DESIGN OF ZIGBEE BASED AUTOMATIC ENERGY METER READING SYSTEM THROUGH GSM AND GPRS

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Abstract

In this paper we have proposed automatic energy meter reading system for TNEB. In tamilnadu Electricity board (TNEB) collect a data 60 days once by manual only the TNEB having more number of customers so its take more time take to intimate customer site. In this system without man power data collect form customer site. We proposed the system (AEMR) using ZIGBEE communication. The ZIGBEE is used to customer side and form a node (ZIGBEE node) for apartments or particular area and connect with one GSM client. The GSM (global system for mobile) connect with one server and more client dependent upon customer site. The data send to automatic every 59th day collected server and intimate to customer site through E-Mail, SMS and billing. And the data will stored in Microsoft access in server.Due to this upgradation there wount be any power theft ,power loss and manpower will be reduced .

Keywords: ZigBee, GSM, communication protocol, Database

1.Introduction

The AMR was first tested by AT&T Corporation (American Telephone and Telegraph Corporation) in cooperation with a group of electric utilities 41 years ago in the USA. It was a successful experiment, after which AT&T offered to provide AMR service based on a telephone communication link. However, from an economical point of view, this project was unprofitable. After nine years, in 1977, a Utility Communication Division was founded in Rockwell International to develop a distribution carrier communication system. The principle of modern electricity meters is based on continuous measurements of the instantaneous values of voltage and current.[1] These data are used to find the instantaneous value of electrical power, which has to be integrated with respect to time to give the consumed energy.

In our proposed system the fully based on network node formation and collect a data form ZigBee as queuing/ one by one like pipeline process and the data as converted analog to digital and the data will be stored the GSM to be used for high security application and data transmission speed will be high.

I.   Proposed Architecture
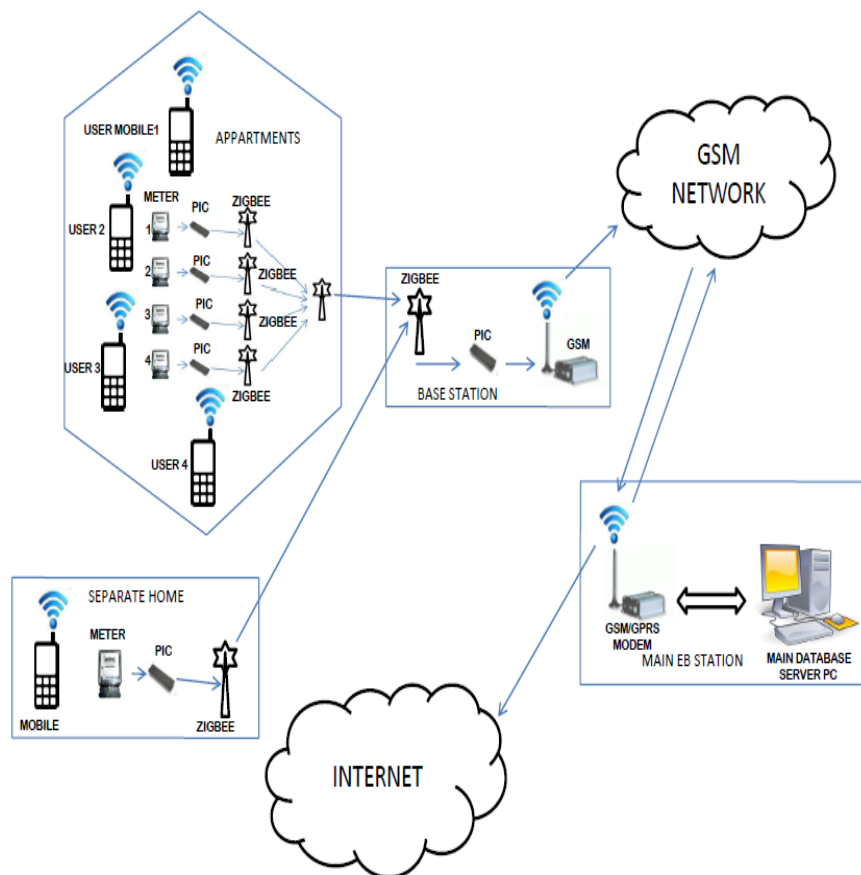
Figure : Proposed architecture

The proposed architecture is shown in figure. In this architecture form as node (ZigBee node) connected with GSM node. The GSM node as connected with server and clients. Each GSM clients having ZigBee node the GSM client act as a server for ZigBee node. The advantage of using ZigBee it's used to short distance data transmission without any data loss and security. The GSM is used to text data transfer and voice call to inform customer site.

