"ENERGY MANAGEMENT CONTROL SYSTEM OF SMART HOME BASED ON ANDRIOD"

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Abstract: Numerous commercial energy-effective products that is helpful in energy saving for particular appliances. It is still hard to a comprehensive solution to effectively reduce appliances' energy consumption in a house. Therefore an intelligent energy control scheme, named the Energy Management Control System Considering of Smart home Satisfaction Based on Android. Which is developed based on wireless smart socket and Internet of things technology to minimize energy consumption of home appliances without deploying sensors.

The EMCos provides four control modes, including peak-time control, energy-limit control, automatic control, and user control. The purpose of the project is amentily and energy efficiency fact to save energy in home. In this method users can set up management policies to control home energy consumption based on time of the day in order to reduce the cost of the bill.

The proposed project can save up to 43.4% of energy for appliances throughout a week. It will reduce the unnecessary power consumption by the user. It is amentily and energy efficiency fact to save energy and also it will minimize the energy consumption of home appliances. Control the power through data voice output. To detects the cost of the bill throughout a week.

1. INTRODUCTION

Smart home is an efficient, comfortable, safe, convenient, environment. Its platform is residential, including construction, network communications, information appliances, equipment automation. The control terminal is part of the system of direct interaction with the user, It is the most direct manifestation of the overall state of the smart home system. It was widespread concerned. There are many control schemes of traditional smart home control terminal, including button control, PC control and so on. If we use an infrared remote control as a smart home terminal, we need to design software and hardware and spend a lot of time and money.

It does not highlight the characteristics of efficient and convenient. Android phones in the smart phone market share accounted for more, because Android operating system is more perfect, so using the smart phone as a smart home becoming the future development trend of smart home system. Treatment, faster and more convenient. This article is designed to Android phone as a smart home control terminal, connecting with smart home server through WIFI, using 2.4G wireless technology to build an internal LAN. It has completed a smart home system remote control.

When user's home is found toxic gas leak, flood, fire, illegal personnel invasion, strange user visits, etc., the user can promptly control by Android control terminal understanding the situation at home, and make timelyIn the past decade, due to greenhouse effect, energy saving has been one of the critical issues in designing electronic appliances. Smart-houses, which are houses equipped with highly advanced automatic lighting systems, temperature control system, security control mechanisms and many other functions, can be seen everywhere in the world.

The purpose of constructing these systems and functions is amenity and energy efficiency. In fact, to save energy, a residence management system with intelligent and automatic energy control policies is required and essential. On the other hand, a smart-house developed on the basis of the Internet of Things (IoT) can save more energy, where IoT is a network system consisting of electronic devices, software, sensors and networks that connect all concerned network entities together to make the system more valuable and able to provide many more services to users.

Up to present, many energy control methods have been proposed. By utilizing IoT, developed a tablet-computer based Home Energy Management scheme to monitor the consumption of home energy. With this scheme, users can set up management policies to control home energy consumption based on the time of a day. The main goal is raising consumers' energy consumption awareness, potentially inspiring them to be more energy efficient.

2.1 PROBLEM STATEMENT

Numerous commercial energy-effective products that is helpful in energy saving for particular appliances. It is still hard to a comprehensive solution to effectively reduce appliances' energy consumption in a house. Therefore an intelligent energy control scheme, named the Energy Management Control System Considering of Smart home Satisfaction Based on Android. Which is developed based on wireless smart socket and Internet of things technology to minimize energy consumption of home appliances without deploying sensors. The RECoS provides four control modes, including peak-time control, energy-limit control, automatic control, and user control.

2.2 Project Justification

The purpose of the project is amentily and energy efficiency fact to save energy in home. In this users can set up management policies to control home energy consumption based on time of the day in order to reduce the cost of the bill. The proposed project can save up to 43.4% of energy for appliances throughout a week. To reduce the unnecessary power consumption by the user. It is amentily and energy efficiency fact to save energy. To minimize the energy consumption of home appliances. Control the power through data voice output. To detects the cost of the bill throughout a week.

