# Cybernation of Home Appliances by Using Smart Phone through Wireless Technology

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**ABSTRACT**: Now a day's so many automation technologies are being introduced for the disable. In this paper we propose a cybernation of home appliances using smart phone through wireless technology. It was developed mainly for disable people to control home area network. This paper represents design of smart display for accessible communication with home appliances like Light, fan, heater, irrigation system and solar power consumption system. These communications has implemented over a smart phone that supervises domestic devices through a wireless controller. In order to integrate user interface with home automation, a development board embedded micro controller was used the inter communication between android and the automation system was made using a Bluetooth connection that is currently available in most android. Here, commercial Bluetooth module connected to the development board in order to execute the experiment.

**KEYWORDS:** Smart phone, Microcontroller, Bluetooth, Smart home, security and Irrigation system.

## I.INTRODUCTION

Cybernation of Home is a term used to describe the working together of all household appliances and amenities, such as centrally-controlled Liquid Crystal Display can have the capability to control everything from security systems, air conditioning, heating, video systems, audio systems lighting and kitchen appliances. A diagram of cybernation of home system is shown below



1. Fig:  Home Appliances

The household activities are automated by the development of special appliances such as water heater which turn ON/OFF and automatic washing machines to reduce manual labour. Homes are wired for electrical power, telephone, doorbell and TV outlet. When a person enters the room the light turns on/off, Upcoming technology room can sense the person and who the person is. Taking into account of the day, it is essential that the different controllable appliances be interconnected and communicates with each other. The basic aim of Cybernation of Home is to control or monitor signals from basic services and different appliance. A smart phone can be used to monitor and control the cybernation

of home system. The household activities such as food preservation and preparation are automated with the movement of pre-packaged food. Automatically handling the preparation of food is possible to only standardized products. The use of electricity facilitated the automation in heating which trim down the manual toil to fuel heaters and gas stoves. In advanced growth of thermostats enables to automated control of heating and cooling at a later stage. Other automated activity includes the air conditioner set to an energy saving setting when the house is vacant and get back to the normal setting when the resident is about back to home. The automation system preserves a list of product records, usage through the RFID tag and bar codes or replaces the order automatically Computers, touch screens controls, tablets wireless transmitters and cell phones different features of cybernation of home.

## II. LITERATURE REVIEW

The literature related to the research topic has been reviewed for last twenty years in order to find out work carried out by various researchers were found so many systems for remote monitoring and control designed as commercial products or experimental platforms. It was noticed that most of the research carried out belongs to the following categories.
a. Internet based Monitoring using GPRS modems, Servers and etc. with different approaches.
❖        This system is more efficient in the times of flooding fine and gas leaks in other form this system also be a security firms & trouble some places.
b. SMS protocols using GSM module individually or in combination with Internet Technologies.
❖        It gives map massages are passed using TDM based on signaling.
c. Monitoring using Wireless Sensor Networks.
❖        It is distributed in very huge sensors to monitor sound, temperature, pressure, etc. It is more used in military purpose.
d. Applications have varied widely like Home Automation, Agriculture, Security Systems, Biomedical applications, health monitoring, Environment and Reservoir etc.

## III. CONTROL AREAS IN CYBERNATION OF HOME

1. Security – With cybernation of home, the car lights turned on in order to help you to walk in the night and the authorities can be alerted through a message can be sent to your cell phone by the system.
2. Thermostat – This is programmed to run the central heating and cooling system as per our required settings. For example, air conditioner(A/C) is set to an energy saving setting when the house is vacant and sets back to the normal setting when the resident is about to return home.
3. Drapes – With the help of the cybernation of home appliance control system, the drapes of the room can be opened and closed during the night time.
4. Lighting – This can be set as per our own required settings for dim and bright light.
5. Audio/Video – This automation system can turn ON the stereo and play music or can also turn on the television.
6. Irrigation/Lawn sprinklers – The sprinkler/Irrigation system can be activated as per the schedule settings.
7. Vacuuming – Robotic vacuum cleaners automatically glides over the carpet to help you keep the house neat and tidy.
8. Solar power- at day time as per our requirement power consumption switched to solar power.

