Indian Journal of Advancd Research in Electrical, Electronics
and Instumentation Engineering (IJAREEIE)
Vol.2.No.1 2014 pp 51-56.
available at: www.goniv.com
Paper Received :08-03-2014
Paper Accepted:22-03-2013
Paper Reviewed by: 1. R. Venkatakrishnan 2. R. Marimuthu
Editor : Prof. P.Muthukumar

DESIGN AND IMPLEMENTATION OF GADGETS FOR AUTOMATIC LPG RESERVATION AND METER PRICING

K.Vijayalakshmi, K.Umamaheswari, B.Sivakami
Dept of Electronics&Communication Engineering
Ponnaiyah Ramajayam College of engg & Technology.
Vallam, Thanjavur-613403
sriuma1716@gmail.com

ABSTRACT

Design And Implementation of gadgets for automatic lpg reservation and meter pricing is the technology of automatically collecting data from energy metering devices (water, gas, and electric) and transferring that data to a central database for billing and/or analyzing. and also monitoring level of the LPG cylinder. If the lpg level is low it automatically booking to nearest gas agency. This saves employee trips, and means that billing can be based on actual consumption rather than on an estimate based on pr consumption, giving customers better control of their use of electric energy, gas usage.

Index Terms- Gas monitoring, Electricity measurement, meter pricing, home monitoring, sensors, wireless transmission, Zigbee.

1. INTRODUCTION

Design And Implementation of automatic lpg reservation and meter pricing is the technology of automatically collecting data from energy metering device. Transferring that data to a central database for billing and/or analyzing and also monitoring level of the LPG cylinder and electricity usage with pricing. If the LPG level is low it automatically booking to nearest central database station. Around 30% of the total C02 Output of the UK has been, consumed as domestic energy, this figure can be reduced by upto 10% through simple Energy saving steps stips .In addition Persuading households to become more energy efficient is vital to cut down CO2 emissions. To equip households with real- time energy consumption feedback is one of ways to achieve this objective; research shows that behavior intervention has the potential to reduce 15% of the energy consumption of a household.

Digital Environment Home Energy Monitoring System Existing energy distribution and management systems focus the large scale domestic energy monitoring and at measurement of power consumption using a current managing system funded by the European Community's transformer sensor, as well as domestic wireless/wired Seventh Framework Program. This is technique from networking technologies such as ZigBee , Infrared , other domestic energy/electricity monitoring systems because its foundation is an intelligent platform that integrates various *provides effective positive behaviour change by offering end* persuasive strategies in order to reason and represent energy *user direct and ambient feedback based on their monitored* feedback information to reach effect positive behaviour changes.

Users differs from others by enabling Real-time and historical participate early on-in the project to improve and refine the electricity monitoring and feedback. However there is also a system design so that it achieve higher coherence and user requirement to be able to monitor and report domestic gas satisfaction. In addition to the implementation of electricity monitoring at both a household and appliance level, automatic gas monitoring has also been realized. With concern on practical, regulatory and health and safety issues, our interference with existing gas installations.

2. SYSTEM OVERVIEW

A. Domestic Energy Management System

The DEHEMS system integrates a number of energy sensors within a household and collects energy data at a wide scale level consisting of 250 households in the country. A large amount of energy data have been yielded during data collection, which create challenges for the backend database and network model design. Roles of end users have also been defined in our focus group and survey studies that certain requirements must be met such as the need for appliance and gas monitoring, comparisons of energy consumption among households, effective user interfaces that provides personalized energy saving tips and alerts, and more general information energy and the environment.

B. Gas Monitoring System

Automatic gas meter monitoring presents an approach to demonstration of domestic gas consumption. In this method, the automatic gas monitoring system is integrated into the Gateway Server communication zone, which makes the gas monitoring system is parallel to the indoor electrical
sensing solutions.