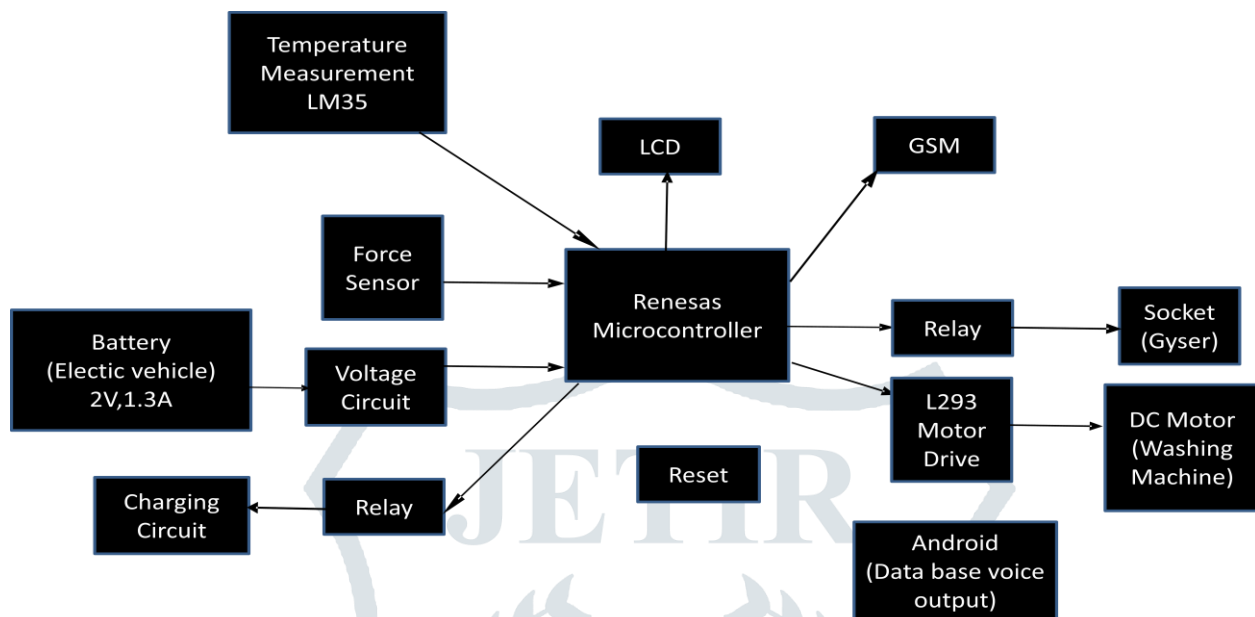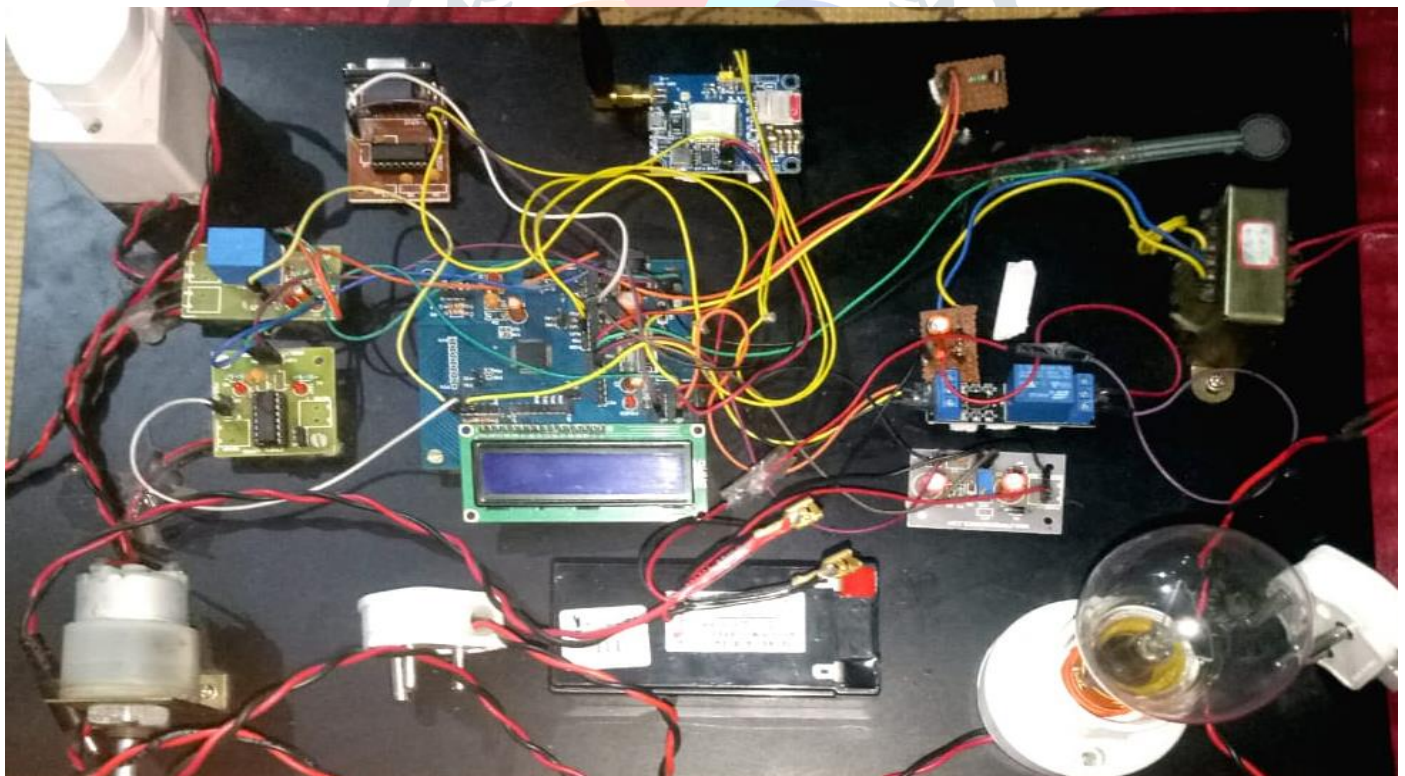## 2.3 Theoretical framework

