HOME AUTOMATION via BLUETOOTH (Using ANDROID PLATFORM)
TEAM MEMBERS

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ABSTRACT

The past decade has seen significant advancement in the field of consumer electronics. Various “intelligent” appliances such as cellular phone, air conditioners, home security devices, home theaters, etc., are set to realize the concept of a smart home. They have given rise to a Personal Area Network in home environment, where all these appliances can be interconnected and monitored using a single controller.

Home automation involves introducing a degree of computerized or automatic control to certain electrical and electronic systems in a building. These include lighting, temperature control, etc.

This project demonstrates a simple home automation system which contains a remote mobile host controller and several client modules (home appliances). The client modules communicate with the host controller through a wireless device such as a Bluetooth enabled mobile phone, in this case, an android based smart phone.
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INTRODUCTION

Although home automation today is not a new thing but most advanced home automation systems in existence today require a big and expensive change of infrastructure. This means that it often is not feasible to install a home automation system in an existing building.

“Homatic” is a wireless home automation application that is supposed to be implemented in existing home environments, without any changes in the existing infrastructure. “Homatic” lets the user to control his home from his or her android smart phone. In the smart phone application the user can select actions what should happen with electrical and/or electronic devices in the network.

COMPONENTS USED

Following components are used in this project:

1. Smart phone
2. Model of a house
3. Computer (LabView)
4. Relays
5. Fans
6. LED’s
7. Adaptor (12V)
8. Db-25 (parallel port interface)
9. Transistors (for switching)
10. Bridge
11. 7805 regulator
PROJECT DESCRIPTION

The project can be better described by dividing it into two categories, namely,
1. Hardware
2. Software

1. HARDWARE

The hardware portion of the project can be explained as follows:

a) HOST MODULE/CONTROLLER
The operating device or the controller we are using is a Samsung Galax Y S5360. It operates on Gingerbread OS (API level 8) with 835MHz single-core processor. The executable application is installed on the device with communicates with the server (PC), which in turn send communicates with the client modules or the house appliances through a relay board designed for parallel interfacing.

b) RELAY INTERFACE CIRCUIT
The relay interface circuit is used to connect the PC with the household electronic or electrical appliances. The circuit comprises of a relay (5v, 5A), a freewheeling diode, a transistor to drive the relay energizing input and connectors to interface parallel port. For testing purpose we are using two fans and two LED’s (serving as light bulbs).
SYSTEM DATA FLOW

SERVER (SMART PHONE) Controlling device application

Via Bluetooth

LABVIEW Bluetooth application

SWITCHING CIRCUITRY

PARALLEL PORT INTERFACING

DEVICES
2. Software

A number of different programming tools were used for the development of the application of “Homatic”.

a) Eclipse Indigo IDE
The main application for Android Smart Phone is coded in the environment of Eclipse Indigo IDE and compiled as a standard android executable that runs on platforms above API level 8 (Gingerbread or higher).

b) Android SDK
The development kit used to program on Eclipse Indigo IDE is the Android SDK developed by Google, Inc.

c) LabVIEW

LabVIEW (short for Laboratory Virtual Instrumentation Engineering Workbench) is a platform and development environment for a visual programming language from National Instruments. The purpose of such programming is automating the usage of processing and measuring equipment in any laboratory setup.

Originally released for the Apple Macintosh in 1986, LabVIEW is commonly used for data acquisition, instrument control, and industrial automation on a variety of platforms including Microsoft Windows, various versions of UNIX, Linux, and Mac OS X.

We are using LabVIEW as main software which is installed in the controlling PC called "SERVER" which must be "ON" at all time as Home automation is not possible without SERVER. The LabVIEW receives the message, decode it and then compare the code of the message for already saved passwords or codes. If the conclusion of already described comparison is true LabVIEW sends the signal through parallel port to switch “ON” the specific device. The software LabVIEW is basically used for automation and control. It gives certain output on the basis of certain input conditions according to the programming
The working of the application can be summarized by the following flowchart.

**APPLICATION FLOWCHART**

The application is supposed to work as a remote controller or a control panel interfaced with a server via Bluetooth. The application here will serve as a host controller, which will describe an event to the server on button click.

First Screen: A splash screen showing an image, most probably a trademark which remains for only 3 seconds and then switches to the next screen.

Second Screen: this screen consists of 3 buttons, namely, “START”, “ABOUT”, “EXIT”

- “START” button starts the application by moving to the next activity
- “ABOUT” button: switches to an activity having only Text View.
- “EXIT” button: when user clicks this button it shows a Toast message dialog to confirm this action. If user presses NO, it returns to the current activity, if user presses “YES” it first switch off any open Bluetooth and then close the app.
THIRD SCREEN: as soon as this activity starts, it asks to enable the Bluetooth of the phone, if user presses NO, app ends, if user presses YES, it turns on the Bluetooth and automatically search for nearby devices to connect with (clickable List View to be used here). When the user selects the device, the phone automatically pair with that device(s) (with or without entering the pin, which depends) and then switches to the FOURTH SCREEN and this THIRD SCREEN is destroyed.

FOURTH SCREEN: this screen has 5 Image Buttons, namely, “LIGHT”, ”FANS”, “TV”, “AC”, “PC”. Clicking every button switches to its own layout.

**LIGHTS**
This layout consists two buttons, “ROOM1” and “ROOM2”. Clicking them changes to their respective layouts.

**FANS**
This layout consists two buttons, “ROOM1” and “ROOM2”. Clicking them changes to their respective layouts.

**TV**
This layout consists two buttons, “SWITCH ON” and “SWITCH OFF”. Clicking any of them sends a hard-coded string to the server.

**AC**
This layout consists two buttons, “SWITCH ON” and “SWITCH OFF”. Clicking any of them sends a hard-coded string to the server.

**PC**
This layout consists two buttons, “SWITCH ON” and “SWITCH OFF”. Clicking any of them sends a hard-coded string to the server.
CONCLUSION

The home automation system has been experimentally proven to work satisfactorily by connecting sample appliances to it and the 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 portability and wide compatibility.

This project will not only provide convenience to the common man but will be a boon for the elderly and disabled.

APPLICATIONS

The project designed is very practical in nature because everything can be controlled with the help of just a mobile phone which is widely available nowadays and also proves to be handy.

Also the project is feasible because the cost of the project is very less as compared to the expensive Wi-Fi based home control systems presently available in the market which require an additional cost of internet services.
FUTURE SCOPE

This project can be further developed by integrating it with the internet to monitor your home while sitting in a remote area. By doing 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 improve the security of your home in this modern day world but will also assist in conservation of energy like if you left any home appliance switched on by mistake, then you can check the status of the appliance on the graphical interface made on your mobile and can switch it off using the internet connectivity.
REFERENCES

Following are the resources used in completing this process:

1) Android official website.  
   http://developer.android.com/


   2nd edition  