HOME AUTOMATION USING PC AND CLOUD

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Abstract:

   Home Automation using cloud network is a system that uses computers or mobile devices to control basic home functions and features automatically through internet from anywhere around the world, an automated home is sometimes called a smart home. This network uses a consolidation of a mobile phone application and PC based program to provide the means of user interface to the consumer. The home automation system differs from other system by allowing the user to operate the system from anywhere around the world through internet connection. In this paper we have developed a Home Automation system that employs the integration of multi-touch mobile devices, cloud networking, wireless communication, and power-line communication to provide the user with remote control of various lights and appliances within their home.

   Keywords - cloud networking, android, multi-touch mobile devices.

1.   INTRODUCTION

   Earlier, we looked into the face of future when we talked about automated devices, which could do anything on instigation of a controller, but today it has become a reality. a) An automated device can replace good amount of human working force, moreover humans are more prone to errors and in intensive conditions the probability of error increases whereas, an automated device can work with diligence, versatility and with almost zero error. Home automation can be useful to those who need to access home appliances while away from their home and can incredibly improve the lives of the disabled. The home automation systems that are available can be divided into two categorize: locally controlled systems and remotely controlled systems. Locally controlled systems are the systems that use an in-home controller to achieve home automation. Through such systems the user can control their home devices within the home through a stationary or wireless interface. Globally- controlled systems are the systems that use an internet connection. Such systems can be controlled through mobile devices, personal computer, etc. The problem of home automation system using Bluetooth, GPRS or RFID needs a separate hardware and software environment to be installed in each home. Moreover such systems provide the user with limited access as the access area is restricted only within a specific range. Cloud Network and mobile devices eliminate the need to install and run applications on the customer's own computers and simplify maintenance and support. This project integrates the locally and remotely controlled systems with the use of a Cloud network. Cloud Computing provides access on demand to resources online which requires less management effort and can be easily provisioned.

2.   SYSTEM DESIGN

   Cloud server is used for central storage. Centralization gives cloud service providers complete control over the versions of the browser-based applications provided to clients, which removes the need for version upgrades or license management on individual client computing devices. Cloud server contains

user databases, glass fish sever, glassfish is an open source application server which is designed to make the web services accessible in an efficient and easy way. 4K bytes of Flash, 128 bytes of RAM, 32 I/O
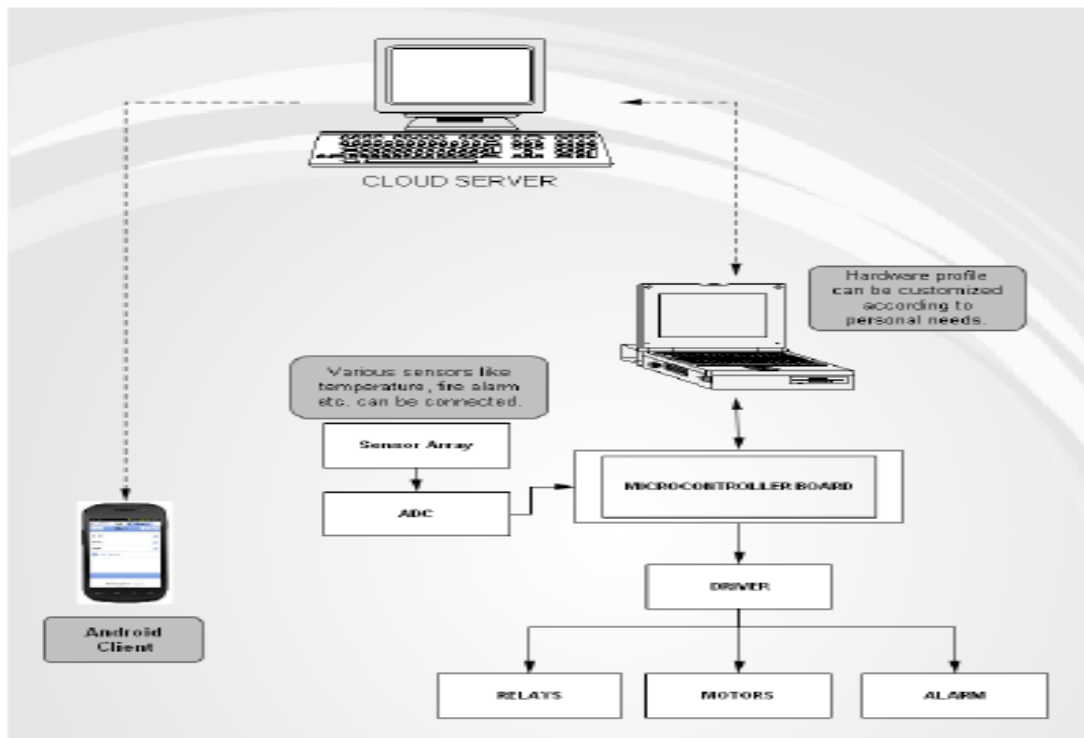

Fig.1. System architecture of a home automation system using cloud server

lines, two 16-bit timer/counters, a five vector two level interrupt architecture, a full duplex serial port.XTAL1 and XTAL2 are the input and output, respectively, of an inverting amplifier which can be configured for use as an on-chip oscillator ,A quartz crystal oscillator is connected to inputs XTAL1 (pin19) and XTAL2 (pin18) The quartz crystal oscillator(11.0592MHz) also needs two capacitors of 33 pF value. RESET (Pin 9) pin is an input and is active high (normally low). Upon applying a high pulse to this pin, the microcontroller will reset and terminate all activities. The four 8-bit I/O ports P0, P1, P2 and P3 each uses 8 pins. PORT 0 can be used for input or output, each pin must be connected externally to a 4.7K ohm pull-up resistor .This is due to the fact that P0 is an open drain, unlike P1, P2, and P3. Open drain is a term used for MOS chips in the same way that open collector is used for TTL chips. High-current Darlington arrays are ideally suited for interfacing between low-level logic circuitry and multiple peripheral power loads. Typical loads include relays, solenoids, stepping motors, magnetic print hammers, multiplexed LED and incandescent displays, and heaters. All devices feature open-collector outputs with integral clamp diodes.

