International Journal of Interdisciplinary Innovative Research &Development (IJIIRD)

ISSN: 2456-236X

Vol. 04 Issue 02 |2020

Efficient Energy Saving Scheme for AMR Network

[1]*Mansi Agarwal*

[1]*Jain(Deemed-to-be)University, Karnataka, India*

ABSTRACT

In this paper we focus on automatic bill generation and distribution system.in this work the proposed a which reduces human intervene in the billing process. For this work we have tacking the help of a microcontroller-based model to aware the customer regarding billing and other details through Gmail, from this technology the customer can see from anywhere the electricity billing. In this technology in the meter reader we use GSM module.

Smart technology process will send the information through the network for the load maintenance, investment, for proper rates, billing, and detection of meter. Accurate measurement of meter reader for transmission loss. Best network, cost effective.

1. INTRODUCTION

Sensor monitoring system was developed in the year of 1972 by the TheodreGeorge. It is developed for the use of meter reading and its utilities. And this technology was patent in the year of 1972 and the awarded goes to this technology by paraskevakos in U.S. The primary objective of AMR is to make the electricity billing process flexible where human intervene can be eliminated or reduced. In the initial stage of installment, a prior permission of house owner needs to be managed. Normally the individual customer or consumer expects actual bill reading based on AMR ratherthan prediction based.

Service provider send the labor to every house to measure and read the meter reading and click the photo of the meter and then send to service provider. Automatic meter reading technology is used to read the correct meter reading. Auto billing generation is the best way to overcome from old technology problem of convention billing.it is wastage of time and resources. In old technology the service prover sends the bill slip but in automated billing there is no need of that. in convention billing as we know many errors will come because of convention bulling s generated by human and human can do mistake but machine cant. the old technology is time consuming procedure due to that when human can do mistake in manual meter reading.

Advanced technology has become the integral part of our life [1]. To satisfy the need of the society, almost in each work, we use the technology[2][3]. In current era computer science is major subject [4]. It has many real life applications such as cloud computing[5], artificial intelligence[6], remote monitoring[7], Wireless sensor network[8, 9, 10], internet of things[11, 12, 13], Neural network[14, 15], FSPP[16, 17, 18], NSPP [19, 20, 21, 22, 23], TP[24, 25, 26], internet Security[27], uncertainty [28, 29, 30, 31, 32] and so on. Technology is the mode by which user can store, fetch, communicate and utilize the information[33]. So, all the organizations, industries and also every individual are using computer systems to preserve and share the information[34] . The internet security plays a major role in all computer related applications. The internet security appears in many real-life applications, e.g., home security, banking system, education sector, defense system, Railway, and so on. In this manuscript we discuss about the protection of authentication which is a part of internet security.

Power factor is used to measure the current voltage. microcontroller is used to calculate the powerand energy consumption. Microcontroller also shows the calculated reading on LCD and then send to the AMR with the help of GSM module. So, microcontroller perform many tasks and it will display the voltage, load balancer, units etc. whatever meter reading generate through gsm module it sends them to customer and it receiver by the customer on her mobile phones successfully. GSM module we use because whatever meter reading will generate it send to service provider and customer as well as. When GSM send the meter reading so no issue will arise that why we put antenna near the gsm due to antenna the signal strength will be improv more and through the communication with GSM is easy .in Automatic meter reading we use sensor to send the voltage and measurement to the customer and service provider.

Meter readers don't need to visit each customer for It can be utilizedin case when the utility company needs to disconnect a consumer due to non-payment of bills or some other reasons.

For conventional meter reading system demand will increase. if demand will increase then requirements also increase. The demand and requirements for conventional energy is power and power management. From the old technology development of new technology in meter reading device are doing improvement. In old technology

we are using electronic devices due to this wastage of time, lack of accuracy, many labors want, theft problem. the new technology of automatic meter reading provides high speed, automatic bill generation, load management, alarm warning if bill not pay at the time.

2. LITERATURE REVIEW

As I read some research paper on automated meter reading from that I understand and see that many publications in different method to solve that old technology problem like that first I said the author who give title of her publication is smart and intelligent gsm based Amr system. and this publication will be done in past 2012 the month of May and the authors are for this publication is Abhinandan jain, dilp kumarr, jyoti kedia and they all are write in that paper about they develop new technology in that they say this technology is fully automatic energy meter reading and the capabilities like this remote monitor and control the meter[35] now it will continuous monitor the meter reader and send the data when service provider send the request and it will send through SMS so from this we don't want many employees for the electricity billing.

