Thesis Paper

HOME AUTOMATION THROUGH VOICE COMMAND AND GSM TECHNOLOGY

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DECLARATION

We declare that the thesis report is based entirely upon the research conducted by the members of the group under the guidance and supervision of our thesis supervisor Dr.Md.Mosaddequr Rahman. We do hereby declare that the thesis titled "HOME AUTOMATION THROUGH VOICE COMMAND AND GSM TECHNOLOGY" is submitted to the Department of Electrical and Electronics Engineering of BRAC University in partial fulfillment of the Bachelor of Science in Electrical and Electronics Engineering. This is our original work and was not submitted elsewhere for the award of any other degree or any other publication.

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ABSTRACT

It is very obvious that our main concern behind designing this system is the satisfaction of the user. The project is to develop a system, which uses mobile technology that keeps control of the various electronic devices or product, which executes with respect to the signal sent by mobile. The rapid growth of technology has significantly changed the living standards of modern society. Seeing the rising number of electronic devices being made in a household, an automated home control system has become a mounting helpful trait. Current systems, however, have problems with complexity, high costs, non-open sources and multiple incompatible standards. This project intends to design an open source, reasonably priced and way easy to use home automation system, which will be done by interfacing the open source Arduino microcontroller with laptop; creating a simple, easy-to-use system to manage home appliances. The project was carried out in quite a few stages. The Arduino is first setup for connection and laptop interfacing. Next, the system is made to work with appliances in a home model. Last of all, a simple user interface is created using some user friendly software to make the system user friendly, implementation of the home automation system design. The home automation system design was successfully implemented. Using little software on laptop connection was made to Arduino through wireless network, allowing for control of the appliances in the home model. In this paper we intend to describe a home automation system which uses speech commands uttered by a user to control various home appliances. This proposed system combines both the macros software for speech recognition visual studio and the Arduino micro-controller that is used to provide control signals to the relays, which will control various devices which are part of the home automation system. Nevertheless this project is simple but effective for every user who certainly have just two electronics device the mobile phone and the laptop itself. The rapidly advancing mobile communication technology and the decrease in costs make it possible to incorporate mobile technology into home automation systems. We propose a mobile-based home automation system that consists of a mobile phone with Java capabilities, a cellular modem, and a home server. The home appliances are controlled by the home server, which operates according to the user commands received from the mobile phone via SMS.

INTRODUCTION

With advancement of technology things are becoming simpler and easier for us. Automation is the use of control systems and information technologies to decrease the need for human work in the production of goods and services. In the scope of industrialization, automation is a step beyond mechanization. Whereas mechanization provided human operators with machinery to assist them with the muscular requirements of work, automation greatly decreases the need for human sensory and mental requirements as well. Automation plays an increasingly important role in the world economy and in daily experience. Automatic systems are being preferred over manual system. Through this project we have tried to show automatic control of a house as a result of which power is saved to some extent. Laptop and cell phone is what we use daily life as like a basic element. Home automation requires domestic appliances to be fitted with the competence to act in response to changes in the home environment, initiate messages, and receive and act on information from other appliances, including messages from the outside the home perhaps relayed by the technical system. Uprising technology gives the capacity for fine-tuning the home environment through the installation and utilization of few electronics device.

Our work consists of two different part controlling home appliances, one through GSM technology and another way of controlling home appliances through Voice Command. The one through GSM technology we will send a text SMS along with a predefined password to ON and OFF appliances. The other one through voice command there we will utter the word ON and OFF to turn them on and off respectively.

BACKGROUND

As time is proceeding ahead, technology is developing and evolving every single moment. No one can claim something to be "latest" because the moment someone does so we can see the presence of something newer and better in front of our very own eyes. We endeavor to cope up with the dynamic changes but it is pretty difficult due to lack of availability of adequate and sufficient resources and technology. Two of the basic fundamental intentions of technology are to make things that are not complicated to be understood by the user and makes working of the user more convenient. Things are simple when the interface between human and technology is least complex. It is an outmost effort by scientists to make the interfacing system more and more convenient for the users. Revolution made by the mobile technology made our modern life easier as it endowing with new services and related commerce with more and more availability.

Short message service (SMS) and GSM (Global System for Mobile) a GSM terminal system provides the (mobile phone), the service center (Service Center) was applied to text messaging service, the service center for information storage and forwarding function. Short message service as a basic business of GSM network has been the system operators and developers more and more attention, the application of this service is developed based on it.

HOME AUTOMATION

Home/office automation is the control of any or all electrical devices in our home or office, whether we are there or away. Home/office automation is one of the most exciting progresses in technology for the home that has come along in decades. There are hundreds of products available today that allow us control over the devices automatically, either by remote control; or even by voice command.

Home automation (also called domestics) is the residential extension of "building automation". It is automation of the home, housework or household activity.

The system is SMS based and uses wireless technology to revolutionize the standards of living. This system provides ideal solution to the problems faced by home owners in daily life. The system is wireless therefore more adaptable and cost-effective. The system uses GSM technology thus providing ubiquitous access to the system for automated appliance control. The platform of this system will fully help the GSM network realization of the short message remote alarm, has the advantages of less investment, low cost, high reliability, but also has good expansibility and practicability, the intelligent, networked direction of the future development of home appliances. Short message sent by mobile terminal hardware circuit level component based on short message send and receive functions can be completed. The aim of the paper is to investigate a cost effective solution that will provide controlling of home appliances remotely. The motivation is to facilitate the users to automate their homes having ubiquitous access. The system provides availability due to development of a low cost system. In addition there was a need to automate home so that user can take advantage of the technological advancement in such a way that a person getting off the home or office does not get melted with the hot climate. Person can easily activate home appliances from outside. Therefore this paper proposes a system that allows user to be control home appliances ubiquitously via SMS using GSM technology.