Fig.1: Block Diagram

Fig.2: Hardware Implementation

By using android (Data Based Voice Output) we control the consumption of energy in a smart home which is developed based on wireless smart socket and internet of things technology to minimize energy consumption without deploying sensors the EMCos Provide four control modes including peak time control, energy limit control, Automatic control & User control. Android (Data Base Voice Output) is the time setting devices such as to send or receive Sms and voice input & output. The purpose of constructing these system and function is amentily and energy efficiency fact to save energy in smart phone.

We used forced sensors, these sensors are simple to set up and great for sensing pressure, when external force is applied to the sensor, the resistive element is deformed against the substrate. Air from the spacer opening is pushed through the air vent in the

tail, and the conductive material on the substrate comes into contact with parts of the active area. The more of the active area that touches the conductive element, the lower the resistance. All FSRs exhibit a "switch like response", meaning some amount of force is necessary to break the sensor's resistance at rest (approximately 1 MΩ), and push it into the measurement range (beginning at approximately 100 KΩ).

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 can be applied easily in the same way as other integrated-circuit temperature sensors. And also it consists of driver circuit (L293) used to control the operation. We have used these device circuits too drive the motors. Considering the voltage circuit and battery, this system is the larger photovoltaic system to generate and supply electricity in commercial and residential applications. GSM is the messaging alert it consist of SIM900 is a Tri-band GSM/GPRS engine that works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz SIM900 features GPRS multi-slot class 10/ class 8 (optional) and supports the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. All pins reset as outputs driving low.

LCDs are preferred to cathode ray tube (CRT) used for display of the function.
A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and most have double throw (changeover) switch contacts.

Renesas Microcontroller is a memory mapped and memory spacing components it consist of general-purpose register: 8 bits × 32 registers (8 bits × 8 registers × 4 banks), ROM: 512 KB, RAM: 32 KB, Data flash memory: 8 KB, On-chip high-speed on-chip oscillator, On-chip single-power-supply flash memory (with prohibition of block erase/writing function), On-chip debug function, Ports → Total 11 ports with 58 Input / Output Pins, On-chip power-on-reset (POR) circuit and voltage detector (LVD), On-chip watchdog timer (operable with the dedicated low-speed on-chip oscillator), I/O ports: 16 to 120 (N-ch open drain: 0 to 4), Timer → 16-bit timer: 8 to 16 channels, Watchdog timer: 1 channel, Different potential interface: Can connect to a 1.8/2.5/3 V device, 8/10-bit resolution A/D converter (VDD = EVDD =1.6 to 5.5 V): 6 to 26 channels, Power supply voltage: VDD = 1.6 to 5.5 V.