## IV. WIRELESS TECHNOLOGY

Remote Monitoring using Wireless Sensor Networks (WSN), Bluetooth, Wife, Zigbee technologies Many Wireless Technologies are RF, Bluetooth, Wi-Fi and Zigbee have been developed and remote monitoring systems using these technologies are popular due to flexibility, low operating charges and etc. so in our project using Bluetooth technology. Today Wireless Sensor type of Network are used an increasing number of solutions, aimed at implementing control system and distributed monitoring in a great number of different application areas. It is designed a general purpose controlling module designed with the capability of controlling and sensing up to five devices simultaneously. The communication between the remote server and controlling module is done by using Bluetooth. The Bluetooth server can communicate with much such type of modules simultaneously. The controller was based on microcontroller and Bluetooth communication TDK Blu2i (Class 1) module which provides a serial interface for data communication. The controller was deployed in a cybernation of home application for a selected set of electrical devices. Home appliances control system operated over a Bluetooth with a smart phone, which enables remote-control, fault-diagnosis and

software-update for home appliances through Java applications on a mobile phone. The system consists of home automation is smart phone and Bluetooth adapter, used for communicate with appliances. Bluetooth consists of a 20MHz, SRAM and 16bit CPU. The adapter of communication board is connected to the home appliance and to the cellular phone through serial ports. The home appliances can communicate with the cellular phone control terminal via Bluetooth SPP. On the contrary, the communications between TM and CC occurs in once a day for data-logging purposes, while alarms are communicated asynchronously, by means of Short Message Service (SMS). Prototypes have been realized to interface with temperature (T, AD590), humidity (RH, HumirelHM1500), and carbon monoxide (CO, Figaro TGS2442) sensors. DECT Siemens GSM module MC35 and module MD32 were used. It was based on Microchip's PIC18F452 microcontroller and TM was designed using 32-bit ARM based microcontroller from Samsung (S3F441FX). It described details of the design and instrumentation of variable rate irrigation sensor network and software for real-time infield sensing and control of a site-specific precision linear-move irrigation system. Field conditions were site-specifically monitored by six in-field sensor stations distributed across the field based on a soil property map and periodically sampled wirelessly transmitted to a base station. An irrigation system machine was converted to be electronically controlled by a programming logic controller(PLC) (Siemens S7-226 with three relay expansion modules activated electric over air solenoids to control 30 banks of sprinklers) that updates geo-referenced location of sprinklers from differential Global Positioning System (GPS) and wirelessly communicates with a computer at the base station. The communication signals of sensor network and irrigation controller to the base station were successfully interfaced using low-cost Bluetooth wireless radio communication through Bluetooth RS-232 serial adaptor (SD202, Initium Company). The major strengths and weaknesses drawn from the conclusions laid by various researchers are as under Major strengths.

1. Exhaustive research has been carried out on Internet based Monitoring scheme with various protocols and systems providing detailed description of remote process states to the authorized users.
2. Many remote monitoring systems have been designed and experimented by using GSM-SMS which normally involved the use of GSM modem for carrying sensing and control  of  devices  in  the  system  by  users  having cellular  coverage. It is popular because of its unparalleled availability and modest security at the affordable price.
3. Numerous systems have been developed using Wireless Sensor Networks which consists of several sensor nodes in proximity and having data transmission and reception capability between nodes and central base station for wide range of applications.

## V. RESEARCH OBJECTIVES

- To design with low cost intelligent embedded system based remote monitoring system using tablet/smart phone.
- To provide flexibility to use any cell phones/tablets/notes for remote monitoring.
- When messaging fails, to incorporate alternative mechanism for communication.
- To implement a simple embedded system as a proof of concept.

1. Primarily looking at the existing status of research in remote monitoring and major impetus is only for development of system applications in industrial automation, health care systems, home automation and defence.
2. With explosive growth of cellular networks in India and sharp reduction in cost of handsets and call charges with coverage of >70% of area, cell phones offer unique opportunity for remote control even in rural area.
3. The research work presented in this thesis is aimed to remotely monitor the system using cell phone by designing and implementing embedded system.
4. It is aimed to provide facility to use even any obsolete mobile model having simple messaging and calling function to make remote system affordable to all categories of users.
5. The major aspect of the research had been to work out strategies to keep operational cost of the system minimum to emphasize its utility to automate simple systems with remote monitoring capabilities.

