Model Details:

The model aims to develop a home automation system that gives the user complete control over all remotely controllable aspects of their home. The user would be able to simply command using app or browser to switch ON/OFF the device instantly.

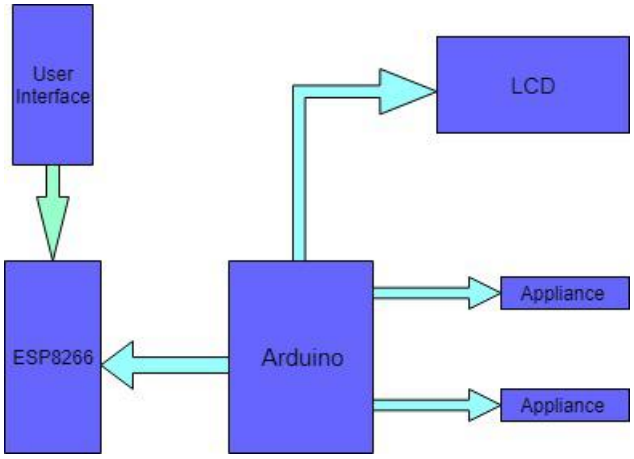
The same objectives can be achieved without a working internet connection for the device using a GSM text functionality. The concept behind this is to receive the sent message string from mobile and then processing it to perform the desired function.

A display is provided, which would show the current time, state of the device and the last action taken by the user.

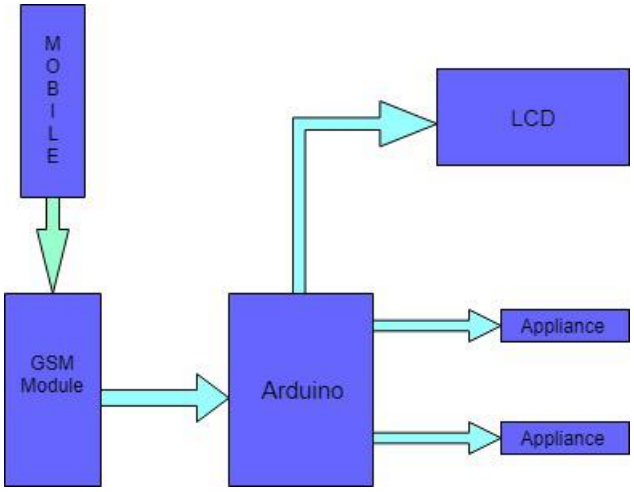
Home appliances being connected: Switch, LED Bulbs,Motor

REPORT

Our focus is to make a home automation system using ESP8266 WiFi module and Arduino UNO. Using this, we would be able to control our home appliances through a web browser or a app or both.
The AC mains appliances would be connected to relays. The controlling device for automation in this project is a Arduino UNO. ESP8266 and Arduino UNO together acts as a web server.
The data sent from web browser or app over wifi would be received by WiFi module connected to Arduino UNO. Arduino UNO reads the data and decides the switching action of electrical device connected to it through relays.



Other aspect of this project can be through GSM module.The system works by sending a predefined text string from a mobile phone which can be present in any part of the world. The string is then received by the Arduino, which decodes it and checks if it matches with the already stored string in command. If it matches, the Arduino drives the relay which further switches ON and OFF the electrical appliances.



Required Components:

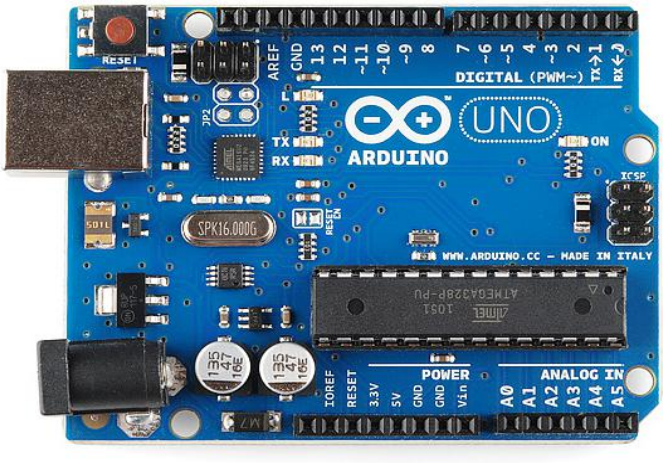
- Arduino UNO

- GSM Module
- ESP8266 WiFi Module
- Connecting wires
- LCD
- Power supply 12v 1A
- Relay
- Resistors (1k)
- Home Appliance(LED Bulb)

Description of Components :

Arduino:

The Arduino Uno board is a microcontroller based on the ATmega328. It has 14 digital input/output pins in which 6 can be used as PWM outputs, a 16 MHz ceramic resonator, an ICSP header, a USB connection, 6 analog inputs, a power jack and a reset button.