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC.
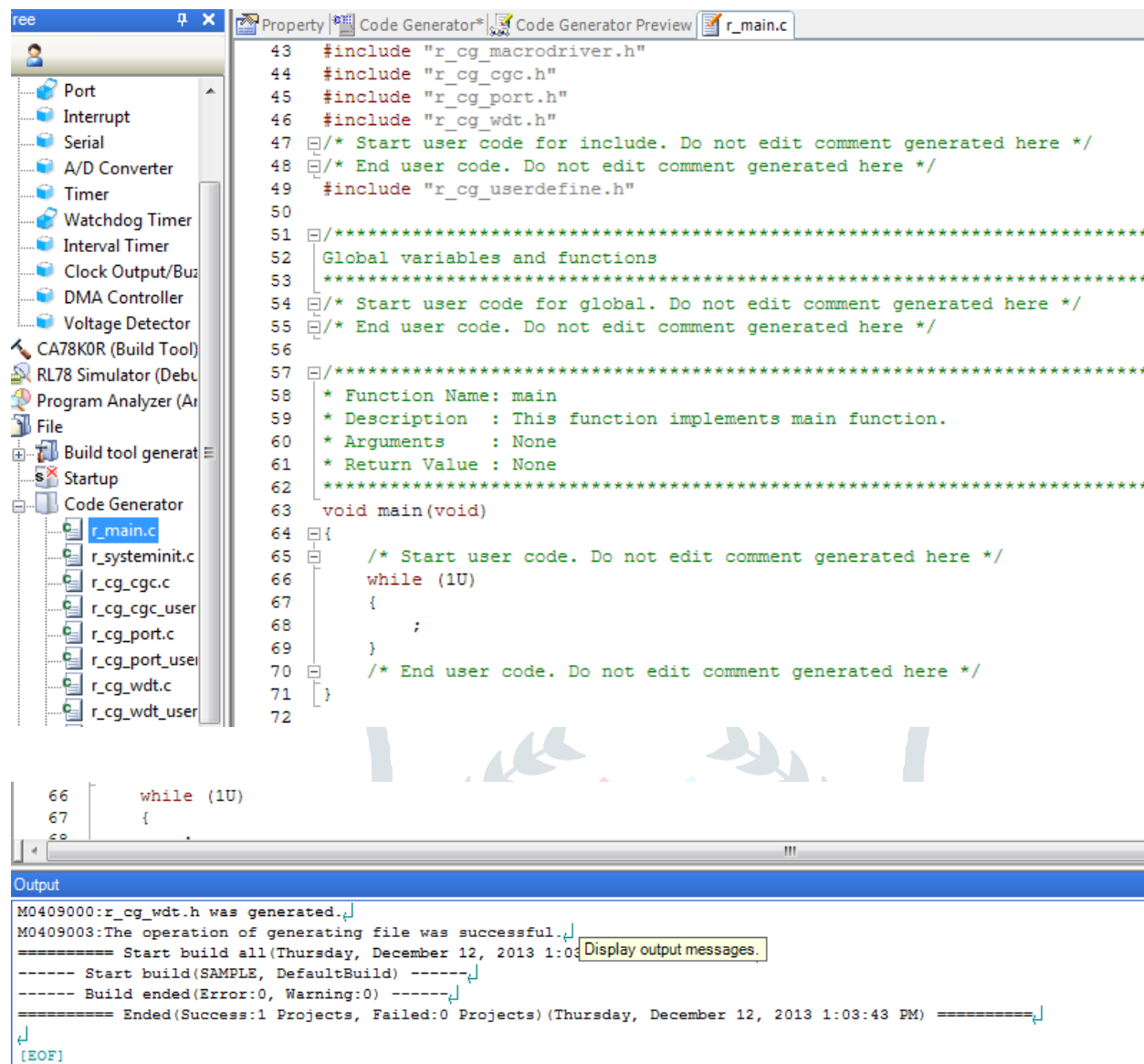
3.1 Programming Languages
Cube Suite+
Cube Suite+ (Cube suite plus) offers the ultimate in simplicity, usability, and security for the repetitive editing, building and debugging that typifies software development. Easy to install and operate, Cube Suite+ offers a highly user-friendly development environment featuring significantly shorter build times and graphical debug functions. The robust lineup of expanded functions and user support functions ensures a dependable environment for all users. Cube Suite+ bundles all the basic software necessary for Renesas MCU software development in one convenient package, ready to use immediately after initial installation. Cube Suite+ is also compatible with Renesas hardware tools, such as on-chip debugging emulator E1 (sold separately), facilitating advanced debugging.