## VI. PROPOSED METHOD

Recently, the social inclusion and technical aid to assure autonomy to people with disabilities are getting attention to all over the world. This work shows a Smart display for accessible interaction on home networks. Based on a research on the accessible interfaces state of the art design was proposed. This interface was implemented  over  a  Tablet  that

controls domestic devices through a home network controller prototype. In order to a research was conducted; evaluate and interviewing people with disabilities in India.
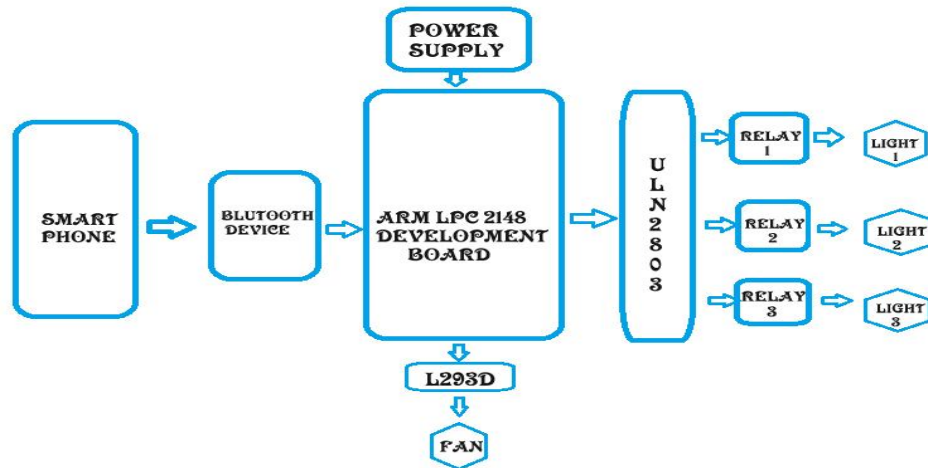


Fig 2.Block diagram

This research consolidated a feasible accessible interface to control home appliances and home networks pointing out the main requirements considering a diversified group of impairments. Mainly this project relies on power line communications. The interconnection between the Tablet/Smart phone and the automation system was made using a Bluetooth connection that is currently available in most android models. A Bluetooth module was used connected to the development board in order to execute the experiment. The Following Components Are Used In Building The Entire System:

### A.      Smart Phone



Fig 3.Smart phone

It most commonly comes installed on a variety of smart phones and tablets from a host of manufacturers offering users access to Google's own services like Search, YouTube, Maps, Gmail and more. Operating Systems have developed a lot in last 10 years. Starting from old key pad phones to`` recent smart phones, minicomputers, mobile OS has come far away. Especially for smart phones is one of the most widely used mobile OS these days is ANDROID.

### B. Bluetooth



Fig 4.Bluethooth module

Bluetooth is a proprietary open wireless technology standard for exchanging data over short distances from fixed and mobile devices, creating personal area networks(PANs) with high levels of security. Electronic devices communicate wirelessly by using Bluetooth technology. This document mainly introduces Bluetooth serial module. The naming rule of HC-06 is same as When HC-03 and HC-05 are out of factory, one part of parameters set for activating device.

### C. LPC2148 Micro Controller

The LPC2148 microcontrollers is based on a 32-bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, it combine microcontrollers with embedded high-speed flash memory ranging from 32 kB to 512 kB. A 128-bit memory interface and unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size, the alternative 16-bit Thumb mode reduces code by more than 30% with minimal performance penalty. Due to their size and low power consumption, LPC2141/44/42/46/48 is ideal for applications where miniaturization is a key requirement like point-of-sale and access control. Serial communications interfaces ranging from a USB 2.0 Full-speed device, multiple SPI, UARTs, SSP to I2C-bus and on-chip SRAM of 8 kB up to 40 kB. These devices are very well suited for communication gateways, soft modems, protocol converters, voice recognition, low end imaging, providing both high processing power and large buffer size. Various 32-bit timers, single or dual 10-bit DACs, 10-bit ADC, PWM channels and  45 fast GPIO lines with up to nine edge or level  sensitive  external interrupt  pins  make  these  microcontrollers  suitable  for industrial control and medical systems.
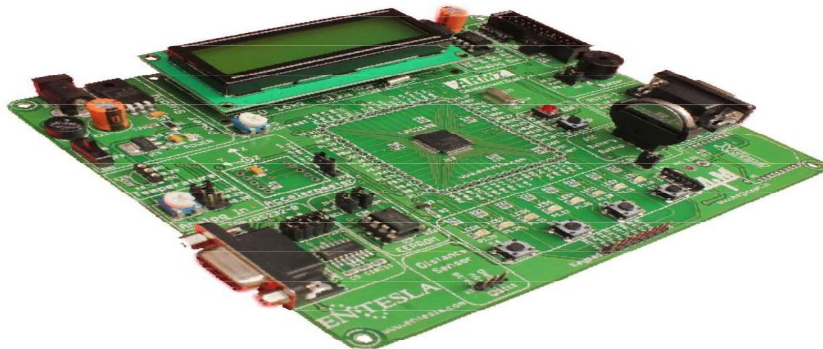