Below shows some data collected from internet how home automation is impacting our life in saving our resources and cost
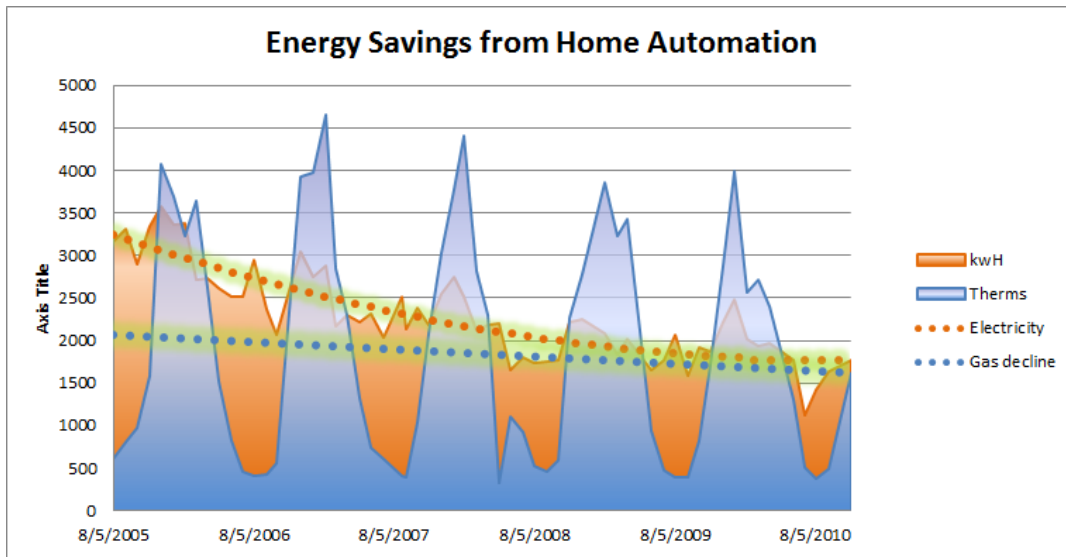
Figure 1: Energy Saving
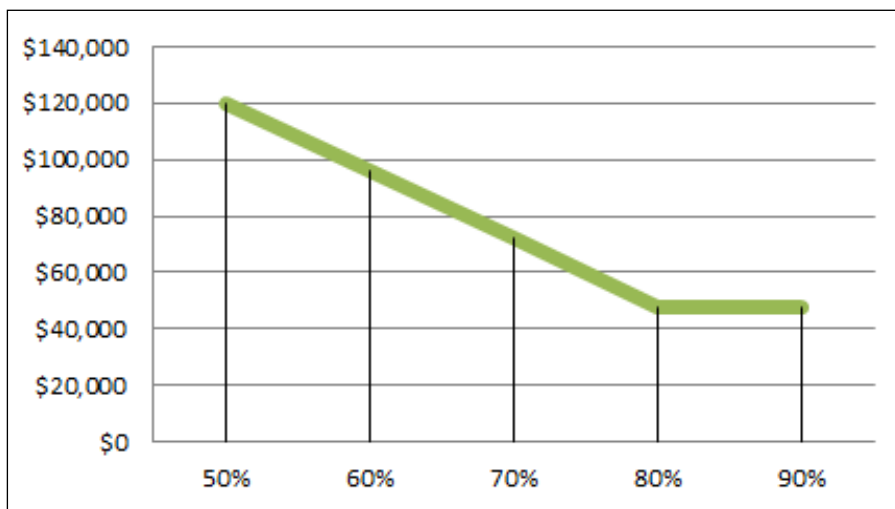
Figure 2: Cost saved by home automation worldwide
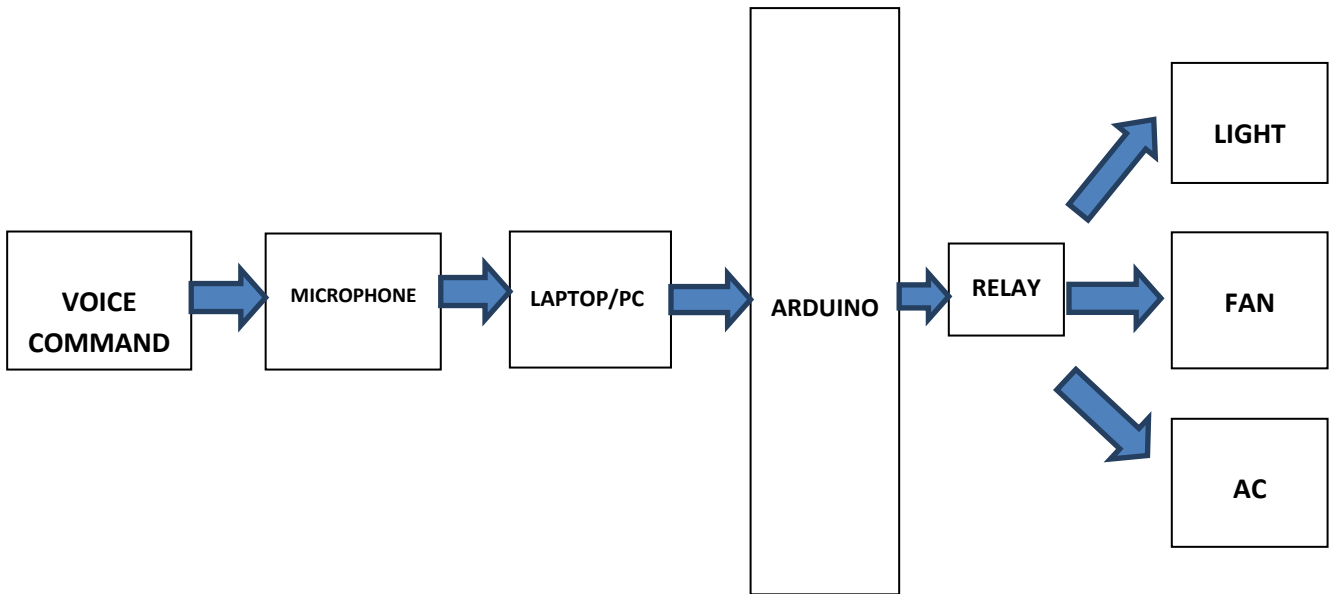
Figure 3: Block diagram of Home Automation system through voice command
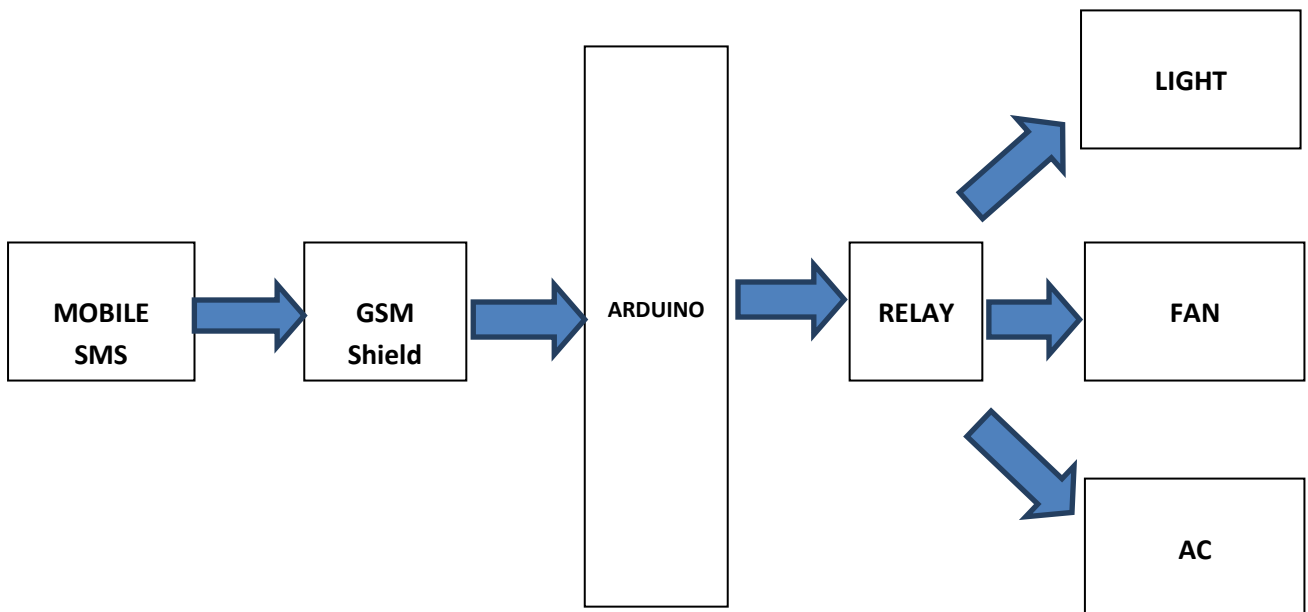
Figure 4: Block diagram of Home Automation system through GSM Technology

SCOPE OF IMPLEMENTATION:

Lots of work has already done in the field of home automation & the advancement of mobile technology helps to create more user friendly system. It is automation of the home, housework or household activity. Home automation may include centralized control of lighting, HVAC (heating, ventilation and air conditioning), appliances, security locks of gates and doors and other systems, to provide improved convenience, comfort, energy efficiency and security. Home automation is such a field where we always want the best and want the easiest one as it's our home! We look forward to a system to install in our home so that its easily interfaced with our daily used devices. So this project has high scope of getting implemented in each and every house.

"A house is a machine for living in."

— Le Corbusier

As time passes, visions of the future ultimately face reality. In computer history, the time scale of "yesterday's tomorrow's" takes place on the exponential substrate of Moore's Law, giving predictions a half-life unknown in almost any other field.

The ultimate promise of technology is to make us master of a world that we command by the push of a button.

