IOSR Journal of Engineering (IOSR JEN) **www.iosrjen.org**
ISSN (e): 2250-3021, ISSN (p): 2278-8719
PP 50-53

Home Energy Management System Based on Power Line Communication

Avinash Tripathi[1], Abdullah Mukhi [2], Rakshit Poojary [3],Prof. Niranjan Samudre[4]

[1](Department of Electronics, Atharva College of Engineering, Malad-West, Mumbai-400095,
[2](Department of Electronics, Atharva College of Engineering, Malad-West, Mumbai-400095,
3(DepartmentofElectronics,AtharvaCollegeofEngineering,Malad-West,Mumbai-400095,
4(DepartmentofElectronics,AtharvaCollegeofEngineering,Malad-West,Mumbai-400095,

Abstract: *Smart metering and power line communication can give nitty gritty data of vitality utilization designs and insightful controlling to apparatuses at home. We propose a home energy management system (HEMS) based on power line communication that can give simple to-get to data on home vitality utilization progressively, astute getting ready for controlling apparatuses, and enhancement of intensity utilization at home. The HEMS consists of three modules: an advanced power control planning engine, a device control module, and a power resource management server. Our model framework diminishes the expense of intensity utilization by around 10 percent.*

Key words: *power line carrier communication, KQ330, energy measurements by voltage divider*

I. Introduction

Power line communication (PLC) is one of the advancements that have demonstrated valuable for control applications and it is where correspondence signs can be sent and got on family unit or mechanical flow conveying electrical cables. This idea includes transmitting data utilizing the electrical power circulation arrange as the correspondence channel. The rule of PLC comprises of transmitting a high recurrence motion at low vitality levels over the 50 Hz electrical flag by superimposing a tweaked bearer motion on line voltage. This data signal is transmitted via the power line and can be received and decoded at another location in the same electrical network.PLC based automation systems range from highly complex such as CEBus which uses complex techniques like spread spectrum to simple ones such as X10[0]. Complex mechanization frameworks have higher abilities that are redundant for an interest the executives framework and have a more expensive rate indicate due their unpredictability.

Basic PLC frameworks, for example, X10 need further improvement to best suit this application. In this examination we dissected the accessible PLC computerization frameworks and research done on electrical interest the executives to detail an interest the board framework by amalgamating an exceptionally planned PLC framework with GSM correspondence. Human administrator charging are inclined to perusing blunder as at some point the houses electric power meter is set in a position where it isn't actually adjacent, then inside our framework brilliant meter is utilized Through the keen meter E-charging is conceivable. It will automatically update the energy consumption of the customer to EB unit. Our proposed framework when low power age consequently goes to control the executives. Every one of the gadgets controlled relies on the need based and timing based control the gadgets when low power generation. This venture proposed framework has computerized metering foundation, however Existing System, can't deal with the power successfully. In general demand response refers to actions taken to change residents' electrical energy demand in reply to variation in the price of electricity over time.

II. LiteratureReview

To propose and implement the present work, different methodologies are being investigated. The reviewed literature has been classified into primary heads which helps in comprehensive analysis study. Literature as per their context can be studied by such an analysis. To study this project for a home energy management system (HEMS) to reduce the cost of energy spending using RTP and with the recent expansion of advanced metering infrastructure, real time pricing (RTP) schemes to be presented in future retail power advertise. This venture proposes a unique vitality the board advance for shrewd homes that consolidate a remote system, in light of Bluetooth little Energy (BSE), for the correspondence among home apparatuses and this project approach to reducing peak load demand, electricity utilization charges with an increase console level of consumers. This project presents the operations of appliance are controlled in response to energy price signals to reduce the consumer's electricity bill while minimizing the everyday level of total energy while preserving ease level. This project suggest to Wireless Sensor Networks (WSNs) and Power Line Communications (PLCs) are used in this work to realize a smart home control network. The objectives are to diminish the effect of remote mediation in a keen home arrange organize and unnecessary vitality utilization of a shrewd home. Bluetooth module JY MCU BT utilized in the task can be associated with any gadget, by means of implicit UART interface to speak with other Bluetooth - empowered gadgets, for example, cell phones, handheld PCs and workstations. The module runs on a 3.6V to 6V supply.