Fig 5.LPC 2148 Micro Controller

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### E. Relays
A relay is an electrical switch that uses an electro-magnetic solenoid to control the position of a mechanical power contactor. Most relays are encased in a plastic or metal housing to keep the moving parts free from outside interference and dust. There are twoparts in a relay. The solenoid inside a relay has an electrical coil with a magnetic plunger that provides the movement needed to flip the contactor switch ON and OFF. The contactor in a relay is where the high-power signal is switched. The contactor switch also has a voltage and current rating that tells you how much power you can expect the relay to conduct before the contacts fail.

# International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

*(An ISO 3297: 2007 Certified Organization)*

## Vol. 4, Issue 1, January 2015

### F. L293D

A quadruple half H-bridge bidirectional motor driver IC, It can drive current up to 600mA with voltage range of 4.5 to 36 volts. It cans also controlling rotation speed using PWM signal generated by microcontroller. At the end of this tutorial reader should be able to use L293D motor driver in his project for controlling at least 2 DC motors.

### G. Control Devices

Here in this cybernation of home using two ac bulb(230v) for the purpose on/off, two dc motor(60&300rpm,12v) for the  purpose for door open/close and fan speed variations, one dc fan(12v) for fan on/off condition, one power led(12v) for intensity varying.

### VII.ANDROID BASED CYBERNATION OF HOME

Android is the name of the mobile operating system made by American company; Google most commonly comes installed on a variety of smart phones and tablets from a host of manufacturers offering users access to Google's own services like Search, YouTube, Maps, Gmail and more.  One of the most widely used mobile OS these days is ANDROID. Android software bunch comprise not only operating system but also middleware and key applications. Android Inc was founded in U.S (Palo Alto of California), by Richminer Andy Rubin, Nick sears and Chris White in 2003. Later Android Inc was acquired by Google. After the original release there have been number of updates in the version of Android.

In Android the Reuse of other application Components is a concept Known as Task. An android application can access other components to achieve the task. For example, a component from of your application you can trigger another component in the system of Android, which manages photos, even if this component is not part of your android application. In this, you select a photo and return to your application to use the selected photo. Such a flow of events in the following graphic
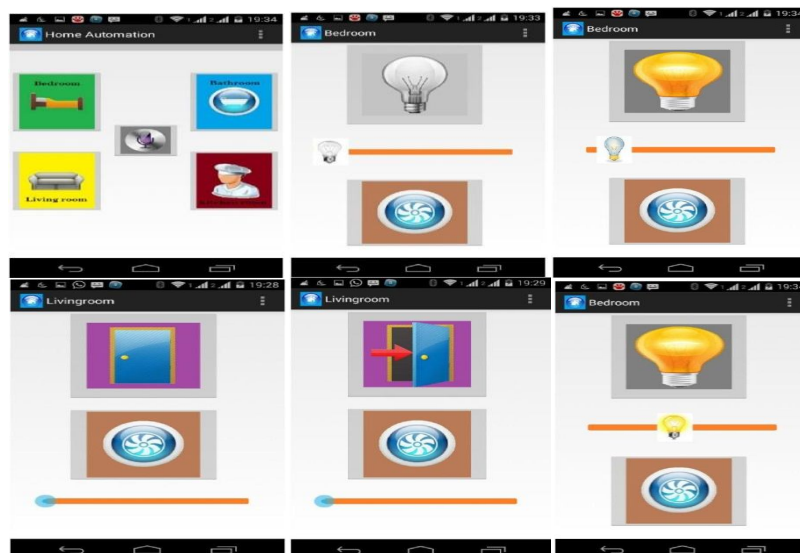


Fig 6. Screenshots of Android app

In my project I am using android mobile phone for cybernation of home icon application. This android application has five activities, in this one main activity and four sub activities (i.e. main frame and living room, bed room, kitchen room, bath room).When we start the application Cybernation of home icon appears in the mobile phone and click on icon to open main activity, which in turn list of sub icons displayed to choose. On the selecting the connection option,
 It opens a Bluetooth device and verifies on/off connection.  If it is on it shows all connected devices, now click on search found a new device and accept HC -05 which is my device and ask for password which is default mentioned as "1234". Now it shows a message that hc-05 was connected.

