Power conservation through Android application

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Abstract: *Android platform for smart mobiles is rapidly getting popular all over the world owing to it's wide variety of possible applications that can be run onto it and uses in many areas of life. Considering this ,an Android based Home Automation project is presented in this paper, whose main objective is power conservation in our homes. Another feature is that through this system, one can operate electrical appliances in another room by means of a simple mobile application. Technically main components are the at mega controller and the Wifi.*
Keywords - Automation, Adapter, ATmega, ,Smartphones.

I.   INTRODUCTION

Home Automation is basically a modified area of building automation .In this paper Home Automation technique is used to design a Smart Home, which can be remotely operated by an Android mobile application. This proposed system is highly energy efficient. Provides for remote controlled operation of electrical appliances and it is highly accessible. It means an owner can have centralized control over lighting, kitchen appliances and many more household commodities. A home automation system integrates electrical appliances with each other. This technique can provide extreme comfort for the elderly and the physically disabled. Android is built in Linux kernel, hence it provides user with freedom for access i.e. developer freedom to modify source code. So Android provides a developer a free platform to create new applications rapidly by the help of numerous facilities.

This paper makes use of applications of a home automation system and presents it's user a centrally controlled system which helps to establish a control over the functions of various home appliances. At the centre,an ATmega8 microcontroller is used to communicate with the appliances that are connected by means of the android application. Web server is used like an interface to regulate the mechanism of the connected devices.

Wireless technology is becoming more and more popular now-a-days. By means of a Wifi,on and off signals can be sent to the web server that can control the appliances at home by means of internet. The database stores the information of the currently operating devices i.e. it's main function is to maintain record of the currently operating and non-operating devices in the network. The major benefit of this system is that a person is not bound by the distance to operate the appliances. The system is operatable from anywhere, as long as internet connectivity is ensured to both the user having the application and the home. This paper will describe the approach that is applied with the smart phone to control various home appliances with android.

II. IMPLEMENTATION

2.1 ANDROID

The main objective of this paper was to present a system that could strike down the main problem occurring in conservation of energy .Ease of access is one of those problems. The easiest way of accessing would be remote access and what better way to do this than through a smartphone. Android is the most popular platform for building smartphones in today's generation. Android is an open source platform built through the Linux kernel which is owned by Google Inc. It was mainly built for mobile phones and tablets. Android Software Development kit provides the tools and Application program interfaces(API) for building application that could be run on Android platform using Java programing language .The application built here is developed through Eclipse kepler SDK v21.1.0.The Android version compatible with this system is Lollipop and higher.

2.2 ATmega

At the midst of this project is the ATmega8 microcontroller that is used to connect and control the connected appliances. This is a low power CMOS 8 bit micro controller based on the AVR RISC architecture. BY executing powerful instructions in a single clock cycle, the ATmega8 achieves throughput ,allowing the system designed to optimize power consumption versus processing speed. The AVR architecture was conceived by two

students at Norwegian Institute of Technology,Alf Egil Bogen and Vegard Wollen. Apart from this some other features are:

- High performance, low power ATMEL AVR.
- Advanced RISC structure.
- High endurance non-volatile memory segments.
- It has many peripheral features like programmable serial USART, real time counter with separate oscillator and master/slave SPI serial interface.
- It's operating voltages are 2.7V to 5.5V
- These chips are inexpensive compared to other microcontroller platforms.
- Cross platform-It's software runs on Windows, Macintosh OSX and Linux operating system.


III.   DESIGN

As stated ,the design of the application consists of many appliance connected to the system. As soon as the user accesses the application he is navigated to the main page of the app. The main page contains many controls, each corresponding to different appliances. The user must switch one of the controls to switch on the corresponding appliance. We are also keeping a log of appliances' status by means of a database that is a cloud server. The server is implemented in Google APP engine. This cloud server keeps track of the appliances and automatically turns on or off the appliance because of the automatic timer function provided. This function allows the user to pre-set the timer in seconds for the appliances, post which the appliance will be automatically switched off by the server which keeps track of the appliances. The commodities can then be manually operated later as well.

The micro controller is connected to the system with the help of a USB to UART cable CP2102.The system is connected to the web server with Wifi. This enables the mobile app to access the ATmega through the system and control the appliances. The system forwards the instruction to the microcontroller which takes the required response to the home unit. The relay in the home unit attached to every appliance amplifies or initiates the response and instructions to the connected appliance.
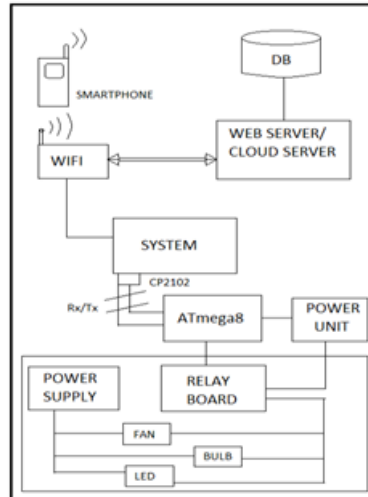
IV.   TESTING

We performed testing on a minor model consisting a fan, bulb and LED light. The appliances were each connected to relay board and had a power supply. The relay board had connection to the ATmega microcontroller and a power unit my means of an adapter. We made server with a personal computer and used the mobile application to toggle through the appliances, which worked successfully.
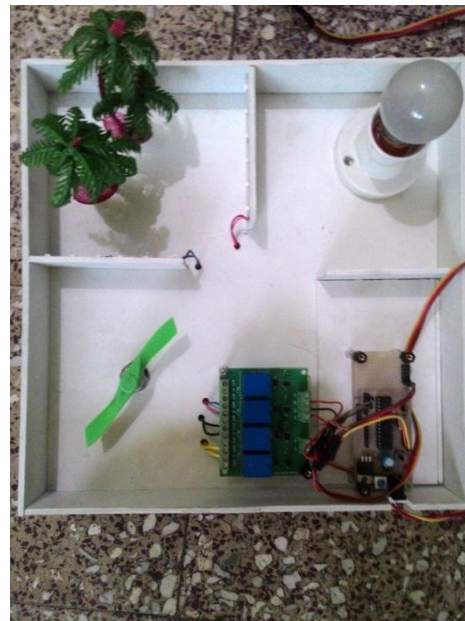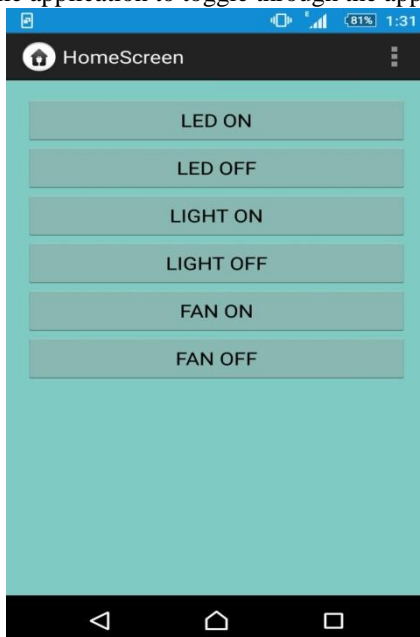
V.   CONCLUSION

This is an ongoing project as discussed we performed it on a small prototype, but the model can be expanded on commercial basis. We have used Android and ATmega, both of which are open source software's. Hence the project costs very less and commercially will be very inexpensive for a common person. The project has to be just operated an Android phone/tablet.

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