Energy Monitoring Using Arm 7

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Abstract : In this project we can introduce the power or electricity monitoring is a major challenge in electricity distribution system. Consumer deceit is a problem faced by all power corporations. Electricity Suppliers Companies are having large amount of money loss due to electricity wastage a by consumers. Electricity management is the use of electric power without paying the bill amount. Detection of electricity is very difficult and requires continuous monitoring to reduce fraud. Distributed Power utilized by consumer from electricity. In this project there is a tow subsystems they are voice control and phone control system.. Using Bluetooth for controlling the devices by the phone monitoring system. And also calculating the amount of the power usage by the ARM 7 microcontroller. Phone monitoring controlling system is convenient for the user better monitoring the usage of their phones.

Index: ARM7, Bluetooth, Relay, LCD, Power Supply, current transportation (ct), potential transportation(pt).

I. INTRODUCTION

The Home automation concept has existing form many years .in this home appliances can distribute Power utilized by consumer from electricity. And other customer illegal act are termed as Non-technical Losses due to the serious changes in technology in the last decade, so many evolution were introduced in electricity departments**.** Conventional houses have always evolved with time to cater for the changing needs of people in terms of security and comfort. Nowadays, people want to carry out tasks as quickly, efficiently and simply as it can be with the least amount of effort. This need can be easily met by converting 'normal' homes into smart ones by implementing a home automation system. Home automation consists of automatic control of lighting, temperature and other appliances, safety and security systems, home entertainment systems, housekeeping and gardening systems. Such systems are designed to enhance comfort, convenience, security as well as energy efficiency by integrating sensors that will monitor various parameters and actuators that will perform predetermined tasks. In recent years, the advent of powerful electronic devices coupled with considerable progress achieved in the field of information and communication technologies have led to a significant evolution in home automation. Ubiquitous technologies have enabled the smart home concept to be extended to include context aware and situation in automation.

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Home project serves as a test facility for the implementation of useful new services directed towards connecting devices, sensors, and appliances through data networks. A Wireless Sensor Network based smart home system for the elderly, to help them ease their work and provide them safe. The   arm7 for the controlling the devices and also home security purpose .Every device will be with standard setup and while adding it into network , it can be given an address and tasks to do. Without using the switches it will control by the arm 7[1] .All the setting will be easily resettable to default value, so people can move the devices between different electrical devices and networks. Home Automation box will be put into variant rooms at home, depending on the needed functionality. Various different sensors could be attached to the boxes. The sensors are used as triggers for actions, that user can set up in the computer program.

II. LITERATURE REVIEW

Soumya .S [2] she introduced a monitoring design based on Rasberry pi. It is used as the overall controlling device. The main Source of the project is the LED'S. Light dependent resistor (LDR) which is used for when human enter the room the lights will on automatically when human leaves the room off the lights automatically, the LED's turn on. Also, the lights can be controlled remotely from anywhere in the world using relay board. Using the wireless protocol for the communication between the components'. This works successfully by connecting various appliances and providing the user remote control for the lighting system in the home. The Raspberry pi which is connected throw sensors and this Raspberry pi work based on the python program. The lights are programmed to turn off automatically if there is no one inside the room or if a person enters the room but the room is bright. Relay board are works based on the java script. The concept is flexible, cost effective and energy efficient. This system functions on its own as well as can be controlled from anywhere with the help of a program code. To control the relay from anywhere any network, a cloud platform called a REST has been used. It is a framework for developing server side applications for developmental boards like Arduino, Raspberry Pi . Bhavika Pandya[3] she instate a technology which is more useful and easily operate for the home automation purpose .In this project used the Bluetooth communication for communication between the mobile and sensors and device. This Bluetooth for communication between the sensors and mobile communication for operating the microcontroller. It will   help for decide the business idea for the application. The main Application of the system is the synchronous alarm clock of the phone. It will remind the user