Click on cybernation of home icon it open a main activity which includes four sub activities (i.e. Living room, Bed room, Kitchen room, Bath room) as show in d figure below. Each sub activity has different colours and also has different room OK icons and at centre we have voice icon which shown as microphone symbol. HC serial Bluetooth products consist of Bluetooth serial interface module and Bluetooth adapter, Bluetooth serial module is used for converting serial port to Bluetooth. There are two MCUs want to communicate with each other, while Bluetooth master device connects and then other one connects to slave device. Their connection can be built once the pair is made. This connection is equivalently by Bluetooth, liked to a serial port line connection including RXD, TXD signals. The Bluetooth serial module used to communicate with each other. When MCU has Bluetooth salve module, it can communicate with computers Bluetooth adapter and smart phone. There is a virtual communicable serial port line between MCU and computer or smart phone. The Bluetooth devices in the market mostly are salve devices, such as Bluetooth GPS, Bluetooth printer. So, master module we need to make communicate. Bluetooth Serial module's operation doesn't need drive and it can communicate with other Bluetooth device has the serial, but the communication between two Bluetooth modules required at least two conditions, the communication must be between slave and master, The password must be correct. However, the two conditions are not sufficient. There are some other conditions based on different device model. In the following chapters, we will repeatedly refer to Liver's (Formerly known as Guangzhou HC Information Technology Co., Ltd.) material and photos. HC☐05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for the transparent wireless serial connection setup. Serial port type of Bluetooth module is fully qualified. The Bluetooth V2.0+EDR (Enhanced Data Rate) with 3Mbps Modulation, complete baseband and radio transceiver. It uses CSR Blue core 04☐External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature).

## VIII. APPLICATIONS

- Precise and safe control.
- Detection of fire, gas leaks and water leaks.
- Smoke detector can detect a fire or smoke condition and lights blink in the house to alert any person of the house to the possible emergency.
- In terms of lighting control, it is possible to save energy when hours of wasted energy in both residential and commercial applications by auto on/off light at night time in all major city office buildings.
- Security systems have included motion sensors that will detect any kind of unauthorized movement and notify the user through the security system or via cell phone.

## IX.FUTURE SCOPE

This project can be further developed by integrating it with the internet to monitor your home while sitting in a remote area. In this, one can keep an eye on his or her home through an internet connected to the user's mobile phone or PC or laptop. This will not only for improve your home security, in this modern day world but will also assist in conservation of energy like if you leave any home appliance switched ON by mistake, then we can check the appliances status on the graphical interface made on your mobile and can switch it off using the internet connectivity.
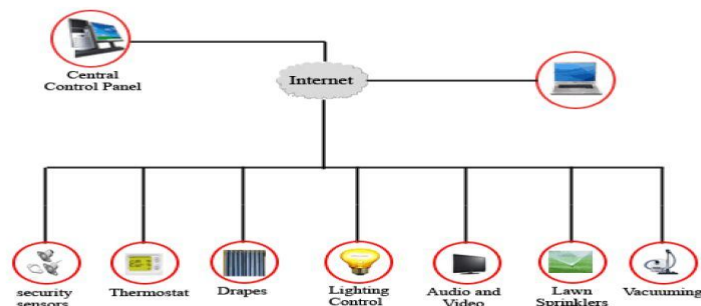


Fig 7.Future cybernation of home

The capabilities of Bluetooth are more than enough to implement the design. And also, most of the current laptop/notebook or cell phones come with built-in Bluetooth adapter. This reduces the cost of Bluetooth.

## X.CONCLUSION

The home automation system has been experimentally proven to work satisfactorily by connecting sample appliances to it and the home appliances were successfully controlled from a wireless mobile device. The Bluetooth client was successfully tested on a multitude of different mobile phones from different manufacturers, thus proving its wide compatibility and portability. This project will not only provide convenience to the common man but will be a boon for the elderly and disabled.

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