–Volker Grassmuck

Hence technology is the unpredictable tool for advancement.
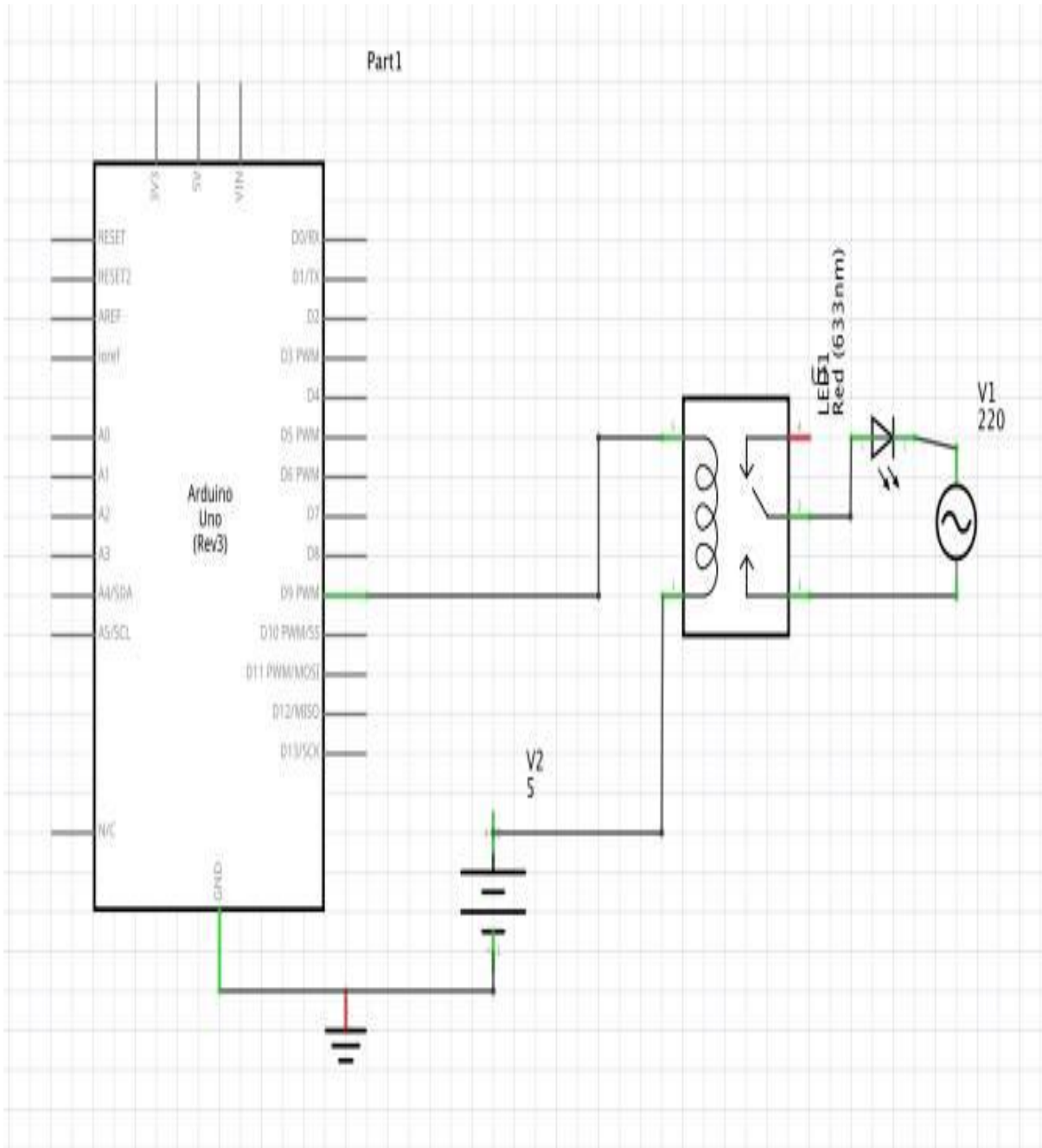
Figure 5: Circuit diagram of home automation system through voice command
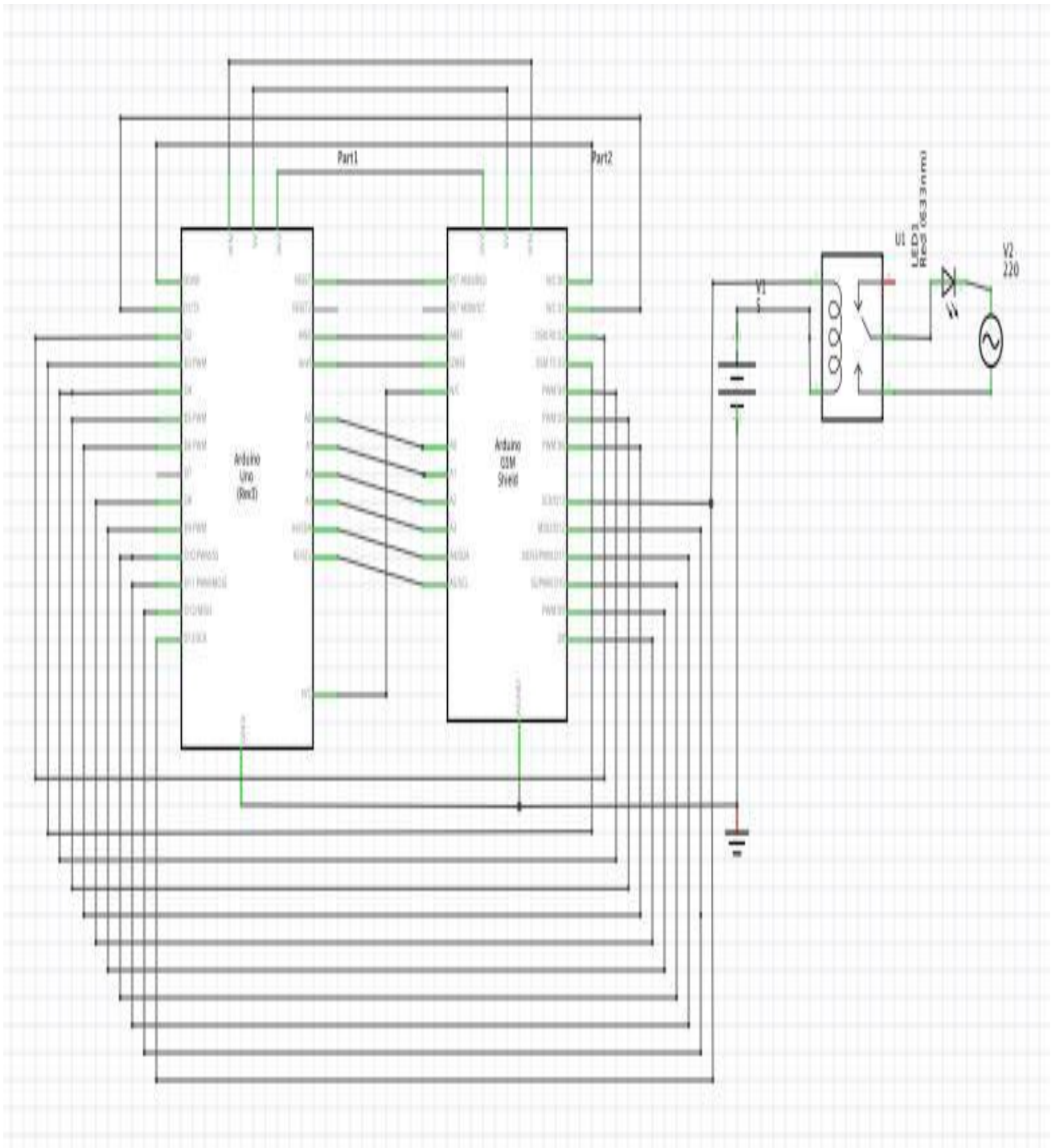
Figure 6: Circuit diagram of home automation system through GSM technology

METHODOLOGY:

Voice command

Microsoft Visual Studio 2010 is an integrated development environment (IDE) from Microsoft.

We used C# language for writing the codes on Visual studio and created two files with extension of .exe renaming them as On and OFF. Setting the voice command on Macros and embed the directory of the exe files. Arduino-1.5.7-windows are the software for Arduino need to be installed in laptop. We used ATMEGA2560 Arduino. There the codes are written in c+ language it will pass 1 for On and 0 for Off. If the Arduino got "1" from the serial communication (led, HIGH) hence LED will be on else if the Arduino got "0" from the serial communication (Led, LOW) LED will be Off. These instructions will be passed from the USB port of the laptop to the Arduino port via com port where it has been connected. We can program as many as code we want to control in our home just using a relay we can simply power it On and Off just by calling the file name we saved as.

GSM Technology

ATMEGA328 Arduino uno has been attached with GSM shield. The GSM shield communicates with an attached Arduino through the Software Serial library. By default, communication between the modem and Arduino happens on digital pins 2 and 3. On the Uno this works without modification. The GSM_TX pin, pin 2 on the shield, sends information to the Arduino. The Arduino relies on an interrupt to know when to read the information on this pin. Need to call from the library by setting defaults password and SIM position number.