This project presents a load measurement plan for home energy organization system with energy demand time. The planned system to manage household loads according to their predefined precedence and guarantee the total household power spending below certain levels. The goal of this project is to encourage the consumer to use less energy during peak hours or to move the time of energy use to off peak times for example, evening and end of the week on interest time. In this project readily available an integrated solution to guess and re-engineer the electricity demand in a region at a given day/time. The system available in this report expands DR to built-up loads by energetically scheduling and selfish appliances in each dwelling unit. In our report, the Home Energy Management System (HEMS) is expected as one of the promising technologies to satisfy the demand. The HEMS helped by a sensor arrange having a proficient power supply so as to spread around the general population.

III. Proposed Method

To actualize programmed metering foundation utilizing network topology and deal with the power dependent on need level and afterward consequently goes to control oversaw. The concept of this report reduces the time delay for a lower priority task and Slicing of interrupt timings to improve the performances. Advantages of proposed system Meter reading taken automatically using Bluetooth module and Power line .communication.

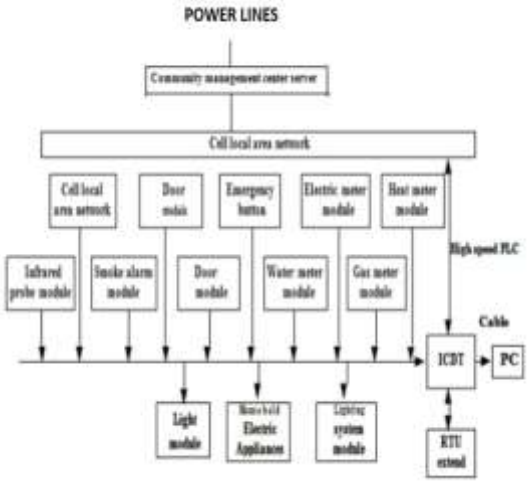

Fig.1. *Block Diagram of Power Line Communication.*

Our proposed system Meter reading taken automatically using Bluetooth module and Power line communication. Then Power cut achieved from Electronic Bill (EB) office through wireless. Normal work happens at any time and external conditions. Involves Less Manpower and High Accurate meter perusing, for example, Customer administration too. Through the application we can teach the microcontroller to switch ON/OFF an apparatus. In the wake of getting the guidance through the Bluetooth module, the microcontroller gives the flag to the transfer board. The application first scans for the Bluetooth gadget. In the event that it is accessible, at that point it dispatches the voice recognizer. It peruses the voice and changes over the sound flag into string. It gives an incentive to every apparatus which will be sustained to the microcontroller gadget. The microcontroller utilizes the port in sequential mode. In the wake of perusing the information it unravels the info esteem and sends a flag to the parallel port through which the transfer circuit will be enacted.

IV. Components

This project makes use of following listed components:

- Power line carrier KQ330 module
- Arduino Uno(microcontroller)
- SG90 servomotors
- Arduino Ethernet shield
- ACS 712 current sensor

Fig.2. *power line carrier KQ330 module*

Integrated KQ-330F module and the peripheral circuit of the carrier plate, without the need for other coupling components, direct connection of 220V AC.Working frequency 120 ~ 135KHZ, the interface baud rate 9600bps. Actual baud rate 100bps.

A frame of continuous transmission of the maximum length is not exactly or equivalent to 252 bytes, a constant transmission outline length from 1 to 252 is characterized by the user, the module does not send redundant data. bandwidth is less than 10 KHZ. NC/RST: reset pin (active low) in the use of frequent switching mode. Without this function, pins should be suspended.

