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Control Home Area Networks for Disable Person

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ABSTRACT: This proposed method provides the effective implementation of display design used for controlling regular domestic conditions in home. The proposed method presents a display design for accessible interaction in home area networks. This technique describes the remote control home area network system that provides easy control of home installed appliances to improve the inhabitant's comfort. User interface is going to be implemented over a Tablet that controls domestic devices. This technique provides accessible interface to control home area networks pointing out the main requirements considering a diversified group of impairments.

I. INTRODUCTION

The "Controlling Home Area Network" concept has existed for many years. The term "Smart Home" followed and has been used to introduce the concept of networking appliances and devices in the house. Home monitoring Systems represents a great research opportunity in creating new fields in engineering, architecture. Home Automation Systems becoming popular nowadays and enter quickly in this emerging market[1]. However, end users, especially the disabled and elderly due to their complication and cost, do not always accept these systems.

Home monitoring system describes a rising practice of increased computerization of household appliances and features in residential apartments, particularly through electronic means that allow for remote monitoring. The latest communication technologies such as GSM/GPRS networks, wireless sensor networks, WIFI, ZIGBEE, Bluetooth, power line carriers and the Internet have been applied to wireless home monitoring system. Home area network designates a promising practice of increased controlling of household appliances and features in uptown dwellings, particularly through electronic means that allow for remote controlling[2].

Bluetooth with globally available frequencies of 2400Hz is able to provide connectivity up to 100 meters at speed of up to 3Mbps depending on the Bluetooth device class. In addition, a Bluetooth master device is able to connect up to few devices. For example, wireless sensor networks based on Bluetooth protocol is commonly used in smart homes and it has become the focus in this field. It consists of ease and home monitoring, security and safety at home, intelligence and remote health monitoring. Wireless sensor networks based on Bluetooth protocol is generally used in smart homes and it has become the center in this field. It consists of ease and home area network, security and safety at home, ambient support and remote health monitoring

Now days Wireless technologies are becoming more accepted around the world and the consumers realize this wireless life style. Now with the Embedded Bluetooth technology, digital devices form a network in which the appliances and devices can communicate with each other[5]. Today, monitoring home area network is one of the major applications of Bluetooth technology. Many domestic appliances such as computers, televisions, fans, electric motors, DVD players, lights, home theater systems, stereo components, air conditioners are accepted. These devices are generally operated using remote monitoring based on Bluetooth technology.

The monitoring home area network was developed focusing on the elderly comfort, allowing home computerization by using the television set and its regular remote control as an interface. The design approach used to

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improve the legibility and convenience of the home automation interface on the mobile screen was to use few and large graphical icons, with horizontal captions describing their function. The communication is made through numbers as shortcuts avoiding navigation with keys. The idea of having a various design, with few and big icons and the use of a user Electronics appliance that is already aware to the user will be exploited in our work.

II. SYSTEM ARCHITECTURES

The proposed controlling home area network architecture is shown in Figure 1. This system is recognized on the source of a wireless sensor network based on Bluetooth technology[3]. The monitoring home area network is composed of recognition appliances, such as sensor nodes, motors and a network coordinator.

Each node or appliances is added to the wireless Bluetooth network. The sensor nodes and the actuator nodes connected to each corresponding home appliance or even lights and fans are installed in the home location

This home network system consists of two main hardware modules: the smart phone and the Arm BT board. The smart phone hosts the android base application which enables the user to access the home appliances and also the monitor all appliances present in home area network.

The wireless network coordinator can provide multiple interfaces to the arm board for local user interactions and remote network management. When the user press buttons on of display screen, the module identifies the signal and sends device messages to the target bluetooth module through the network. The corresponding Bluetooth module will operate the connected appliance via the connected driver circuit