C. SMS Contents Management

Two types of packets are defined in the protocol, including *data* packets and *config* packets. No acknowledgement packets are defined confirming the reception of *data* and *config* packets as SMS messages are assumed to be received by the GSM network. Communication protocol is designed to define the format of gas readings and reader settings sent between gas readers and the SMS Gateway. The GSM module is assumed to provide reliable SMS communication, so an SMS message sent by a gas reader can be delayed, but will be received by the gateway eventually, and vice versa.

Block Diagram

Figure 1:block diagram of automatic lpg reservation & meter pricing

Proposed system:

Automatic LPG booking and Remote meter reading refers to the system that uses a communication technique to automatically collect the meter readings and booking and other relevant data from utilities' gas meters, without the need to physically visit the gas meters. The development of Home Automation Control technology has captured data from the meter to center stage of the utility business plan.

3. PROJECT DETAILS

In this system we are intended for the fast and energy saving technique. We are collecting data from the usage level and communicate with central database through wireless transmission and automatic booking. And also we have to monitoring the usage of electric level with pricing.

4. BLOCK DESCRIPTION

The lpg cylinder is placed above the loadcell sensor. It is used to measure the weight of the gas. And also we are using IR sensor which is located at the electric meter. These two sensors are monitor the daily usage. This details from the sensors are connected through the wire to ADC. It is used to convert analog to digital signal. Again it connected to microcontroller. It is used address of the function using embedded c. Microcontroller connected with LCD display which is used to give the usage of our domestic energy.

5. MODULES OVERVIEW

Software module:

- Keil compiler
- Visual studio 2008
- Embedded c

Hardware module:

- Pic16f877a microcontroller
- Zigbee transceiver
- Load cell sensor
- Lcd
- Relay circuit
- Motors and sensors

Transmitter section

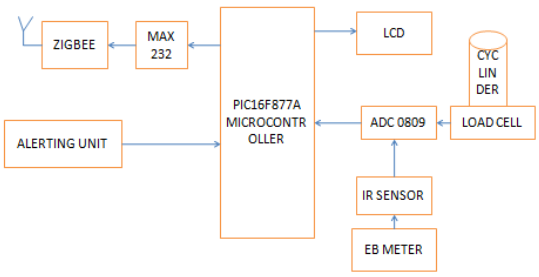


Figure 2: Transmitter section

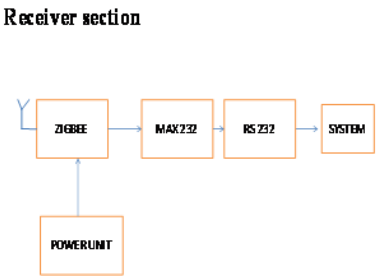


Figure 3:Receiver section

Microcontroller Interfacing And Communication

Microcontroller PIC16F877A is one of the PIC micro family microcontroller which is popular at this moment, start from beginner until all professionals. Because very easy using of PIC 16F877A and use FLASH memory technology so that can be write erase until thousand times. This capability can be used to create assemply line production, to store calibration data available only after final testing, or it can be used to improve programs on finished products.

Figure 4:PIC16F877A

Zigbee Networks

ZigBee is the only standards-based wireless technology designed to address the unique needs of low-cost, low-power wireless sensor and control networks in just about any market. Since ZigBee can be used almost anywhere, is easy to implement and needs little power to operate, the opportunity for growth into new markets, as well as innovation in existing markets, is limitless. ZigBee offers unique advantages for wireless applications. With a this new technology, realizing a standard specifies the PHY Layer and MAC Layer for low data rate wireless PANs. It is based on the IEEE 802.15.4 standard. The IEEE 802.15.4 standard specifies the PHY Layer and MAC Layer for low data rate wireless PANs.

This paper includes ZigBee Alliance, IEEE 802.15.4 model, applications and a dvantages of ZigBee, future scope of ZigBee. The performance of the zigbee networks for various areas have been analysed and also the network application area had been reviewed. This paper includes ZigBee Alliance, IEEE 802.15.4 model, applications and adv antages of ZigBee, future scope of ZigBee. The performance of the zigbee networks for various areas have been analysed and also the network application area had been reviewed.