V. Advantages

The advantages of this project are as follows:

- Most private dwellings do not have dedicated neither low nor high-speed network cabling installed, and the labour costs required to install such wiring is often quite high.
- Power line communication utilizes the current electrical system for correspondence. So the expense of establishment is lower than other correspondence framework and accessibility of correspondence administration can be wherever outlets exist. Accuracy can be balanced according to necessity.
- Power Line Communication is also used in internal electrical installation within buildings and homes called in home PLC for various communication application.
- If there is the accessibility of various electrical plugs in each room, the home electrical cable framework speaks to an amazing system to share information among wise gadgets, likewise with high information exchange rate, up to a couple of many Mbps.
- Power lines are well insulated to provide any negligible leakage between conductors and ground even in

adverse weather condition.

- Power lines considerably higher mechanical quality contrasted and common lines. They would normally unaffected under the conditions, which might seriously damaged telephones lines.

VI. Limitations

There are some limitations of PLC which are listed below:

- Proper care must be taken to watch bearer hardware and people utilizing them against high voltages and flows on the lines.
- Reflections are created on lines associated with high voltage lines. This expands weakening and makes issue.
- High voltage lines have transformer associations, weaken transporter flows. Sub-station types of gear unfavorably influence the bearer flows.
- Noise presented by electrical cables is definitely more than if there should be an occurrence of phone lines. This is due to the noise generated by discharged by discharge across insulators, corona and switching processes.

VII. Applications

Following are some of the advance uses and applications of PLC technology:

- Automatic Meter Reading:Power consumption is a specified area to select that area of a suitable control of the energy convention of this system is demanded and observed.
- Home network and internet access: More and more automation is being handled via remote communication, whether it's from the office or from the comfort of your own home. Today's PLCs give you the ability to access your control system to handle such tasks as monitoring via a website to determine the condition of a machine or check other statistics. With the most recent Power Line Communication innovation, nearly anything that can be practiced alongside the machine can be cultivated wherever there is an Internet association.
- Home automation is taking centre stagein home technology circles for its ability to lethome owners greatly reduce their energy consumption withoutchanging their lifestyle, therefore helping them do theirpart to slow global warming, as well saving them money.Home automation can be an exciting, new innovations that make home appliances fun and easy to use forevery member of the family.Controlling of the home deviceswithout human intervention using Power Line Communication.
- Transmitting Radio programs: The PLC-powered broadcast transmission and antenna switch system is working reliably, transmitting at high power from a remote location. A lot more communicate related frameworks can be computerized utilizing AutomationDirect equipment, for example, FM recieving wire exchanging, control, blame location and transmission line pressurization.

VIII. Conclusion

For supporting energy management services, HEMS monitors smart meter and make a plan to control the appliances related to energy remotely from internet providing auto-configuation, remote monitoring, energy management, flausible controlling.

Planning makes to shift device controlling on peak price time and to smooth power demand work load.HEMS can deliver clear benefits about resource utilization, energy conservation and cost reduction to users.

References

[1] Cynthujah Vivekananthan, Student Member, IEEE, Yateendra Mishra, Member, IEEE, and Fangxing Li, Senior Member, IEEE," Real-Time Price Based Home Energy Management Scheduler," IEEE TRANSACTIONS ON POWER SYSTEMS, VOL. 30, NO. 4, JULY 2015.

[2] Mario Collotta, Member, IEEE, and Giovanni Pau," A Novel Energy Management Approach for Smart Homes using Bluetooth Low Energy," IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS, VOL. 0, NO. 0, SEPTEMBER 2015.

[3] Mingfu Li and Hung-Ju Lin," Design and Implementation of Smart Home Control Systems Based on Wireless Sensor Networks and Power Line Communications," IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS, VOL. 62, NO. 7, JULY 2015.

[4] Dhinakar P1, John Clement Sunder A2, Ramesh S M3, Vignesh Kirubaharan D4," Load Measurement in Home Energy Management System with Demand Response," International Advanced Research Journal of Science, Engineering and Technology Vol. 1, Issue 3, November 2014.

[5] Serene Althaher, Student Member, IEEE, Pierluigi Mancarella, Senior Member, IEEE, And Joseph Mutale, Senior Member, IEEE," Automated Demand Response from Home Energy Management System under Dynamic Pricing andPower and Comfort Constraints," IEEE TRANSACTIONS ON SMART GRID,VOL. 6, NO. 4, JULY 2015.