Renesas Flash Programmer
The Renesas Flash Programmer provides usable and functional support for programming the on-chip flash memory of Renesas microcontrollers in each phase of development and mass production.

3.2 Program Implementation
CUBE SUITE+

```
ree                              Property | Code Generator* | Code Generator Preview | r_main.c
                                 43    #include "r_cg_macrodriver.h"
                                 44    #include "r_cg_cgc.h"
  Port                           45    #include "r_cg_port.h"
  Interrupt                      46    #include "r_cg_wdt.h"
  Serial                         47    /* Start user code for include. Do not edit comment generated here */
  A/D Converter                  48    /* End user code. Do not edit comment generated here */
  Timer                          49    #include "r_cg_userdefine.h"
  Watchdog Timer                 50
  Interval Timer                 51    /**********************************************************************
  Clock Output/Buz               52     Global variables and functions
  DMA Controller                 53    **********************************************************************
  Voltage Detector               54    /* Start user code for global. Do not edit comment generated here */
  CA78K0R (Build Tool)           55    /* End user code. Do not edit comment generated here */
  RL78 Simulator (Debu           56
  Program Analyzer (A            57    /**********************************************************************
  File                           58    * Function Name: main
  Build tool generat             59    * Description  : This function implements main function.
  Startup                        60    * Arguments    : None
  Code Generator                 61    * Return Value : None
    r_main.c                     62    **********************************************************************
    r_systeminit.c               63    void main(void)
    r_cg_cgc.c                    64    {
    r_cg_cgc_user                 65        /* Start user code. Do not edit comment generated here */
    r_cg_port.c                   66        while (1U)
    r_cg_port_user                67        {
    r_cg_wdt.c                    68            ;
    r_cg_wdt_user                 69        }
                                  70        /* End user code. Do not edit comment generated here */
                                  71    }
                                  72

   66        while (1U)
   67        {
   68            .

Output
M0409000:r_cg_wdt.h was generated.
M0409003:The operation of generating file was successful.
========== Start build all(Thursday, December 12, 2013 1:03 Display output messages.
------ Start build(SAMPLE, DefaultBuild) ------
------ Build ended(Error:0, Warning:0) ------
========== Ended(Success:1 Projects, Failed:0 Projects)(Thursday, December 12, 2013 1:03:43 PM) ==========

[EOF]
```

4. LITERATURE SURVEY
4.1.1 A. H. Mohsenian-Rad
In which introduction of a game-based approach for optimizing energy consumed by a residential building. But they did not consider users' satisfaction degree for their efficient task scheduling. Optimal scheduling of in-home appliances with storage devices has been discussed in which the total cost minimization is one of the objectives of its optimization attempt. Basically, these two techniques were developed mainly based on deterministic and/or meta-heuristic methods. But they failed to consider users' convenience and comfort levels for their cost optimization process.

This is the trial and error method and also complicated method, cannot set as per the user convenience.

4.1.2 A. Anvari-Moghaddam
Developed an integer nonlinear programming model for optimal energy use in a smart home by considering a meaningful balance between energy saving and a comfortable lifestyle. Through incorporation of a mixed objective function under different system constraints and user preferences, the algorithm presented in reduced the domestic energy usage and utility bills, and ensured an optimal task scheduling and a thermal comfort zone for its inhabitants. However, if IoT techniques can be applied to this model, the energy can be further reduced.

It is having both equality & inequality is difficult to operate and construct the Network.

4.1.3 W. K. Park
Developed a context-aware middleware that provides users with an automatic home service inside a smart home following the users' preference. This middleware uses open service gateway as the framework of the home network, and employs sensed data to predict the users' preference for home appliances. This sensed data includes pulse, body temperature, facial expression, room temperature, time and location.

This application is only applicable to residency hospital, Apartment etc; this is not for a smart home.

5. HARDWARE IMPLEMENTATION

5.1 Renesas R5f100le

It is a memory mapped and memory spacing components,
it consist of general-purpose register: 8 bits × 32 registers
(8 bits × 8 registers × 4 banks), ROM: 512 KB, RAM: 32 KB,
Data flash memory: 8 KB, On-chip high-speed on-chip oscillator,
On-chip single-power-supply flash memory (with prohibition of block erase/writing function), On-hip debug function, Ports → Total 11 ports with 58 Input / Output Pins, On-chip power-on-reset (PORT) circuit and voltage detector (LVD), On-chip watchdog timer (operable with the dedicated low-speed on-chip oscillator), I/O ports: 16 to 120 (N-ch open drain: 0 to 4), Timer → 16-bit timer: 8 to 16 channels, Watchdog timer: 1 channel, Different potential interface: Can connect to a 1.8/2.5/3V device, 8/10-bit resolution A/D converter (VDD = EVDD =1.6 to 5.5 V): 6 to 26 channels, Power supply voltage: VDD = 1.6 to 5.5 V.