The performance parameters viz. Delivery ratio & loss ratio had been calculated by using tool Network Simulator-2, for different number of nodes and different areas for wireless star networks as shown in the table below. The simulation results are as follows. It shows that as the simulation area increases, the delivery ratio decreases and the loss ratio increases.

Load cell sensor

- convert force into electrical signal we a sensor called a "strain guage "to the load cell.
- Metallic string can differ in electrical resistance depending on whether it is elongated or contracted.
- This load cell sense the usage of gas level.

TABLE 1: Performance Analysis of Wireless Star Networks

No. of nodes	**Performance Analysis**	**Delivery Ratio (%)**	**Loss Ratio (%)**		
No. of nodes	***Area***	***Packet sent***	***Packet Received***	**Delivery Ratio (%)**	**Loss Ratio (%)**
7	Small	38579	37633	97.54	2.45
	Medium	1820	0	0	100
	Large	1820	0	0	100
9	Small	38310	37548	98.01	1.98
	Medium	1820	654	35.93	64.06
	Large	1820	107	5.87	94.12
13	Small	1820	656	36.04	63.94
	Medium	1820	111	6.09	93.90
	Large	1820	0	0	100

Performance Parameters

To evaluate the performance of the mesh interconnection net- works, a simulation model has been developed in NS2 with only built-in options. Tcl is used for specifying the Mesh interconnec- tion network simulation model and running the simulation. The existing routing algorithm to compute the path and for packet generation is used. Flow control in interconnection networks has mainly been an issue to prevent buffer overflow and packet loss. Packet loss oc- curs when one or more packets of data traveling across a network fail to reach their destination. Packet loss can be caused by a number

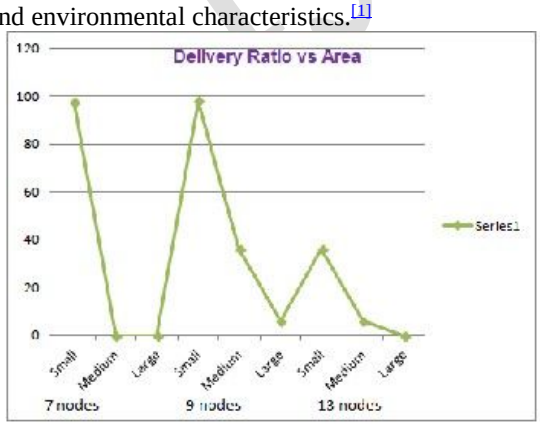
of factors including buffer overflow, congestion, corrupt- ed packets rejected in-transit, faulty link, faulty nodes or dead- locks. In addition to this, packet loss probability is also affected by down of links and distances between the transmitter and re-ceiver

Zigbee Advantages:

The ZigBee protocol is designed to communicate data through hostile RF environments that are common in commercial and industrial applications. ZigBee protocol features include:

1. Zigbee provides supports for point-to-point, point-to- multipoint and mesh networks.
2. It has low duty cycle which provides long battery life.
3. ZigBee has Low latency.
4. Direct Sequence Spread Spectrum (DSSS) is used in ZigBee technology.
5. ZigBee has ability to use upto 65,000 nodes per network
6. 128-bit AES (Advanced Encryption Standard) encryption for secure data connections are used in it.
7. Collision avoidance, retries and acknowledgements are one of the most efficient features of ZigBee.