3. INTERFACING

ADCs (analog-to-digital converters) are among the most widely used devices for data acquisition. A physical quantity, like temperature, Light, humidity, and velocity, etc., is converted to electrical (voltage, current) signals using a device called a transducer, or sensor. We need an analog-to-digital converter to translate the analog signals to digital numbers, so microcontroller can read them. ADC808 has 8 analog inputs (IN0 to IN7). It allows us to monitor up to 8 different sensors using only a single chip. The chip has 8-bit data output. The 8 analog input channels are multiplexed and selected according to three address

pins, A, B, and C. Select an analog channel by providing bits to A, B, and C addresses. Activate the ALE pin; it needs an L-to-H pulse to latch in the address. Activate SC (start conversion) by an H- to-L pulse to initiate conversion. Monitor EOC (end of conversion) to see whether conversion is finished. Activate OE (output enable) to read data out of the ADC chip, An H-to-L pulse to the OE pin will bring digital data out of the chip. 2(-1) to2 (-8)-The digital data output pins. We have developed the Home Automation System for the Android application but we can build cross platform system that can be deployed on various platforms likeiOS, Windows. Limitation to control only several devices in home can be removed by extending automation of all other home appliances. Security cameras can be controlled, allowing the user to observe activity around a house or business. Security systems can include motion sensors that will detect any kind of unauthorized movement and notify the user,other security feature such as open-door and motion detection, energy monitoring, or weather stations can be implemented succesfully. Scope of this project can be expanded to many areas by not restricting to only home. It is not just limited to house hold appliances, but also can be used for industrial devices or business applications. It will be flexible to support various wired as well as wireless technologies like Bluetooth, Zigbee, Wi-Fi, World Wide Web. We have discussed a simple prototype in this paper but in future it can be expanded to many other areas.

4.   RESULT ANALYSIS

The system will allow the user to control appliances and lights in their home from a Mobile Device and PC from anywhere in the world through an internet connection. It will also allow the user to control their device units within their home from home server using GUI.
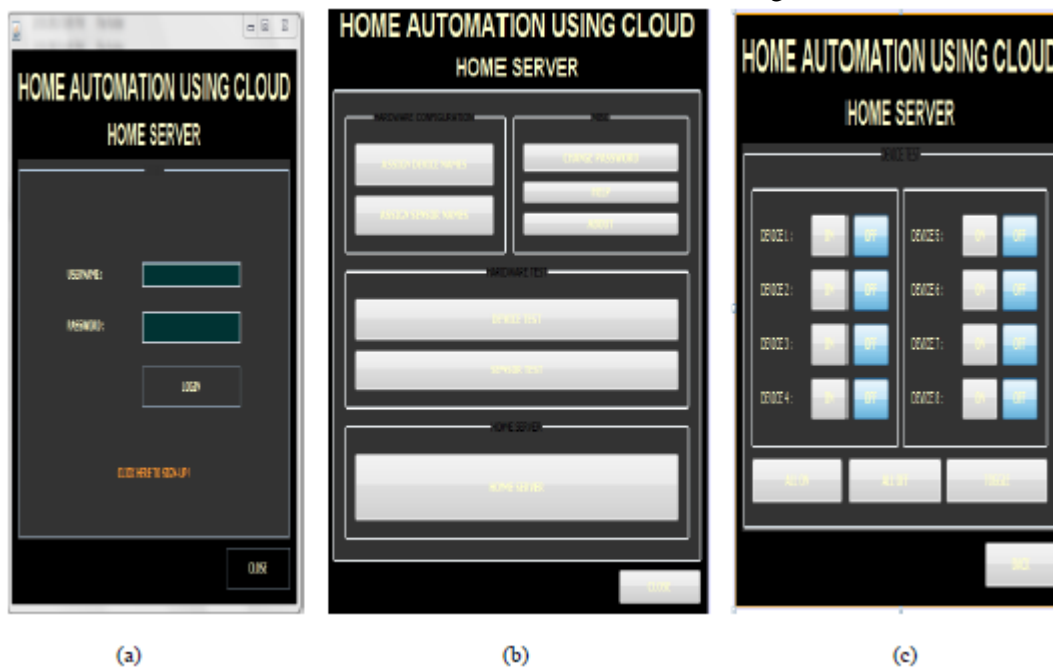

Fig.2.Output sample

The home server GUI will control over the system; if neither the Mobile nor PC will be able to control the device units in the home. Another feature provided is auto control. This feature allows the user to control their home units without any internet connection or without using the homes server. The system will turn appliances on and off such as: fan and television or any other home appliances. The system will refresh on the Mobile and PC every time the user chooses an option to control or monitor a specific unit.

CONCLUSON

In the home automation system , by integrating multi-touch mobile devices, cloud networking, wireless communication, and power-line communication, we will be able to design and build a fully functional home automation system. It will allow the user to control various appliances and lights within their home from any location in the world through cloud network using 1) mobile devices, 2) PCs, or 3) in-home graphics user interface(GUI) on their home servers. Using this system as framework, the system can be expanded to include various other options which could include home security feature such as open-door and motion detection, energy monitoring, or weather stations.

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