Fig.3: Renesas R5f100le

5.2 LCD

LCD Details. The Liquid Crystal Display (LCD) is a display on the MB5 that is capable of displaying 4 lines of 20 characters. This document describes the operation of the particular LCD used on the MB5. As one might expect, to display a sequence of characters, a character code must be written to the LCD. 3. Temperature sensor.

Fig.4: LCD

5.3 Temperature sensor (LM35)

TheLM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the Centigrade temperature. ... The LM35device is rated to operate over a −55°C to 150°C temperature range, while the LM35C device is rated for a −40°C to 110°C range (−10° with improved accuracy).
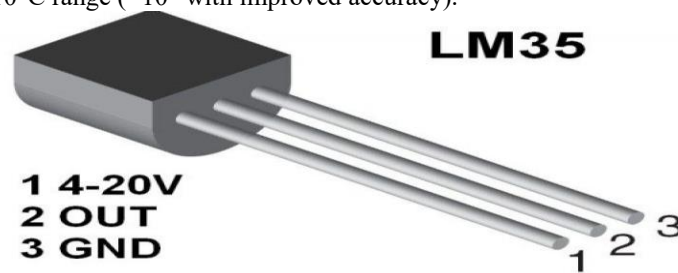

Fig.5: Temperature sensor (LM35)

5.4 Force Sensor

The forced sensors, these sensors are simple to set up and great for sensing pressure, when external force is applied to the sensor, the resistive element is deformed against the substrate. Air from the spacer opening is pushed through the air vent in the tail, and the conductive material on the substrate comes into contact with parts of the active area. The more of the active area that touches the conductive element, the lower the resistance. All FSRs exhibit a "switch like response", meaning some amount of force is necessary to break the sensor's resistance at rest (approximately 1 MΩ), and push it into the measurement range (beginning at approximately 100 KΩ).

Fig.6: Force Sensor

5.5 GSM

The GSM stands for Global System for Mobile Communication. It is a digital cellular technology used for transmitting mobile voice and data services. The concept of GSM emerged from a cell-based mobile radio system at Bell Laboratories in the early 1970s.

Fig.7: Force Sensor

5.6 Voltage Circuit

In a This DC-DC 12V to 3.3V 5V 12V Power Module Multi Output Voltage Conversion is also known as Buck converter or also as Step-Down Voltage Converter.

The module is capable of altering the output of the power source/supply before supplying it to the load so as to deliver the specified power to your load.

The device is very flexible and easy to use. The module is powered by 6V to 12V DC input, and provides three fixed DC outputs: 3.3V, 5.0V, and a third output which is a direct connection to the DC input(input to the module).
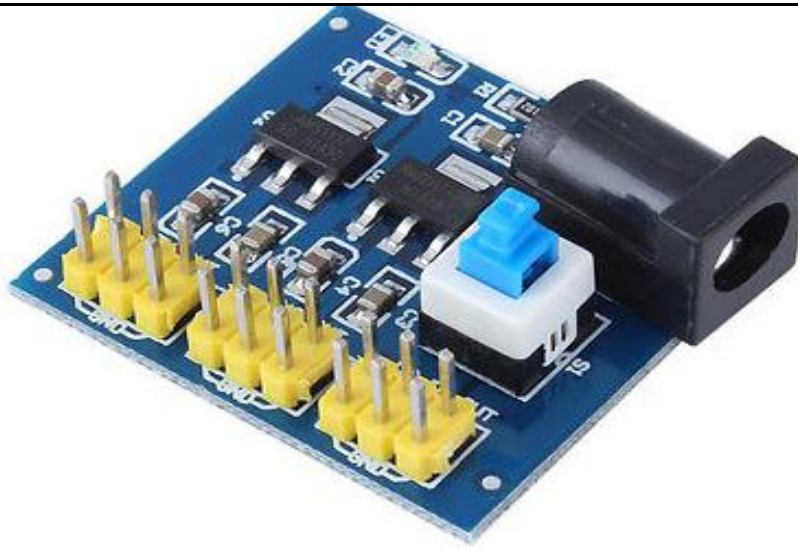
Fig.8: Voltage Circuit

5.7 Relay

In This 1-channel 5V control Single-Pole Double-Throw (SPDT) High-level trigger AC power relay board can be controlled directly via a Microcontroller and switch up to 10A at 250 VAC. The inputs of 1 Channel 5V 10A Relay Module are isolated to protect any delicate control circuitry.