The SMS could be done from any SIM but it must contain the password and with a message "LEDON" OR "LEDOFF". The message should be of 180 characters. LEDON/LEDOFF sent to the GSM module via SMS. Then Arduino gets this from GSM module via serial communication. Then it performs a string to string comparison. If it matches with LEDON then microcontroller sets a pre-specified pin HIGH else if it matches with LEDOFF then it sets that pin LOW.

FULL SET UP PICTURE

Figure 7: Full set up of our system

Figure 8: Snapshot of Arduino 1.5.7 GSM based

Figure 9: Snapshot of Arduino 1.5.7 voice command

Figure 10: Screenshot of the text

Figure 11: Screenshot of the software Microsoft Visual Studio

Figure 12: Snapshot of the macros

DESCRIPTION OF THE SOFTWARE AND COMPONENTS USED

Visual Studio is a software development environment (also known as an integrated Development Environment or IDE), it's used primarily by Software Developers to build Software products, websites and Utilities. Visual Studio comes in several flavors, all have different feature and are aimed at different people in the Development team.

It is a complete set of development tools for building ASP.NET Web applications, XML Web Services, desktop applications, and mobile applications. It supports different programming languages and allows the code editor and debugger to support (to varying degrees) nearly any programming language, provided a language-specific service exists. It provides many different application templates to help us to create programs, and several programming languages in which to write them. Built-in languages include C, C++ and C++/CLI (via Visual C++), VB.NET (via Visual Basic .NET), C# (via Visual C#), and F# (as of Visual Studio 2010)

Visual C#: Visual C# (pronounced C sharp) is designed for building a variety of applications that run on the .NET Framework. Visual C# is simple, powerful, type-safe, and object-oriented. With its many innovations, Visual C# enables rapid application development and also retains the expressiveness and elegance of C-style languages.

Visual Studio also includes a debugger that works both as a source-level debugger and as a machine-level debugger. It works with both managed code as well as native code and can be used for debugging applications written in any language supported by Visual Studio. In addition, it can also attach to running processes and monitor and debug those processes. If source code for the running process is available, it displays the code as it is being run. If source code is not available, it can show the disassembly. The Visual Studio debugger can also create memory dumps as well as load them later for debugging. Multi-threaded programs are also supported. The debugger can be configured to be launched when an application running outside the Visual Studio environment crashes.

Using Visual Studio 2010 (IDE):

Automation interfaces provided by Intel Visual Fortran. Automation interfaces are programmable objects used to access underlying IDE components and projects in Microsoft Visual Studio 2008 to provide experienced developers with a means of automating common tasks and allow a finer degree of control over the IDE and the Fortran projects being used within it, it's targeted towards Home Users, Hobbyists, Students and Developers who are working alone on Non Commercial Applications or Websites. The features include implicit line continuation, auto-implemented properties, collection initializers, and more.

Visual Studio 2010 includes Enabling Emerging Trends.

Cloud Development: Windows Azure Tools for Visual Studio enables developers to build, debug and deploy services and applications for the cloud. This includes a project model that you can use to build your application or service. The Windows Azure Tools are used to deploy the package to the cloud through the Live Developer Portal.

Parallel Development: It's not easy by any means to write code that is optimized to run across more than one processor (parallel development). Microsoft now provides an environment that will help do this through Visual Studio IDE support for Parallel development and Native C++ libraries and compiler support for parallel applications. In addition, version 4 of the .net framework will also provide things like P-LIINQ and parallel language semantics and framework components. The debugger and a performance analyzer are also optimized to support parallel development.

Inspiring Developer Delight

Coding Improvements: A new editor uses Windows Presentation Foundation technology to provide integrated support that helps you understand your code. Things like the "Document Map Margin" — which renders a graphical view of your source file with information about the code, third party add-ons for custom views, "Inline Call Hierarchy" - see how a particular method or entity is passed into and out of the code section, and "Highlight References" - a visual representation of code references.

C# development: It was developed by Microsoft within its .NET initiative and later approved as a standard by Ecma (ECMA-334) and ISO (ISO/IEC 23270:2006). C# is one of the programming languages designed for the Common Language Infrastructure. C# is intended to be a simple, modern, general-purpose, object-oriented programming language.

SharePoint Development in Visual Studio 2010

The tools added include:

➢ View lists and other artefacts from SharePoint in Visual Studio
➢ New SharePoint Services Project file
➢ Visual Web Part Designer, web part project items
➢ Event Receivers for SharePoint, Wizards to select the event receiver
➢ ASPX Workflow Initiation form for Workflow Project
➢ SharePoint packaging explorer and editor

Visual Studio helps to create those code and apply coding becomes more fun when we can write code to say Switch ON our room lamp, Switch on water heater or Switch our house blow when any strange sound is made and the list goes on. It's all about controlling electronic equipment with the aid of one of man's greatest inventions "The Computer".

Arduino Mega
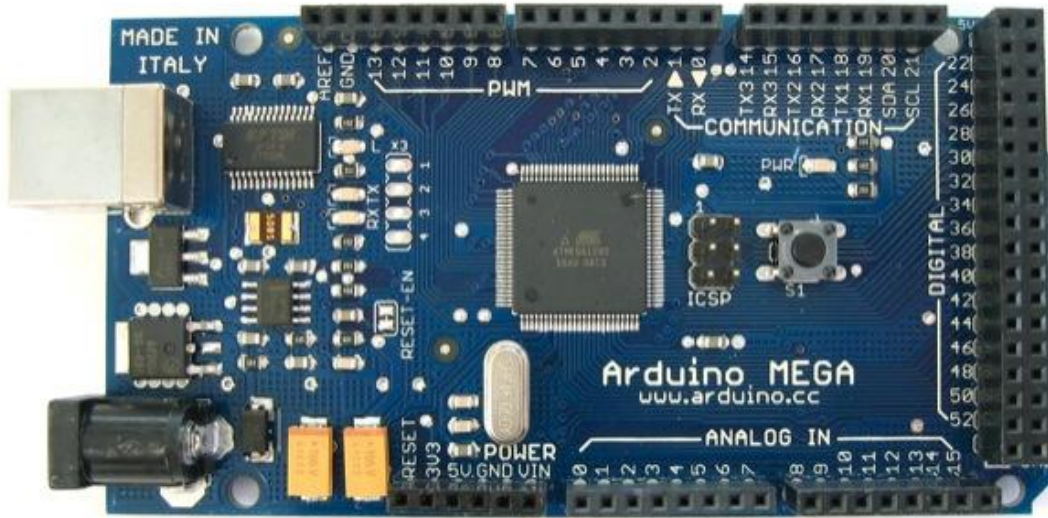
Figure 13: Arduino Mega Device
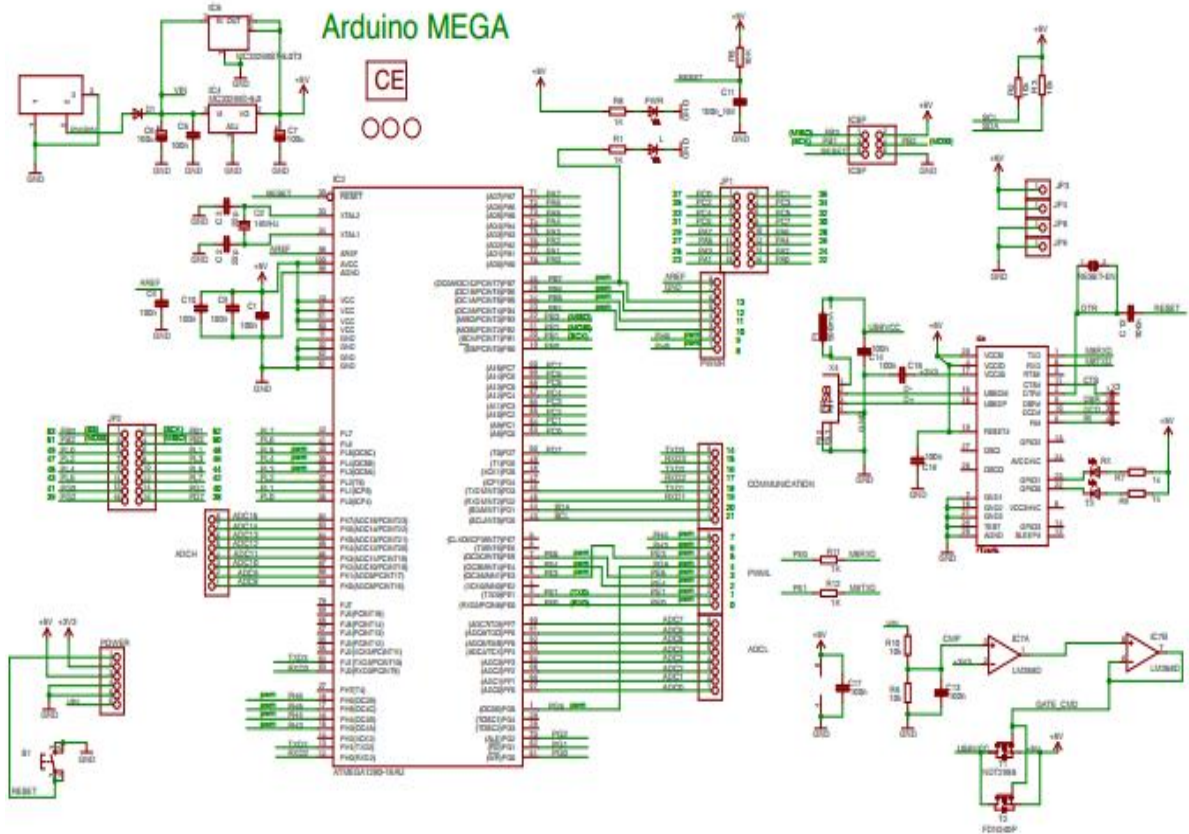
Figure 14: Arduino Mega circuit diagram