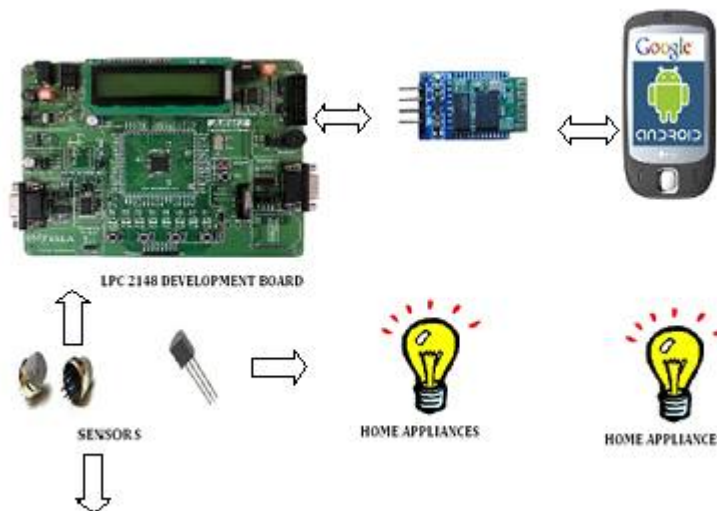


Fig 1. Functional Diagram of the System

Fig 1 shows the overall monitoring function of the system. The system is directly installed beside the square electrical switches on the wall. The Bluetooth wireless connection enabled the system communicates with android based application on smart cell phone without cable. The target home appliances are monitoring by the system Main ARM Board.

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III. HARDWARE DESIGN

This section mainly discuss about the hardware construction of main control board. Fig 2 shows the hardware block diagram in the main control board. In Arm 7 LPC2148 Board contains two serial interfaces that are UART0 & UART1. Here out of two ports we are using UART0. The Transmitter pins send the data into smart phone and the receiver pin receives the data from smart phone[9]. The smart phone and controller speed are denoted by using baud rate. When the baud rates of both smart phone and controller are same, then only the data transmit and receive correctly otherwise not. UART (Universal Asynchronous Receiver Transmitter) are one of the simple interfaces which deliver a cost effective simple and reliable communication between one controller to another controller or

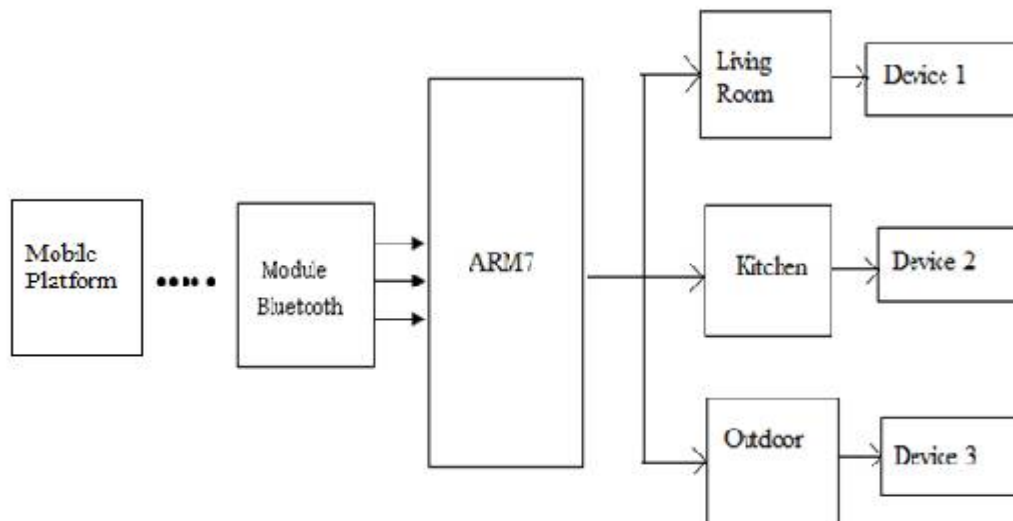


Fig 2. Block Diagram of the System

between a controller and PC. For the Bluetooth module, low cost Bluetooth module is chosen to establish the Bluetooth connection between main control board and the smart phone.

Bluetooth is based upon small, high performance integrated radio transceivers, [4]each of which is allocated a unique 48-bit address derived from the IEEE 802 standards. It operates in the unrestricted 2.45 GHz ISM "free band", which is available globally, although slight variation of location and width of band apply. The range is set at 10 meters to optimize for target market of mobile and business user. The range can, however, be increased Gross data rate is 1Mbit/s, with second generation plans to increase to 2 Mbit/s. One-to-one connections allow maximum data transfer rate of 721 kbits/s

The Bluetooth antenna in our component picks up the packets sent from the smart phone. Then, these packets containing the appliance status commands are pipelined through Arm 7 and the designed analogue circuitry according to the definition of each output[11]. Different home appliances are connected to the digital output ports of the Arm BT board via relays to provide sufficiently high currents and voltage compatibility. For test purposes, 5W, 240V lamps have been used.