The default state of the relay when the power is off for COMM (power) to be connected to NC (Normally Closed). This is the equivalent of setting the relay board IN pin to HIGH (has +5v sent to it).

When you have power connected to the relay's NO (Normally Open) connector and you set the corresponding IN pin to LOW (0V, or Ground), power will flow in from the COMM connector and out of the NO, connector powering your device.
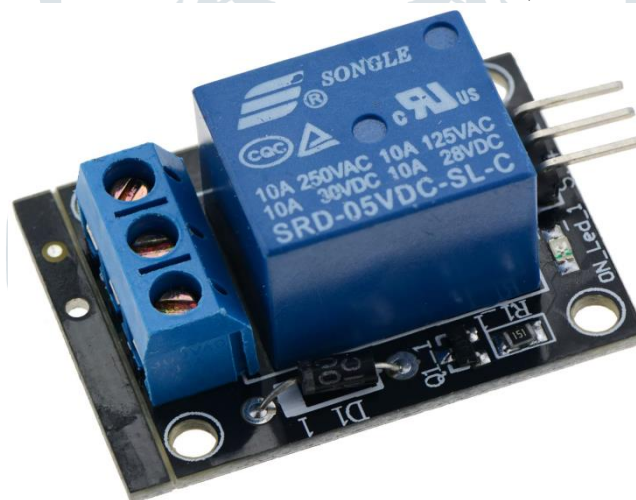

Fig.9: Relay

5.8 L293 Motor Drive

L293D Motor Driver IC. L293D IC is a typical Motor Driver IC which allows the DC motor to drive on any direction. This IC consists of 16-pins which are used to control a set of two DC motors instantaneously in any direction. It means, by using a L293D IC we can control two DC motors.
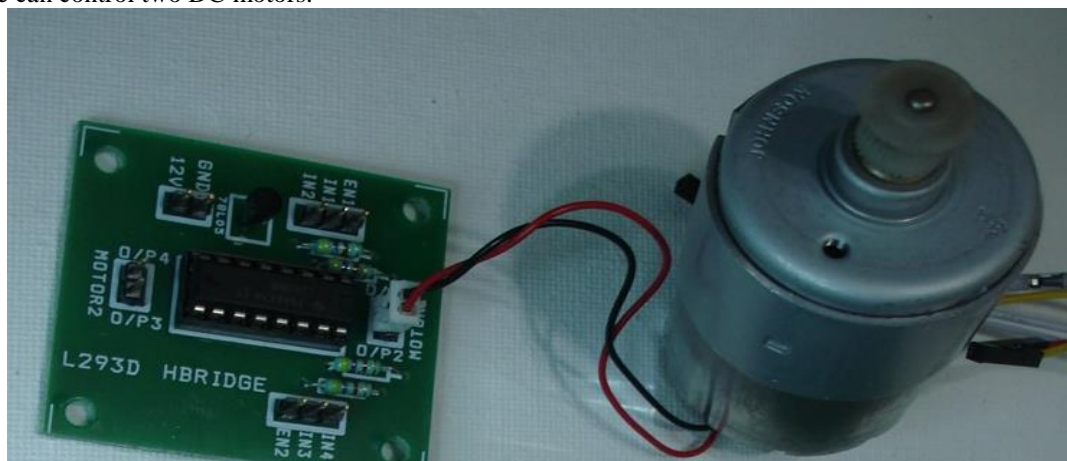

Fig.10: L293 Motor Drive

6. Conclusion:

The smart house is to automatically control those appliances in the house to achieve the goals of energy saving and smart living. The result shows this scheme saves more amount of power consumption and also in experimental result we can save 43.4% of energy can be reduced. Mainly it is provide energy consumption awareness. The purpose of the project is amentily and energy efficiency fact to save energy in home. In this users can set up management policies to control home energy consumption based on time of the day in order to reduce the cost of the bill.

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