Another paper we read that is automated wireless meter reading system for monitoring and controlling power consumption. In this paper design will present to avoid high construction and maintenance cost of the system. The system is design like if the customer in not pay the bill the power connection if that house will be disconnected automatically from remote server. This technology is introduced by Abdul Rahim in the year of 2012 and the month will going is June.[36]

Now the author Anushree present a paper whose title is IOT based smart energy meter monitoring and theft detection using at mega. And it is developed in year of 2016 and the month will be November .and she write in that paper is so the main object of the author is that the detection of electricity theft and increase the cost paid by customer and provide safety to the customer. to identify the theft the alert message will generate and send to the user. In this system the author additional add setup of IOt based that provide global environment connection to the user so it allows the customer to see meter reading for anywhere at any time due to this theft of electricity will not occur and in terms of customer it costly but safely.[37]

Smart energy meter title given by the author Rajesh and Vishnu in this paper he presents And said that our old technology so many problems will occur like reading, inaccuracy, delayed work etc. to solve this problem smart energy meter is used. the main important thing in smart energy meter is consumption measurement of meter, transmission of data, data processing and billing.[38]

3. PROBLEM DEFINATION

The current technology of meter reading as we know employees come to one by one-person home and check the meter and take the photo of meter reading and then send the record to the service provider of electricity due to this technology service provider need many employees. Due to reading of meter by a person some mistake will also happen sometime. this technology is so much time consuming .now the another method to solve this problem if the user directly send the photo to service provider so from that we don't want many employees and it will time consuming also but this is also not a perfect solution because due to this irregular bill generation will occur and it will increase the problem to service provider. And another method is our proposed system in that meter fetch the unit instantly and updates the service provider database. so due to this here no so much human work we want.

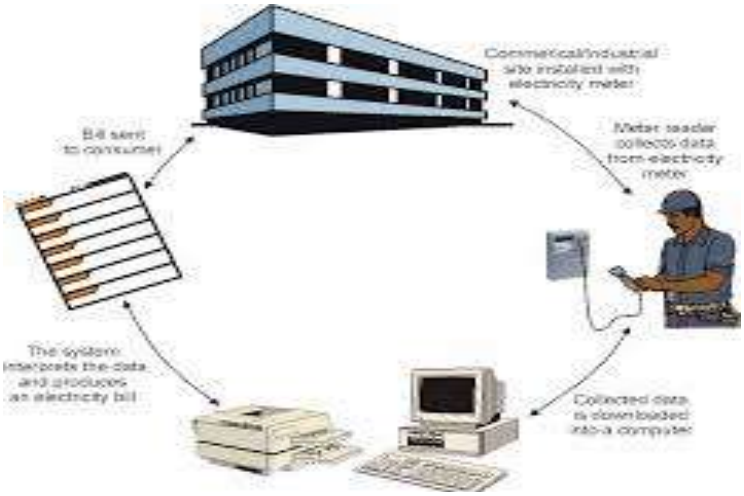


Figure 1:- Old technology of meter reading

4. PROPOSED METHODOLOGY

As we know in the old technology of meter reading our country finds out different problems. We study to solve this problem of meter reading and we are developing digital meter reader for that problem our country face due to digital meter reader our problem will solve. We will see many articles, research paper, website, news, paper etc. to produce good and feasible model for our country the study was conducted at the electrical circuit.

In the Reading unit first, we want to convert the analog meter reading to digital meter reading and the sequence will be between binary numbers it means 0 to 1. Then the first problem will come in this how meter of reading will go to analog digital watt meter automatically. So, we want to analyze that the rotation of disk in the meter to be counted. If it is possible to calculate the rotation of disk in the meter then the meter reading can be calculated. For analyze the digital meter reading we can use sensor in the disk. We are using Infrared sensor to digital meter reading. To control any device wirelessly we use infrared sensor because infrared sensor are the only device in that transmitter and receivercommunicate wirelessly

If no problem error occurs in between sensor then it will provide value but if any problem occurs then it will give another value. When the meter is start then disk will rotate and how much rotation disk will take for that we put sensor so if the disk cross from the sensor it will count the value .We want to Put transmitter in the meter like if the disk rotation start then the meter recognize the value. To place the infrared transmitter in the disk we want to do hole in the disk and we want to put the transmitter in 2 different direction of the disk in the meter reader.

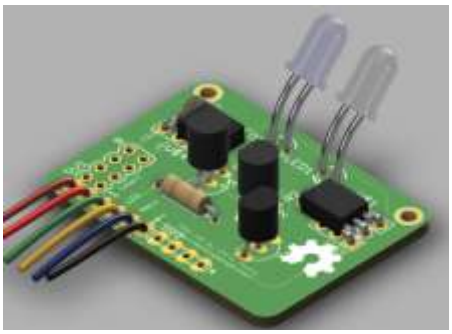


Figure 2:- Infrared transmitter and Infrared receiver

As we see in the above diagram the transmitter is very close to each other. Now when the disk is rotating how the sensor will connect with each other. For connectivity between each sensor is only possible when also pass in between from both the sensor. If hole will be passing in between the infrared transmitted and receiver it means signal can be found for each time it means the disk is rotated by one. As we know the electricity voltage is very high so to control that we can use microcontroller

Her we take one circuit diagram to implement this in this we take LED it indicates that infrared transmitter infrared receiver id working or not. if it working then hole found and led light will turn on. Or else led light will turn off it means there is no communication. To implement this we take infrared sensor, infrared transistor, infrared resistors, infrared receiver, led light are used.