Summary

Microcontroller	ATmega2560
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	54 (of which 15 provide PWM output)
Analog Input Pins	16
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	128 KB of which 4 KB used by boot loader
SRAM	8 KB
EEPROM	4 KB
Clock Speed	16 MHz

Arduino is a device which can make computer more sensible and manageable comparison to physical world rather than desktop computer. It is very popular and easy to use Programmable board for creating projects as Arduino is an open source microcontroller based development board which develop environment for writing software for the board. It's also most common microcontroller board for advanced users and all kinds of more determined projects. Arduino play a very important role in our daily life as it can be used to develop interactive objects like animated sculptures, toys and games and radio links, taking inputs from a variety of switches or sensor. It's also been used to make robots, home automation gadgets, automotive projects, for sensing and controlling lights, motors, locks and servos, sound and video, in short it just about anything else we can dream up. It can also help to be a web server and connect projects to the internet. Arduino projects can be stand-alone or they can communicate with software running on our computer (e.g Flash, Processing, MaxMSP).

In the year 1002 AD, King Arduino ruled the country, Arduino is been names and cobble stone stoned street is the place where a new era in electronics had its roots. Arduino board was born in the year 2005 in the classroom of the Interactive Design Institute in Ivrea, Italy. In this institute there is a familiar term called ("Arduino – The Revolution of Open hardware ") which means an open source microcontroller based development board which has opened the doors of electronics to a number of designers and creative engineers The new prototype board, the Arduino, created by Massimo Banzi and other founders, is a low cost microcontroller board that allows even a learner to do great things in electronics. Banzi want to make Arduino affordable for all students. Meanwhile a designer-friendly programming language called "Processing" had been developed by Banzi's colleague from MIT. One of Banzi's students, Hernando Barragan created software tools similar to *Processing*. He

developed a new prototyping platform known as *Wiring*, it include both a user-friendly IDE as well as a ready-to-use circuit board. It turned out to be a promising project the success of which continues till date. However, Banzi wish to make a platform that was even cheaper, simpler and easier to use.

Macros

Speech Recognition is available only in English, French, Spanish, German, Japanese, Simplified Chinese, and Traditional Chinese. Besides voice, the most important piece of equipment that we need to get started with Windows Speech Recognition is a good microphone. While many new laptops have microphones built in, it's better to get a separate microphone that's dedicated to speech recognition. A USB microphone can provide the best fidelity, but a mike that plugs into a mini-jack on our computer ought to work well enough. Consider getting a headset microphone. Unlike a microphone that sits on our desk, a headset mike allows moving around—and if we are willing to use Windows Speech Recognition a lot, that's something we will need. Also, headset microphones are less prone to making mistakes because they stay a consistent distance from the mouth as we talk. We will also want consistent and calm surroundings, without a lot of external noise that our microphone might pick up. As using Windows Speech Recognition, we can train it to filter out sounds from our environment; but it's good to start out with as quiet an environment as possible.
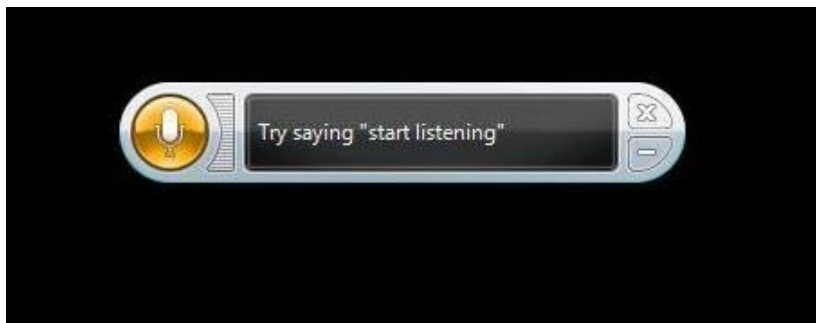
Figure 15: Macros

RELAY

A relay is an electrical switch that opens and closes under control of another electrical circuit. In the original form, the switch is operated by an electromagnet to open or close one or many sets of contacts. It was invented by Joseph Henry in 1835. Because a relay is able to control an output circuit of higher power than the input circuit, it can be considered, in a broad sense, to be a form of electrical amplifier.

A relay switch can be divided into two parts: input and output. The input section has a coil which generates magnetic field when a small voltage from an electronic circuit is applied to it. This voltage is called the operating voltage. Commonly used relays are available in different configuration of operating voltages like 6V, 9V, 12V, 24V etc. The output section consists of contactors which connect or disconnect mechanically. In a basic relay there are three contactors: normally open (NO), normally closed (NC) and common (COM). At no input state, the COM is connected to NC. When the operating voltage is applied the relay coil gets energized and the COM changes contact to NO. Different relay configurations are available like SPST, SPDT, DPDT etc, which have different number of changeover contacts.

For a relay to operate a suitable pull-in & holding current should be passed through its coil. Relay coils are designed to operate from a particular voltage often its 5V or 12V. The function of relay driver circuit is to provide the necessary current to energize the relay coil, when a LOGIC 1 is written on the PORT PIN thus turning ON the relay. The relay is turned OFF by writing LOGIC 0 on the port pin .In our system two relays are used for device control.
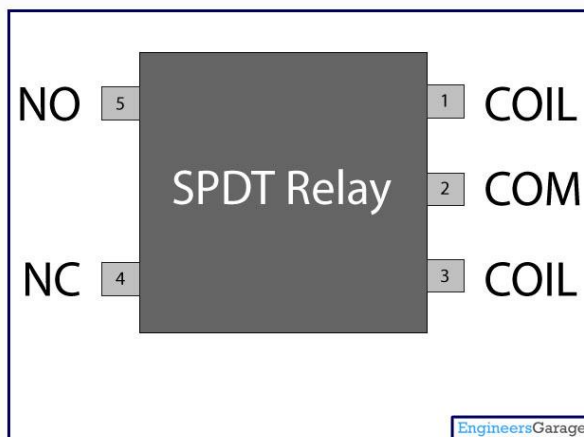
Figure 16: SPDT Relay

GSM Shield

Figure 17: GSM Shield

The GSM shield communicates with an attached Arduino through the Software Serial library. By default, communication between the modem and Arduino happens on digital pins 2 and 3. On the Uno this works without modification, but to use the Leonardo or Mega boards, some slight changes are required.