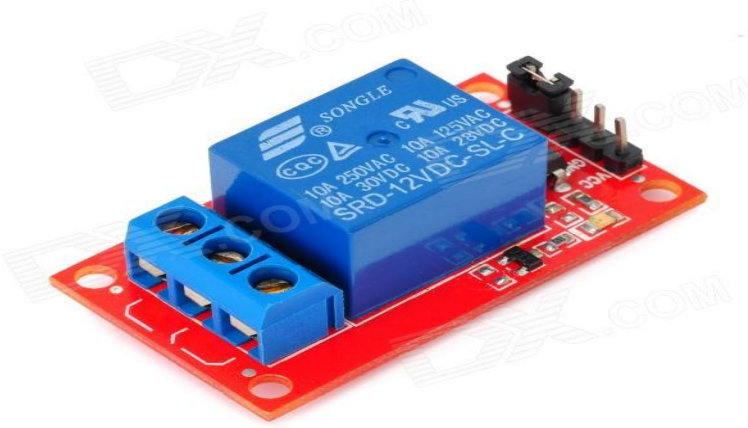


GSM Module:

GSM stands for GLOBAL SYSTEM for MOBILE COMMUNICATION. A GSM module is a chip or circuit that is used to establish communication between a mobile device and a GSM system.

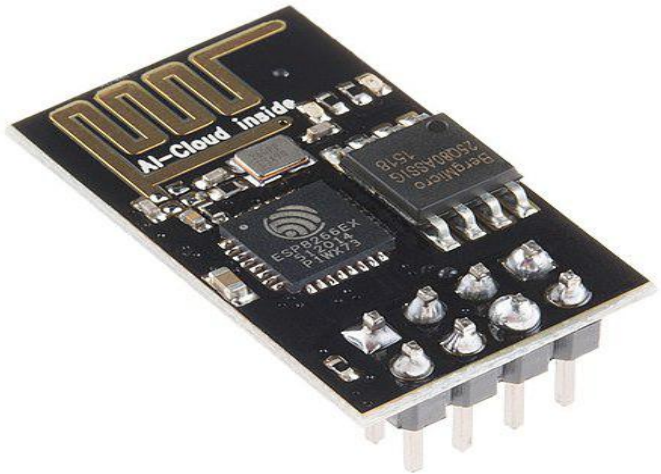
Relay:

A relay is an electromagnetic switch operated by a relatively small electric current that can turn on or off a much larger electric current. A relay has NO and NC states. When a relay is energized it switches from NO to NC or from NC to NO whatever its previous state be.



ESP8266 WiFi Module:

The ESP8266 WiFi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much WiFi-ability as a WiFi Shield offers.



LCD Display:

LCD stands for Liquid Crystal Display. It is a flat panel display. It has two rows and 16 columns. So it is called LCD 16×2 display. These are used to display arbitrary images or fixed images. These liquid crystals do not emit light directly. these displays are used in many electronic devices like televisions mobile phones computers laptops etc. These displays are in three colours red green white.It is made of either passive matrix or active matrix display grid.

Connections:

CH_PD is Chip Power Down pin, which is active low. So we will give 3.3V to it, which will enable the chip.Connect the VCC and CH_PD of the ESP8266 to the 3.3V output pin of Arduino. Then connect the TXD pin of the ESP8266 with the digital pin 2 of the Arduino. Then make a voltage divider to make 3.3V for the RXD of the ESP8266 which is connected to the pin 3 of Arduino. We are using software UART through digital pins 2 & 3 of Arduino. Connect the ground of the ESP8266 with the ground of the Arduino.

Connect three relays to pins 11, 12 and 13 of the Arduino. Connect 5V and ground from the Arduino to power the relay. We can connect AC devices to the output terminals of those relays. First connect one wire (Phase) of the AC source with the common terminal (COM) of all relays and the second wire (Neutral) of AC source to one terminal of AC devices. Then connect the other terminal of AC devices to the NO (Normally Open) terminal of relays.

Conclusion:

Wi-Fi technology capable solution has proved to be controlled remotely, provide home security and is cost-effective as compared to the previously existing systems.

With the help of smart phones or computer the devices can be operated according to the user wish with complete accuracy.

Future Scope:

As time goes on, we should be able to connect more and more of our home devices automating every aspect of our home life. Voice command technology will be everywhere, and remote controls will be a thing of the past.

Home automation products aim to simplify our home life in ways we didn't even realize we wanted or needed. The future will bring an increase in combination sensor products, like the connected sensors. Ultimately, these multi-sensing home automation devices will better "understand" the context of how we live our lives and automatically adjust our environment accordingly.