It consists of two lights and a switch with two buttons, while the Bluetooth module is designed under the switch. These two lights can be controlled by relays as well as remote control since Bluetooth module has been added to the system. The gas sensor and alarm module is highlight of system. It is composed of a Bluetooth module, a gas sensor, an alarm. This module is designed to detect gas leak such as CO₂, methane, LPG in the kitchen room. If the gas leaks,

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there will be an alarm sound, meanwhile, emergency message will be sent to the user terminal through the Bluetooth module.

IV. SOFTWARE DEVELOPMENT

Software design section contains the main functions of the system designed in the Arm 7 and the Android application in smart phone. The process is of the Low Triggering Switches in the system. The switches detection function is performed by the Arm7 processor[13]. The activating switches are designed by display design of android application. Any input switch is pressed; it will interrupt the main function loop of the processor. Then, the processor will trigger the relay. At the moment, processor also informs the change of switch status to smart phone application that wirelessly connected to the Arm board.

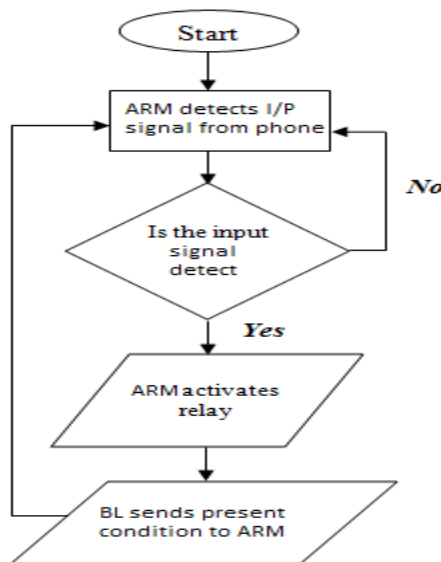


Fig 3. Low Voltage Activating Devices Process

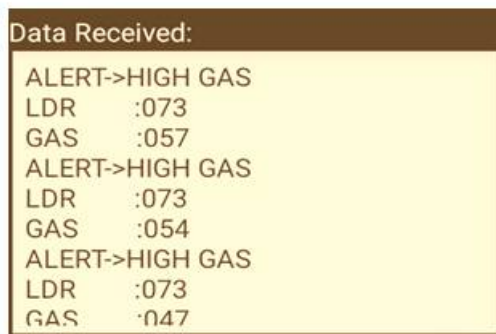


TABLE I
THE APPLIANCES CONTROLLED BY
SOFT REMOTE CONTROL SYSTEM AND THEIR FUNCTIONS

Appliance	Function
Management system	LPG detect
	Alarm ON
	LPG not- detect
	Alarm OFF
Gate	Close
	Open
Light B1	On
	Off
Light B1	On
	Off

Fig 4. Android Main monitoring GUI



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Upon the implementation of the program, it first checks if Bluetooth is already enabled on the phone. If Bluetooth is enabled, the device and service discovery process will start. Once device exist, they will be registered down for the user to select one. The program then checks to see if the selected device is in range. It will then verify if the device is a Bluetooth transceiver (Arm BT board). Now if there are no devices paired in memory, the program will search for Bluetooth-enabled devices within the area. Once device detects, these devices will be displayed on the screen and also paired in memory. Fig 4 illustrates the interface of Android application selecting Bluetooth device. User can connect directly to main control board by Bluetooth connection.

V. CONCLUSION

In this paper we have implemented design and implementation of a low cost, flexible and wireless solution to the home monitoring system. The system is protected for access from any user. The users are normal to acquire pairing password for the Arm Bluetooth and the cell phone to access the home appliances. This improves a protection from unauthorized users. Various control parameters can be managed with the help of Bluetooth and able to manage the device such as lights, opening and closing of the door etc. without going to actual site. The proposed system will be flexible enough to include such kind of modifications

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