Arduino's GPRS shields are becoming popular these days. They enable developers to build applications that use ubiquitous GPRS networks. A variety of Arduino compatible GPRS shields are available in the marketplace that uses popular GPRS modules from providers such as SIMCOM, Telit, Quectel etc.

The GSM_TX pin, pin 2 on the shield, sends information to the Arduino. The Arduino relies on an interrupt to know when to read the information on this pin. The Mega do not have interrupt capabilities on pin 2.

We do not need to change any code to program the shield for use with the Mega or Leonardo; the library will change the Arduino's RX pin automatically depending on the board selected in the "Tools" menu of the IDE.

Steps followed to get them work together. First of all Install the SIM card into your GPRS Shield and then Take an Arduino board and install the GPRS Shield over it. Connect the antenna to the GPRS Shield then connect the Arduino to your computer using a USB cable. In addition you need to plug the power adapter to Arduino. .Press and hold the power button a short while(Over 3 seconds) on the GPRS Shield to turn it on. Wait half a minute for the GPRS Shield to connect to the network (NET LED will start blinking every 3 seconds or so). If it keeps on blinking every 800mS, which means EFCom can't connect to the Internet, then pull the SIM card and re-plug it. As always with Arduino, every element of the platform – hardware, software and documentation – is freely available and open-source.

ATMEGA328

The GSM library uses digital pin 10 to communicate with the Mega. On the GSM shield, connect a jumper wire between digital pins 2 and 10. Bend the male header attached to pin 2 on the GSM shield to the side so it does not connect with the Mega.
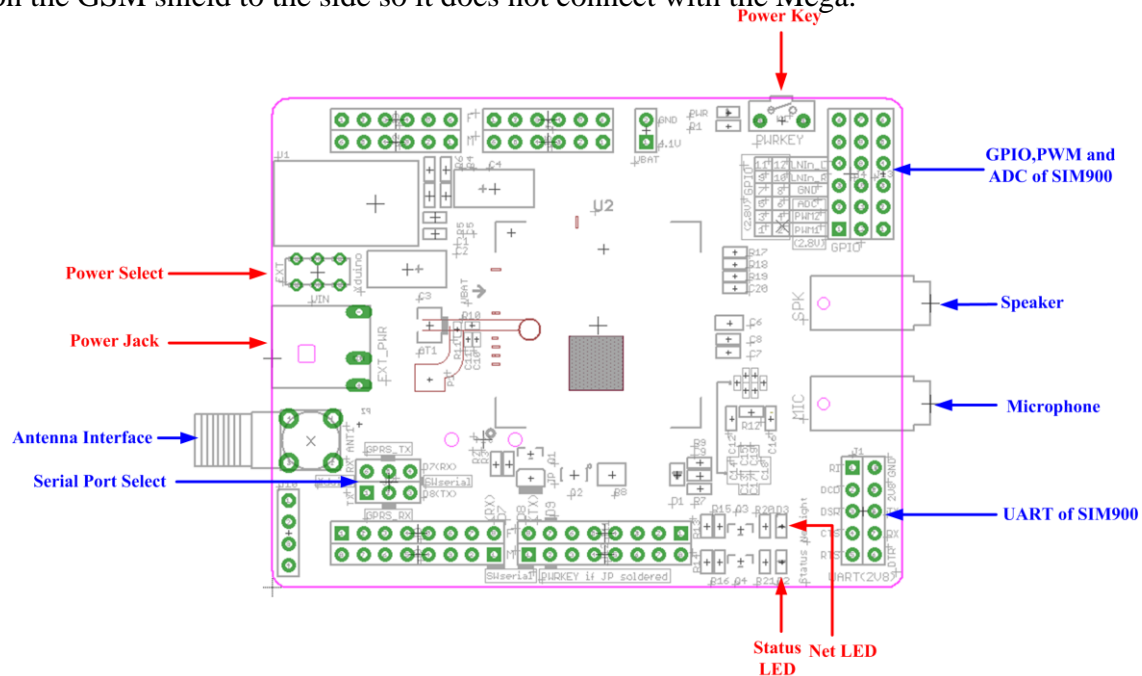
Figure 18: ATMEGA328 circuit diagram

Features-

- ✓ Based on SIM Com 's SIM900 Module
- ✓ Quad-Band 850 / 900/ 1800 / 1900 MHz - would work on GSM networks in all countries across the world.
- ✓ Control via AT commands - Standard Commands: GSM 07.07 & 07.05 | Enhanced Commands: SIMCOM AT Commands.
- ✓ Short Message Service - so that you can send small amounts of data over the network (ASCII or raw hexadecimal).
- ✓ Embedded TCP/UDP stack - allows you to upload data to a web server.
- ✓ Speaker and Headphone jacks - so that you can send DTMF signals or play recording like an answering machine.
- ✓ SIM Card holder and GSM Antenna - present onboard.
- ✓ 12 GPIOs, 2 PWMs and an ADC (all 2.8 volt logic) - to augment your Arduino.
- ✓ Low power consumption - 1.5mA(sleep mode)
- ✓ Industrial Temperature Range - -40°C to +85 °C

ADVANTAGES

The advantages of this system are it has an ability to control the user-desired home appliances through SMS , can simulate live-in conditions when the house is leave unattended during holiday, and in-control of house's condition via SMS.

The main effective advantage of Home Automation is:

1. Convenience: An automated system provides unparalleled convenience to the owner. By having a living place that is self-sufficient to automatically perform routine functions through a simple access panel or with a few clicks of buttons offers a lot of convenience to the family members. You can switch on your water heater, ac, even put off the lights, which are still on when you came out. You can also close the window curtains, brew your coffee in the coffee maker or turn on the smart home theater, or even fill your bathtub even before reaching your home.

2. Save on Energy Bills: With the use of advanced home automation, you can also cut-down on your costs for electricity. This is very much possible as you don't need to keep your refrigerator on, or AC running at home to make you feel at comfort. With use of such home automation solutions, you can manage many functions of your home and operate them to run on optimum energy requirements. This way, not only you save your precious household equipments, but also help to reduce your energy costs and save the national interest as well!

3. The use of home automation system is highly effective and could be beneficial in terms of planning for a modern home. With the use of such automated systems, you can surely saving a great percentage of your electricity consumption as well as save dollars on that. Starting from the home theater installation to the management of your washing machine, water heater, flow taps, air conditioners, you can manage your audio and lighting systems through such smart solutions. This offers you flexibility of usages as well as a convenience of operation as you no longer need to rush to any particular device to switch that off!

4. Improve life quality and keeping ourselves away from any electrical hazards.

DISADVANTAGES

1. It depends on power if any power failure occurs then the system will collapse.

2. It is no secret that installing a home automation system can be quite costly. But, it all depends on the equipment you wish to have installed. Remember, the more advanced system you wish to have in your home the more expensive it will be.

3. If there is any damage due to rupturing of cables or the fibers the entire system gets crashed. This will not be the case of radio signals or the other signals. Here there will be a problem of signal receiving. The wiring of the system results in crash in most of the systems.

4. If the human does not handle the kit safely or if he/she does not use the correct keys to perform the operations, human errors may occur. Human errors also lead to destructions of the machine. Then there will be a huge system crash.

5. Every coin has two sides. Home automation also has several disadvantages. Many People think it has a possible to make people lazier. That eventually might end up making huge harm in human social and professional life.

