

Automatic Energy Meter Reading System Based On IOT

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Abstract: All human beings use different types of technologies in many fields. Nowadays, the energy provider company's employees visit each house and record the meter reading manually. This produces errors due to human intervention, hence proposed system reduces manual work, time and makes this system accurate and user friendly. Common errors like extra bill amount or notification from electric board even though the bills are paid will be overcome. Design and implementation of project is mainly based on PIC microcontroller using IOT. In this system, the live meter reading can be displayed on the VB application to the service provider and for consumer android app is designed through which bill is calculated and a message is sent to user. Any person can pay their bills through the android app using two options, either they can do recharge of specific amount like prepaid system or they can pay the bill using account. A specific amount equal to the bill is deducted from user's account. This system also can be used to complain when needed.

Keywords - PIC Microcontroller, WIFI Module, Android app.

I. INTRODUCTION

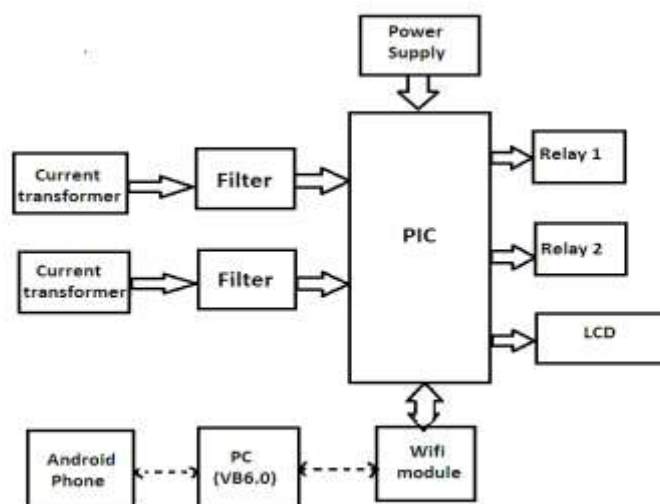
In today's world of technology, there is online billing facility for electricity. People no need to go to office for the bill amount. They can pay these bills from anywhere but condition is that they should have internet connection. Due to this, human efforts are reduced in large amount. But this manual work is reduced partially and not fully. Human intervention still exists as in conventional electric meter reading system, company's employee has to come every individual's house to capture an image of meter for generating bill every month. Here due to manual work, we may get incorrect results. For example customers can receive extra bill amount or they get call or message from company even after paying the bill for particular month. Also people may manipulate reading so that bill with less amount be generated. Though the possibility of such incorrect results is less, incorrect reading can lead to incorrect bills. Hence in order to overcome these drawbacks this project proposes automatic meter reading system which can reduce manual work. At the same time system is made correct as it does not include manual work. An energy meter is used to measure the consumption of electricity of a residence as well as industries, factories that is places where electricity is used. The project mainly deals with energy meter, which utilizes the features of embedded systems i.e. combination of hardware and software in order to implement desired functionality. This system enables the electricity department to read the meter readings monthly without a person visiting each house. This can be achieved by the use of PIC microcontroller unit that continuously monitor and records the energy meter reading in its permanent (non-volatile) memory location.

This system continuously records the reading and the live meter reading can be displayed on VB application to the service provider and for consumer android app is designed. This system can be used to complain when needed. Proposed system generates bill amount automatically for consumer. This will decrease human efforts as standing in line to pay the bills. It gives accurate readings and bill amount. Designed app is user friendly. This system can be implemented also for complaining to service provider. This is used for real time applications.

There is a lot of work about automatic energy meter reading which is carried out previously. Some of this work is explained here. Pooja D Talwar, Prof. S B Kulkarni, Dr. M. S. Sheshgiri presented a technique of telemetric communication which is helpful for reducing energy consumption [1]. H. M. Zahid Iqbal, M. Waseem, Tahir Mahmood proposed automatic energy meter reading system which was based on GSM. According to that research, electricity board can cut the supply and establish the same whenever required [2]. Dhodla Pratyusha, Pothuganti Sravan Kumar, Bantu Snehittha, Billa Mahendar presented a design of the same using ARM controller and GSM module and proposed an accurate billing without any error [3].

II. PROPOSED METHODOLOGY

Block Diagram



Block diagram of this project consists of energy meter, microcontroller and iot part. Energy meter is a device used to measure electricity consumption. Energy meter consists of current transformer and filter. Current transformer is used to produce alternating current and resistance is connected in parallel in order to convert current into voltage as microcontroller only accepts voltage value. Microcontroller is main component of the system as it takes reading and sends it over iot. Wifi module is used for iot operation. Energy meter reading can be displayed on LCD display. Two relays are used for two loads. A relay is used to switch on/off the load.

Working

In this project, wattage consumption of each load is measured and accordingly energy bill is generated which will be forwarded to user and company. PIC microcontroller is used to control and monitor the loads. Microcontroller is connected to loads via relays and current transformer is used for monitoring and controlling purpose. Through relay load can be controlled and for sensing purpose Current transformer is used. Current transformer will measure the amount of power consumed and this reading is given to PIC Microcontroller through its inbuilt analog pins. PIC microcontroller will measure the wattage consumption according to the data received from current transformer and it will display this data on LCD. That data is also forwarded to PC via Wi-Fi module in each interval of time. Service provider which will have PC application, can see the status of consumption of electricity and according to the electricity consumption per unit bill is generated. From android application user will get the amount of energy consumption and cost. This is prepaid energy meter reading system. This simply means user will be provided with "Recharge" option. At the start of month, user has to recharge his/her account with some amount, say rupees 500. According to wattage consumption, money will be deducted from user's account. User has to keep this app on every time so that user will get notification of units consumed and money deducted time to time. Proposed system has two way communication so that consumer can check status of their consumed energy, because of which consumer can manage load accordingly to reduce the cost. If consumer faces any problem related to bill amount or meter then consumer can complain by using android app.

Features	PIC18F452
Operating Frequency	DC-40MHz
Program memory (bytes)	32K
Program memory (instructions)	16384
Data memory (bytes)	1536
Data EEPROM memory (bytes)	256
Interrupt sources	18
I/O ports	Ports A,B,C,D,E
Timers	4
Capture/Compare/PWM Modules	2
Serial communications	MSSP, Addressable USART
Parallel communications	OPSP

10-bit Analog-to-Digital Module	8 Input channels	
RESETS (and Delays)	POR, BOR, RESET Instruction, Stack Full, Stack Underflow (PWRT, OST)	
Programmable Low Voltage Detect	Yes	
Programmable Brown-out Reset	Yes	
Instruction set	75 Instructions	
Packages	40-Pin DIP	44-Pin PLCC
	44-Pin TQFP	

Features of PIC 18F452

III. FIGURES



IV. CONCLUSION

This paper describes the automatic energy meter reading which reduces the manual work and makes the system accurate and fast. It also eliminates the error which may occur in today's electric meter reading. User is provided with prepaid or recharge facility so that he/she can get information about units which are consumed and the amount deducted from balance for those consumed units. The bill generated is sent to user through an app. An android app is made user friendly. This app is switched on all the time, thus user comes to know about meter reading and amount of bill. User can pay the bill from its android app. System can be implemented in electricity departments, household energy meter monitoring and various industries.

ACKNOWLEDGEMENT

It is a great pleasure to acknowledge all those who have supported us for successfully completing our project. We are deeply indebted to our Principal, HOD, Project Coordinator and Faculty advisor for their creative suggestions during the preparation of the project.

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