversaries so that we don't miss a thing. Energy management can be included in our project, our home knows which rooms are empty and powers off the lights, music and turns down the HVAC (heating, ventilating, and air conditioning) to that area to save energy. Control functions let the owner adjust temperature and other variables to lower energy use. ATmega32 microcontroller, Resistive touchscreen,74HC595 shifter, Relays, Burg strips , Phone jack, RGB-LEDs ,Voltage regulator IC 7805,Resistors and Capacitors have been used. RGB –LEDs can be used for us to understand whether the appliance is on/off.A6276 was specifically designed for LED-display applications.

It can be enable by using Wi-Fi , so we have particularly designed a transmitter side, receiver side and a power supply circuit. This gives us an advantage of a "wire-free" home. In order to achieve this, a touch panel is interfaced to the microcontroller on transmitter side which sends ON/OFF commands to the receiver where loads are connected. By touching the specified portion on the touch screen panel, the loads can be turned ON/OFF remotely through wireless technology.
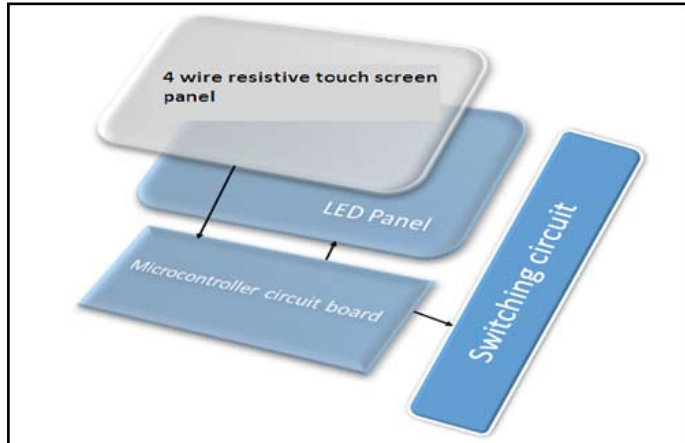

Fig. 2: Flow of the circuit.

Simulation has been done using keil and Proteus 7.0 simulation software and PCB designing has been done using ultium.
To have a connectivity, one can use remote control, zigbee or GSM module. The system implements the wireless network using ZigBee RF modules for their efficiency and low power consumption. Further, the project can be enhanced by using GSM module interfaced to the control unit. By doing so, the user can control home appliances by sending an SMS. Advantage of using this technology is that there is no range limitation when compared to RF technology or wireless connection. This project has been tested using bulbs on the load side. One can even use fans which needs a motor- driver IC. The project could include a finger print scanner or voice recognition. As soon as an authorized person touches the screen , it unlocks and you can make changes. Advantages of using a home automation system is convenience, flexibility, peace of mind, independence of location and centralized control. Disadvantages could be high cost of ownership, lack of robustness, poor manageability, and difficulty achieving security

III. Recent Trends

A fully automated home that works according to our reactions and moods. It could even have SMS facility. For example, when we text "Coming home" to our home, it will set up the temperature of our home, AC/heaters can be enabled and our favourite music can be on. It could have various facilities like intrusion detector, smoke detector, and energy management. When any family member comes home, we can receive a SMS. Internet access can be monitored.

IV. Conclusions

Domotics is becoming the most important factor to introduce an automated environment in all homes. It has been used across the globe. To the least in
garage doors, lighting and temperature control. It has had its merits and demerits. But customers are most willing to adapt this technology. It can be modified and designed according to requirements. The major disadvantage is that people don't like

computers controlling their lives and also that it follows a routine. However, these new technologies are still in early stages with a lack of robust standards creating compatibility issues affecting their reliability. Another problem is that these systems are not fully accepted by final users, especially the old and disabled-arguably the ones that need it the most. But it would be the need of the future and will bring a tremendous change in the day to day life of every human being.

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