by the alarm time to which appliance to on. It will then automatically start the appliances at the specified time and then stop them when their work ends. The application will be coded as such to decode the meaning of any statement from the user. The user won't be restricted to use of any particular command set. If any problem will occur then the speech recognize will work for communication between the devices and also controlling purpose. In Bluetooth communication it was a wireless communication and also in this used a voice sensor for appropriate command and controlling the devices. In this project there is a other usage that was the detecting the gas linkage and fire accidents at home by the using the sensors and security purpose also introduced in this. Kadam [4] found a new method for Home Automation there are many technologies available in market like Zigbee module, x-10, Insteon, Enocean . In this project they used the GSM module and it is low cost and user friendly .It is the good security system and also easy to understand this. The GSM means the global system for mobile communication in any place of the world. It will automate the home appliances. They want to add for future development in this project using the other sensors like temperature and gas . After testing the system on protest we will implement it on the hardware. Home security systems consist a continually, year after year, developing research field. Some of these systems are limited to support basic operations, while some others content a range of additional sources. In this paper, security system for smart home automation is proposed. The introduced system operation is supported by a GSM embedded mobile module, which enables the alert messages transmission to both mobile devices of end users, and central security offices. This project they implemented using the embedded hardware design and they used many security applications in this. And also in this user security also implemented based on the GSM module. Sandya Viraj Mali[5] presented a strategy utilizing numerous sensor for the controlling the home gadgets and furthermore security reason and this undertaking is easy to use and ease. In this task utilized the temperature sensor and PRI sensor. Framework manages one time secret word for the client login and control the gadgets. Utilizing the Arduino board for information controlling and information correspondence between the gadgets. It will go about as microcontroller. In this venture they utilized the GSM module for the caution the client by the portable alert and furthermore message . In this manner the framework guarantees home wellbeing just as security. That can be achieve by neighborhood organizing or by remote control. however to be Home robotization application on web through perusing the subject of E-mail. LEDs were utilized to show the exchanging activity. The prominence of system empowered home robotization has been expanding significantly as of late because of straightforwardness and a lot higher moderateness. In addition, with the fast extension of the Internet, there is the potential for the remote control and checking of such system empowered machines. Be that as it may, the new and energizing chances to expand the availability of gadgets inside the home with the end goal of home computerization through web are. Swathi.k[6] In this undertaking she presented a remote based home computerization framework which is an ease and easy to understand remote controlled home robotization framework is displayed utilizing Arduino board, Bluetooth module, advanced mobile phone, ultrasonic

sensor and dampness sensor. Utilizing the advanced cell application is utilized in the recommended framework which enables the clients to control up to 18 gadgets including home apparatuses and sensors utilizing Bluetooth innovation. These days, the majority of regular home mechanization frameworks are intended for uncommon purposes while proposed framework is a broadly useful home computerization framework. Which can without much of a stretch be execute in existing home. The recommended framework has a greater number of highlights than customary home robotization frameworks, for example, a ultrasonic sensor is utilized for water level identification and soil dampness sensor is use for programmed plant water system framework. This paper additionally depicts the equipment and programming design of framework, future work and degree. The proposed model of home robotization framework is executed and tried on equipment and it gave the definite and expected outcomes It
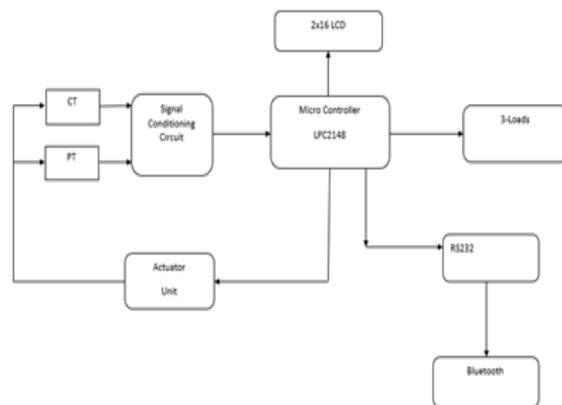

Fig. 1. Block Diagram of Proposed home automation

Sensors:

The choice of sensor in an application can be quite challenging because the performance of a system mainly depends on the reliability of a sensor and other components of the application. To determine the right sensor for any application, certain things need to be taken into analysis:

CT (Current Transformer) :

a) A present transformer has an essential curve, an attractive center, and an auxiliary contort. The substituting current streaming in the essential creates a rotating attractive field in the center, which at that point prompts an exchanging current in the auxiliary turn circuit. A key goal of current transformer configuration is to guarantee that the essential and optional circuits are productively coupled, with the goal that the auxiliary current bears a precise relationship to the essential current.

b) PT (Potential Transformer):

The sensor is Voltage Transformer hypothesis or Potential Transformer hypothesis is much the same as hypothesis of broadly useful advance down transformer. Essential of this transformer is associated over the stages or and ground contingent on the necessity. Much the same as the transformer, utilized for venturing down reason, potential transformer PT has lower turns curve at its auxiliary. The framework voltage is connected over the terminals of essential bit of that transformer, and after that proportionate auxiliary

voltage shows up over the optional terminals of the PT.

We can decide the waste dimension by estimating the separation from the highest point of the junk receptacle to the loss by sensor. The sensor that can be utilized in this model ought to furnish estimation from 2cm to 400cm with 3mm exactness, which is satisfactory for common waste receptacles. The fundamental purpose for determination of Ultrasonic sensor over Infrared sensor is Infrared sensors can't work in dim situations. The estimations of Infrared sensor fluctuate with light and they are unfit to use in daylight because of obstruction. In addition, Ultrasonic sensors are totally insensitive to factors like dust, light, smoke etc.

CT/PT TESTING:

Below is the list of Major tests conducted on CT & PT they are

- Insulation Resistance Test
- Polarity Test
- Secondary/Loop Resistance Test
- Burden Test (optional test)
- Magnetization Curve Test (optional test)
- Turns Ratio Test (optional test)
- Primary Injection Test
- High Voltage Test
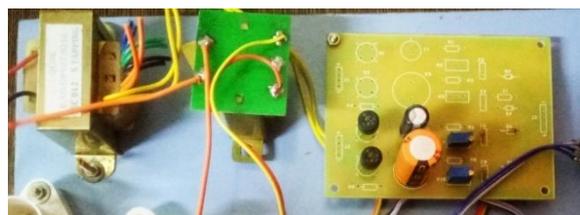
Fig. 2. Picture of PT,CT sensors

III. THEORETICAL ANALYSIS

By knowing the time taken, and also knowing the amount of the current we used , the controller can calculate the amount of total current we used for home appliances. The formula relating the power and time traveled is as follows:

Ratio = N_p /N_s =V_p /V_s= I_p /I_s

Pav=Psum/5;
Energy=Pav/3600; //watt hour
KWH=KWH+Energy;
amt=KWH*2+40;

ARM 7:

ARM7 LPC2148 Evaluation Board is intended for software engineers and specialist to build up their very own applications and smooth the advancement of creating and troubleshooting of different applications and structures utilizing High speed 32-bit ARM7 Microcontrollers. It contains LPC2148 ARM7 microcontroller as an on board CPU. It incorporates on board two UARTs, supply to interface LCD show, Touch board, LEDs, ADC data sources and Wireless Modules Bluetooth to make an independent adaptable test stage. Client can without much of a stretch submits being developed in this stage, or use it as reference to application advancement. A portion of the example

application on the board incorporates Vehicle following utilizing GSM, Bluetooth. Home computerization utilizing hand-off and Bluetooth .Where client can control transfers utilizing his cell phone.

Fig 3:arm 7 microcontroller

B. *Relay:*

C. *Relays are devices which allow low power circuits to switch a proportionally high Current/Voltage ON/OFF. A relay circuit is typically a smaller switch or device which drives (opens/closes) an electric switch that is capable of carrying much larger current amounts.*

D.