6. Network sometimes fails due to GSM shield.

7. System has some delay due to receiving sms.

CODE FOR VOICE COMMAND

```
int light=9;
   int fan=10;
   int ac=11;
   void setup()
   {
           pinMode(light, OUTPUT);
           pinMode(fan, OUTPUT);
           pinMode(AC, OUTPUT);
           Serial.begin(9600); // baud rate
           Serial.flush();
   }

           void loop()
   {

           String input = "";
           // Read any serial input
           while (Serial.available() > 0)
   {
   input += (char) Serial.read(); // Read in one char at a time
   delay(5); // Delay for 5 ms so the next char has time to be received
   }
           if (input == "1") //if the Arduino got "1" from the serial communication
   {
           digitalWrite(light, HIGH); // on
   }
           else if (input == "0") //if the Arduino got "0" from the serial communication
   {
           digitalWrite(light, LOW); // off
   }

   else if (input == "2") //if the Arduino got "0" from the serial communication
   {
           digitalWrite(fan, HIGH); // on
   }
            else if (input == "3") //if the Arduino got "0" from the serial communication
   {
           digitalWrite(fan, LOW); // off
   }
   else if (input == "4") //if the Arduino got "0" from the serial communication
   {
           digitalWrite(AC, HIGH); // on
   }
```

```
        else if (input == "5") //if the Arduino got "0" from the serial communication
    {
        digitalWrite(AC, LOW); // off
    }
}
```

CODE FOR SMS COMMAND

```
#include "SIM900.h"
#include <SoftwareSerial.h>
#include "sms.h"
SMSGSM sms;
char number[]="1676399292";
char message[180];
char pos;

char *p;
char *q;
char *r;

const int light=9;
const int fan=10;
const int AC=11;

void setup(){
  pinMode(light,OUTPUT);
  pinMode(fan,OUTPUT);
  pinMode(AC,OUTPUT);

  Serial.begin(19200);

  if (gsm.begin(19200)){
    Serial.println("\nstatus=READY");
  }

  else{
    Serial.println("\nstatus=IDLE");
  }
}
```

```
void loop(){
    pos=sms.IsSMSPresent(SMS_UNREAD); // pos is a built-in function
        Serial.println((int)pos);
      if((int)pos>0 && (int)pos<=50){

          Serial.print("NEW MESSAGE!!!, POS=");
          Serial.println((int)pos);
          message[0]='\0';
          sms.GetSMS((int)pos,number,message,180);
          p=strstr(message,"1234");
       if(p){

            Serial.println("PASSWORD OK");
             p=strstr(message,"1ON");
          if(p){

                  Serial.println("LIGHT ON");
              digitalWrite(light,HIGH);
      }
          else{

            p=strstr(message,"1OFF");
            if(p){

             Serial.println("LIGHT OFF");
             digitalWrite(light,LOW);
             }
      }

            delay(1000);
    q=strstr(message,"2ON");
            if(q){

       Serial.println("FAN ON!!!");
       digitalWrite(fan,HIGH);
            }
      else{

       q=strstr(message,"2OFF");
       if(q){

          Serial.println("FAN OFF");
          digitalWrite(fan,LOW);
```

```
            }
                }

            delay(100);
    r=strstr(message,"3ON");
            if(r){

        Serial.println("AC ON!!!");
        digitalWrite(ac,HIGH);
            }
    else{
        r=strstr(message,"3OFF");
        if(r){

            Serial.println("AC OFF");
            digitalWrite(ac,LOW);

        }
    }

}// password loop ends
sms.DeleteSMS((int)pos);
  delay(5000); // before looping again
}
```

CODE FOR VISUAL STUDIO

```csharp
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.IO.Ports;

namespace ConsoleApplication1
{
    class Program
    {
        static void Main(string[] args)
        {
            SerialPort port = new SerialPort("COM5", 9600, Parity.None, 8, StopBits.One); //Change COM5 to your com.
            port.Open();
            port.Write("1"); //the data that will be sent to the Arduino, change if it is needed.
            port.Close();

        }
    }
}
```

FUTURE MODIFICATION

1. Security door lock system - Keys are so last year! Set up unique entry codes for everyone in the house, or unlock the front door for someone even when we're not there to greet them. We can even open or close the garage door remotely.

2. Home alarm system - This system has GSM interface, so that we can get SMS alert from our home when the security fails. It will helps to protect from theft. The system has 1 motion sensor, 2 magnetic sensor for doors and 1 temperature sensor. The whole system is controlled by atmega8 microcontroller. It continuously reads the sensors and if any of the sensor fails then it will send an SMS to the house owner and will also buzzer will blow at the same time. Even we can use it as like our family has left for the day but forgot to lock the door or arm the system. We will receive an alert SMS and we can just easily lock up and activate our system from our smart phone.

3. Security camera – In this system we will get a notification and video recording will start anytime there is motion detected at our front door or take a snap shot so we can see who's knocking.

4. Gas Detector – The main object of this system is to perceive hazardous circumstances that could damage life, property and resources such as a fire, an explosion, a chemical spill or radiation. It will help to detect smoke and will send call to the owner's number at the same time. As well it automatically activates safety measures like, opening window turns on the exhaust fan and sprinkler.

5. Mobile Application – In case of controlling many appliances, like in hotels. We can go for mobile application, so that we don't need to memorize all the number of the all fans and lights. We just need to set all the appliances with specific icon in the mobile phone through mobile application. So when we need to control them, we just have to press the icon.

6. Interfacing Lots Of Number – If anything goes wrong and system need to alert me through sms but system facing poor network. In this case we can adjust and save more mobile numbers, so that system can access many numbers at same time.

RELATED WORK

Nguyen et al. [17] proposed a Home appliance control system. Infrared ray and power line communication are used to control the home appliances system. This system helps user to checks the status of appliances and controls them remotely from everywhere. And this is done through their cellular phone or Internet. The simple approach to control the home appliances is given in this paper.

Jawarkar et al. [16] proposed the software system for communication between mobile and computer. UART 16550A chip is programmed using appropriate control format to support AT command. The mobile in this system is used for receiving and executing commands from preconfigured users and informing status about change in input to the user through SMS. The system can also send SMS to specified mobile user if there is a change in the status of the input ports. This system is not for time critical systems.

CONCLUSION

Now-a-days home is equipped with various machineries and equipment's which provides various facilities to human life. Most used devices at home are electrical light, electric fan, air conditioner and refrigerator. These are to be controlled and operated by human beings. However this may not be possible all the time. Operator may not be at home and may be somewhere in a different place and if the necessity arises to control these home appliances there must be some source to control and monitor the home appliances. This necessity made the invention of new product which controls the home appliances. We introduce a new mechanism using mobile phones which control home appliances and make our work easier. Home appliances controlling are using mobile phone and voice recognition software. Application creates a friendly environment to the user. Main advantages of this system is reducing power wastage saving time and also for security purposes. Mobile phones have become almost an inseparable part of civil lives today.
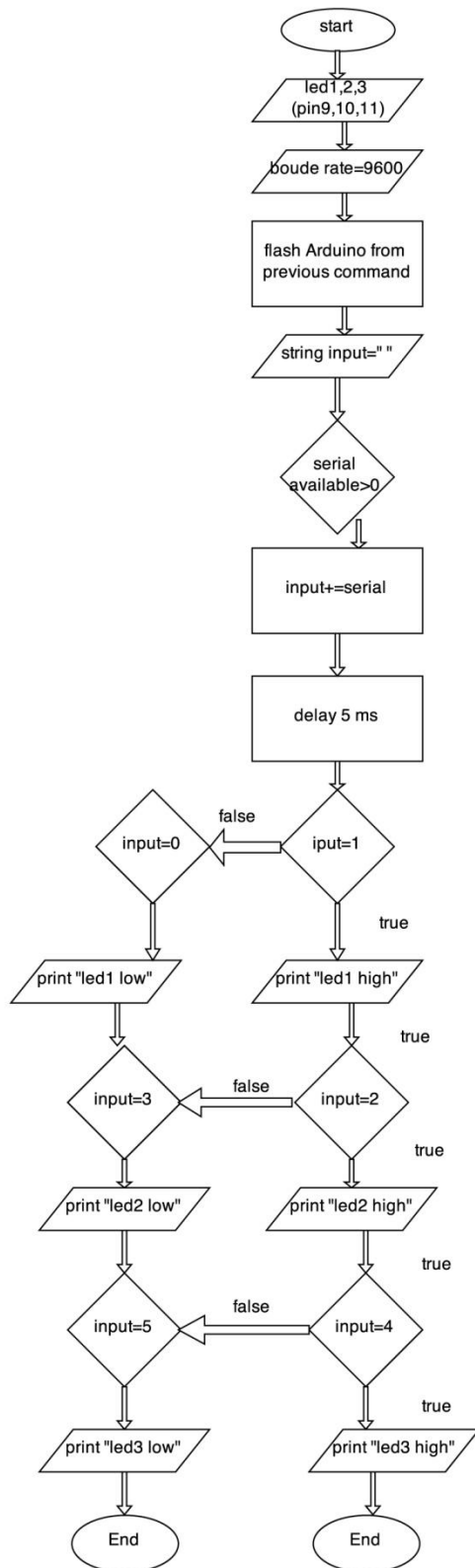
In this paper we introduced a low cost, flexible, wireless solution to the home automation. The novel approach in this paper discusses the migration of the initial control mechanism of devices with simple functionality to more complex devices which has not been discussed at this level before. The system is secured for access from outside through an SSL algorithm protected server. The users are expected to acquire login and password to access to the site. This adds protection from unauthorized accesses.All these choices of devices were the least possible alternatives making the whole system a low cost solution to the home automation. An embedded version of this system with a network capable PC processor embedded in a single package with the master node is also in progress.