At the same time in this system the cost wise less only and the system is lifelong maintenance for customer site as well as server site. In this system used as ZigBee ha 2.4 GHz and GSM as 900 MHz to 3 GHz. The short distance data transfer is used as ZigBee and long distance data transfer is used to GSM.[3]

In this system plan to used LPG Gas, Water also because the system is converted analog data to digital data to transmission.

II.   **Communication protocols**

The data transfer from energy meter to ZigBee, ZigBee to GSM and GSM. The overall data stores in server PC the communication needs protocols. In this system I have to used different protocols given below.

- TCP/IP
- UDP-USER DATAGRAM PROTOCOL
- ETHERNET PROTOCOL
- SIMPLE NETWORK PAGING PROTOCOL

The TCP/IP (Transfer control protocol/internet protocol) is used to data transfer from server to PC for sending E-Mail to customer site and data to be store in particular head of Electricity board.[5] The UDP (user datagram protocol) used to communicate a short distance data to long distance data transfer.SNP (simple network paging protocol) is used to send the SMS for mobile communication to inform customer site via text.

III.   Software used

In this system software is used as both front end and back end. The front end I have to use VB dot net and back end MS Access to store a data as per receiving a server if incase any one of customer site will be down the last 60 day data to take match the server and generate the bill and inform to the nearest EB station take a complaint.
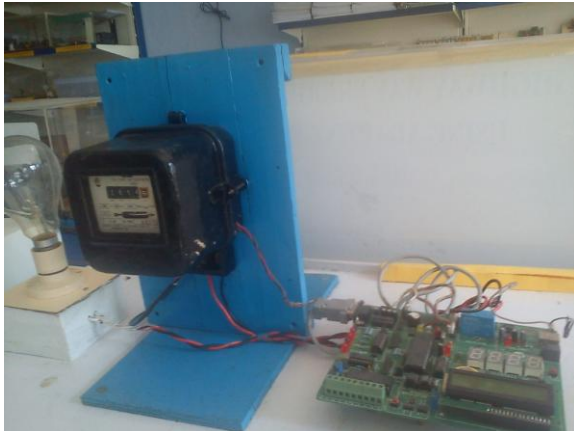
Prototype

IV.   Billing process

To decrease the cost of the proposed AEMR system, in-house software is developed using VB.net and is used to control the central server. The implemented meter data management system will have the following functions:

a) Remote metering: The meter reading is sent automatically to the server and customers can remotely get their consumption at any time.

b) Bill issuing: The billing system shall provide monthly bill for customer who does not remotely access the server.[8]

c) Customer tracking: The billing should include better customer tracking, bill forwarding, identification of customer financial accounts information, and use of monetary deposits for account closing requirements.[9]

V. Conclusion

This solution can be used in domestic and industrial purposes .By using this solution we can save the power theft ,man power for taking the reading and timimg.The AMER (Automatic energy meter reading system) was designed in our lab and I proposed to TNEB and waiting for reply to implement the system. ZigBee is a wireless communication technology that uses small, low-power digital radios based on the IEEE 802.15.4 standard for wireless personal area networks (WPANs) and GSM. In future I have plan to create a mobile application for TNEB to customer pay a bill directly any were and any time. The complete prototype to be design and tested successfully and also the billing process and SMS alert to be verified. Automatic Meter Reading is a challenging step for the Provincial Electricity Authority to take as it brings benefits to both customers and the organization itself and at the same time it is not easy to implement even though many AMR systems have been successfully implemented and proven worldwide. ZigBee is a wireless communication technology that uses small, low-power digital radios based on the IEEE 802.15.4 standard for wireless personal area networks (WPANs) and GSM is a wireless RF large band not interfere of different customer.

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