E. *Interfacing relay with ARM 7:*

Control the hand-off activities by utilizing LPC2148 Development Board. Here we are utilizing two Relays. The hand-off comprises of a loop and a switch. At the point when the curl is enliven, the switch closes, associating the two contacts together. ULN2803 is utilized as a driver for port I/O lines, drivers yield associated with transfer modules. Connector accommodated outside power supply if necessary .The hand-off is principle gadget in the arm 7 miniaturized scale controller.

Pin configuration of relay module:

Port P1 pins (Realy1 – P1.20) and Relay2-P1.21) for relay module, make port pins to high, relay will activated.
Give +3.3V power supply to the Relay module is connected with When the program is downloading into , the Relay output is working that the Relay is ON some time period and the Relay is OFF some other time of period.
If you are not getting any output from Relay, then you just check the jumper connections & check the Relay is connected properly. You just check it with debugging mode in Keil compiler.
HC-05 Bluetooth Module:

1. HC-05 is a Bluetooth gadget utilized for remote correspondence. It takes a shot at sequential correspondence UART.
2. It is a 6-stick module.
3. The gadget can be utilized in 2 modes; information mode and direction mode.

4. The information mode is utilized for information exchange between gadgets while direction mode is utilized for changing the settings of the Bluetooth module.
5. AT directions are required in order mode.
6. The module chips away at 5V or 3.3V. It has an installed 5V to 3.3V controller.
7. As HC-05 Bluetooth module has 3.3 V level for RX/TX and the microcontroller can identify 3.3 V level, in this way, no compelling reason to move transmit dimension of the HC-05 module.
8. But we have to move the transmit voltage level from the microcontroller to RX of HC-05 module.
9. For more data about HC-05 Bluetooth module and how to utilize it, allude the theme in the sensors **and**
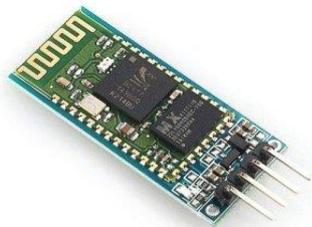
modules area.
fig 4:hc-05 bluetooth

Programming Steps:

- Initialize UART0
- Configure a pin as output for LED
- Read data from received from Bluetooth
- Take decision according to data received 1 - ON, 0 - OFF, anything else – Select proper option.

LCD:

Gem Displays are utilized for showing status or parameters in installed frameworks .LCD 16x2 is 16 stick gadget which has 8 information pins (D0-D7) and 3 control pins (RS, RW, EN). The rest of the 5 pins are for supply and backdrop illumination for the LCD. The control pins help us design the LCD in order mode or information mode. They additionally help design read mode or compose mode and furthermore when to peruse or compose. LCD 16x2 can be utilized in 4-bit mode or 8-bit mode relying upon the necessity of the application. So as to utilize it we have to send certain directions to the LCD in order mode and once the LCD is arranged by our need, we can send the required information in information mode. For more data about LCD 16x2 and how to utilize it, allude the point LCD 16x2 showcase module in the sensors and modules segment.

Fig.5. lcd

Hardware requirements:

- ARM 7 (LPC 2148) Microcontroller (ARM7 Evaluation Board)
- Power Supply (9V Adaptor, 5V Adaptor)
- Bluetooth Modules
- Relay interface (user can interface any devices according to their needs / Application)

Software requirements:

- Programming Language: Embedded C
- KEIL U Vision IDE
- Flash magic

IV. PROJECT HARDWARE AND IMPLEMENTATION

For the equipment usage associate the 2x6 lcd to the arm 7 board and the 3 loads which are associated toss the 3 transfer sheets and utilizing two sensors are the present transportation and potential transportation are associated with control unit and afterward Bluetooth which is associated with arm 7 board having rx, tx pins , gnd and voltage. These heaps are constrained by the portable application which is HC-05 blue tooth application
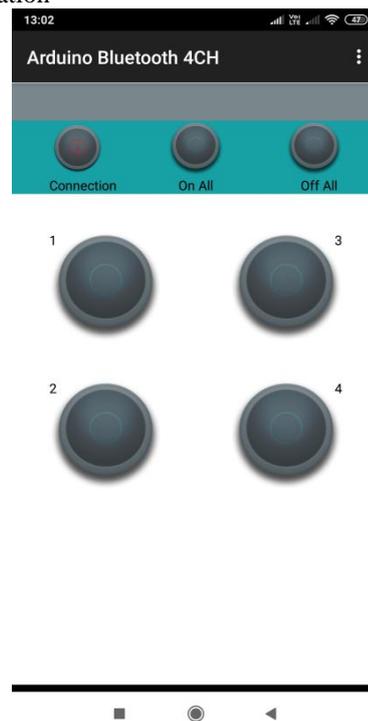

Fig.6. mobile Bluetooth app

## SIMULATION/EXPERIMENTAL RESULTS DISCUSSION:
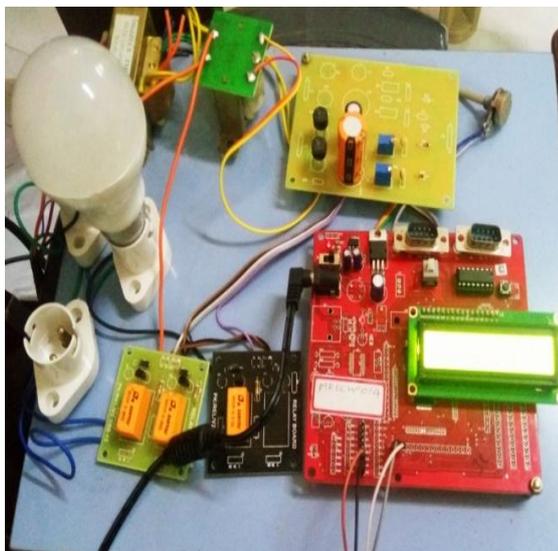
Fig.7. energy monitoring for the devices
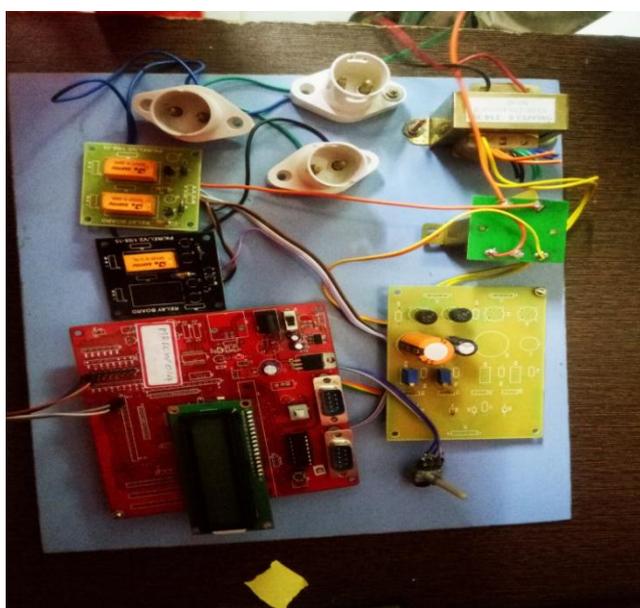
Fig.9. energy monitoring for the devices using arm 7

VI. CONCLUSION AND RECOMMENDATIONS

It is clear that from this experiment water can be used in efficient manner and also there will be no wastage of energy. It can also be used for the development of technology. It is a new way of energy monitoring in embedded technology . The content in the previous papers are used as per our requirement. It is a proposed system and it is better than the other system. It can be further be implemented for future purpose. we can also save the energy as it is important parameters. This model can be further implemented by adding some more features like fire sensors, alarms etc. If this model gives good feedback then this can be used in any other transport systems. Thereby energy is conserved.

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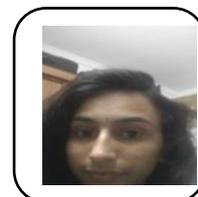
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