Upcoming Automation: Future will be of Automation of each and every single product. Each and every product will be smart devices that we use on a daily basis and that will be controlled through a smart chip called microcontrollers. All home appliances will be controlled either by PC or hand held devices like PDA or mobile handsets with high proficiency and efficiency.

The project can be implemented in real life and very easy to install. Simplify project and deployment is also the aim of the project. Improving life style and saving money and energy is most desirable objective of this work. Reliability is the vital factor for why choosing our project as we are dependent of the two most reliable thing laptop and mobile phone for our system 24/7 working, since we are under network tower. No risk, as no shocking hazard.

Hereby we come to an end of our project "HOME AUTOMATION THROUGH VOICE COMMAND AND GSM TECHNOLOGY". This project can be used anywhere either at home or offices. This is also cost efficient. Thus by this attempt of ours the ON/OFF processes of many devices was successfully carried out by just using two separate methodologies.

FLOW CHART OF THE CODES for Voice Command

```
                        ( start )
                            |
                     / led1,2,3      /
                     / (pin9,10,11) /
                            |
                     / boude rate=9600 /
                            |
                   [ flash Arduino from ]
                   [ previous command  ]
                            |
                     / string input=" " /
                            |
                       < serial
                        available>0 >
                            |
                   [ input+=serial ]
                            |
                   [ delay 5 ms ]
                            |
        < input=0 > <—false— < iput=1 >
            |                     | true
   / print "led1 low" /   / print "led1 high" /
            |                     | true
        < input=3 > <—false— < input=2 >
            |                     | true
   / print "led2 low" /   / print "led2 high" /
            |                     | true
        < input=5 > <—false— < input=4 >
            |                     | true
   / print "led3 low" /   / print "led3 high" /
            |                     |
        ( End )               ( End )
```

FLOW CHART OF THE CODES for GSM technology

Flowchart:
- start
- char no 01XXXXXXX
- char msg=180 / char position
- char p,q,r / pin9,10,11=(led1,2,3)
- baud rate=19200
- bigin with 19200
- print "idle"
- print "ready"
- check position
- check pos as int no
- pos>o&& pos<=50
- print "new msg, pos"
- print pos as int
- check pos,180 / char,no,msg
- p="msg,1234"
- p
- print "password ok"
- p= msg,1on
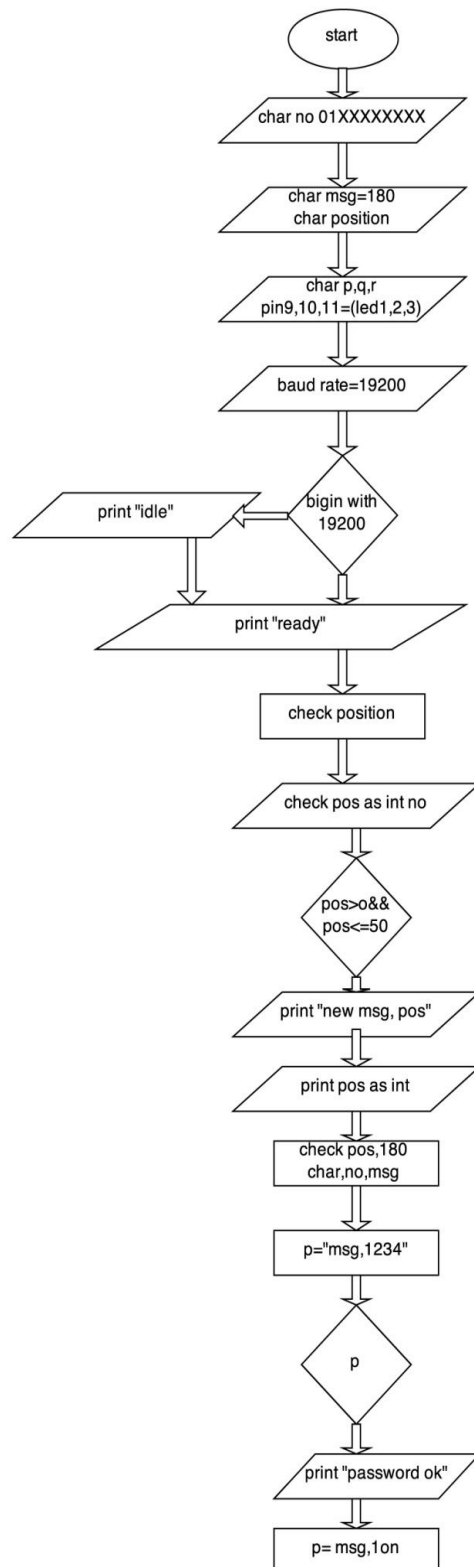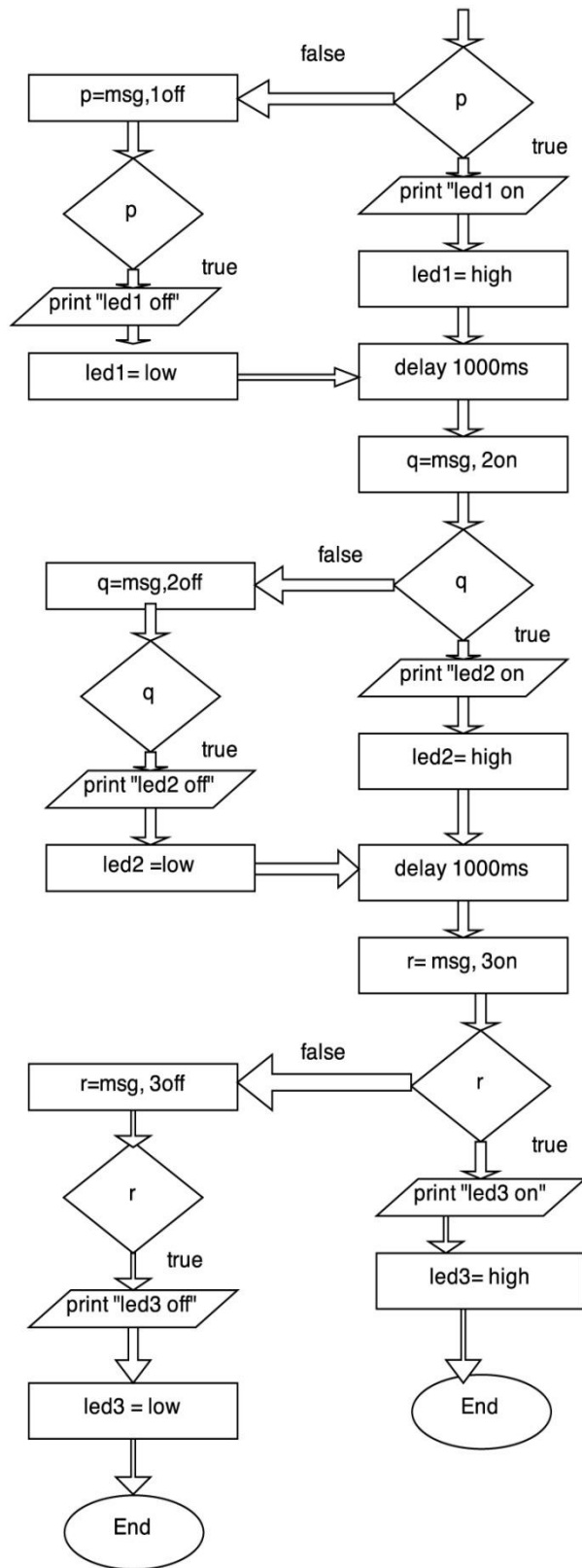
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