With hundreds of members around the globe, ZigBee uses the 2.4 GHz radio frequency to deliver a variety of reliable and easy-to-use standards anywhere in the world. Consumer, business, government and industrial users rely on a variety of smart and easy-to-use ZigBee standards to gain greater control of everyday activities. With reliable wireless performance and battery operation, ZigBee gives you the freedom and flexibility to do more. ZigBee offers a variety of innovative standards smartly designed to help you be green and save money. ZigBee networks are secured by 128 bit symmetric encryption keys. In home automation applications, transmission distances range from 10 to 100 meters line-of-sight, depending on power output and environmental characteristics.[1]



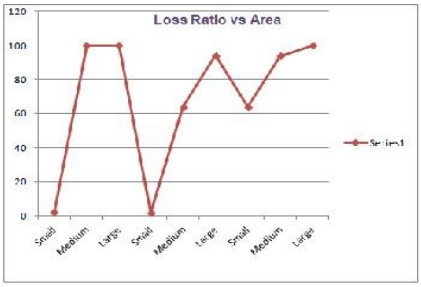


Figure.5 Delivery ratio for different no. of nodes with different area

Zigbee applications:

There are many applications that are having redundant, self- configuring and self-healing capabilities of ZigBee wireless mesh networks. These applications include:

Building Automation:

It provides security, HVAC (Heating, Ventilation, and Air conditioning) refers to technology of indoor or automotive environmental comfort. Now HVAC is widely used in the buses and cabs. It is also used in lighting control, access control and Adaptive Multi-Rate (AMR or AMR-NB) audio codec is a patented audio data compression scheme optimized for speech coding.

Energy Management and Efficiency

To provide greater information and control of energy usage, pro- vide customers with better service and more choice, better man- age resources, and help to reduce environmental impact. Con- sumer Electronics To provide more flexible management of lighting, heating, cooling, security and home entertainment systems such as TV,DVD's, home theatre.

PC and Peripherals

To integrate the system to perform different types of tasks, we have input/output devices as well as high speed processors, storage media and many other devices such as joystick, OMR. Home Control To integrate the lighting, heating, cooling and security or we can say that it is responsible for controlling the home.

Telecommunication Services

It covers information services, Mobile Commerce, also known as M-Commerce or mCommerce, is the ability to conduct commerce using a mobile device, such as a mobile phone, Personal Digital Assistant (PDA), Smartphone, or other emerging mobile equipment such as dash top mobile devices.

Industrial Automation

To extend existing manufacturing and process control systems reliability [6]. The interoperable nature of ZigBee means that these applications can work together, providing even greater benefits.

Personal Health Care

ZigBee Alliance provided many devices which helps for the fit- ness of patients such as personal wellness monitoring, Electrocar- diograph (ECG), chronic disease monitoring, glucose meter pulse oximeter.

Application:

Home Automation Control technology is very useful in many applications. By using this technology we can accommodate a lot of benefits. Some benefits are as follow-

Accurate information from the network load to optimize maintenance and investments.
Customized rates and billing dates.

Accurate measurement of transmission losses.Automatic outage information and faster recovery.
Better and faster customer service.
Flag potential high consumption before customer gets a high bill.

6. RESULT

In this project, we present a novel system to perform fast and time saving methods. Automatic LPG booking and remote reading technique refer to the system that uses a communication techniques and automatically collecting data, booking without need to the physically visit the gas meter. Display the details from the domestic energy devices with the help of lcd and transmitting through Zigbee to central base station. This system is very useful technique to the environment. Gas and electric energy is the most valuable commodities all around the world. So this technique very helpful to save the energy. Wireless transmission is used to support and provide the communication between domestic users and the base stations.

7. CONCLUSION

In this paper, an automatic gas monitoring solution has been presented involving its hardware design, the communication method implementing the collection of gas data, and the deployment of the system. This technique focuses at the awareness of domestic energy literacy and environment consciousness and offers personalized approaches to energy saving.

Monitoring of gas consumption is inevitable project to achieve this goal. However, this techniques used on electricity monitoring are simply not applicable for gas with regard to practical, regulatory and health and safety issues. Therefore our approach seeks a solution for monitoring household level gas monitoring that does not require any interference with existing gas installations.

The gas monitoring system as well as the last implementation, which challenges were met due to complicated installation environment, misunderstanding of candidates, and the lack of inexperienced fitters. All 30 gas readers have been installed eventually, 83% of which are connected successfully.

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