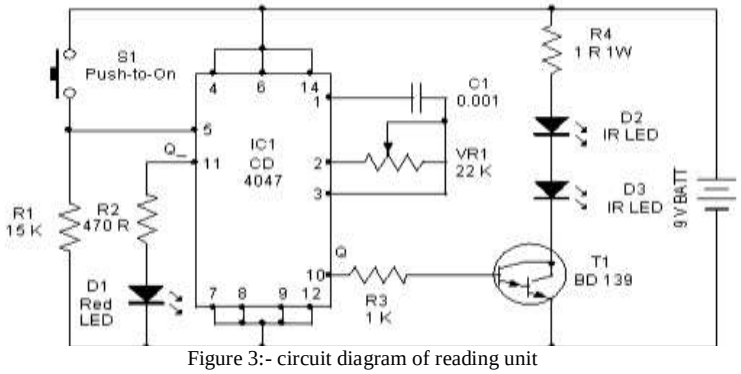


Figure 3:- circuit diagram of reading unit

If the hole will pass in between the Sensor the Service become 0. As per the condition if the Service come 0 then it will be increment by 1.so, the value will be stored in the counter variable. So, meter unitadd the Service from counter variable. then meter read the value it will store the unit in microcontroller and it is now available for transmission.

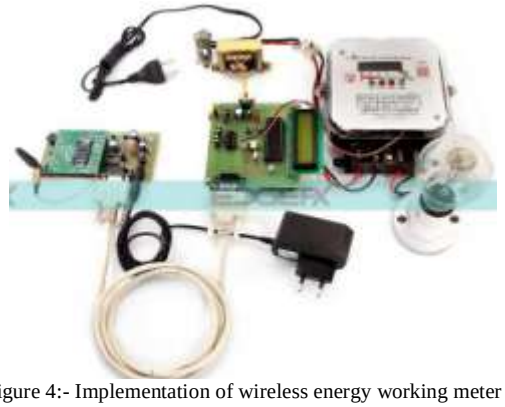
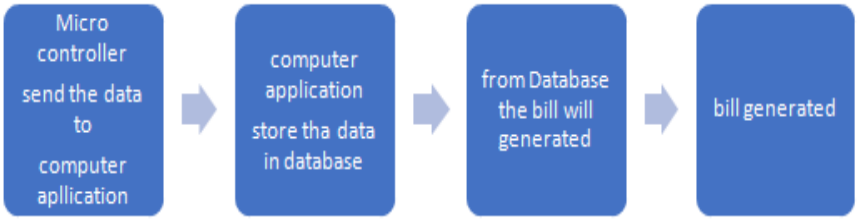


Figure 4:- Implementation of wireless energy working meter

As we know the data is most important part, we use digital technology because human can sometime do mistake so that mistake will not occur.so, data should be transfer in an efficient manner without losing a data. meter reading stored in the microcontroller and it is ready to transmit the data. so, the question arise how the data will transmit now. We are Using GSM module to communicate. Because due to GSM module the data loss will be reduce. To connect meter and the server to each other we want GSM transceiver in every meter at low cost. A transceiver module is use to transmit and receive data on time. transceiver module has been found at low cost.For the purpose of data processing a computer application has been developed. In this application we put all meter number and then we giver the address to microcontroller through serial port number. So now microcontroller receive the data form transceiver after that meter reading is show in the server. Now microcontroller received data send to application which we created in the computer. Application received the data form microcontroller. Through application the data will be generated in decrypted format so it will save in database and from that database it will send to user wat is the meter reading of that user.



So now bill will be generated and the bill will send to the user by Gmail, SMS. so now user can pay the bill from anywhere using any payment gateway method.

5. CONCLUSION

Automatic meter reading using GSM technology. It is a cost-efficient Automatic Meter Reading system. Due to this implementation the electricity sector will be reduced and the cost of employees also be reduced. So to implement the Automatic meter Reading system we take necessary steps.

Automatic meter reading System in future it will provide accurate meter reading and as we see As per security concern in that also security will be improved. And in future we think to expand this technology more due to that cost to read meter is also less.

6. ACKNOWLEDGEMENT

I would like to express my profound gratitude to professor Dr. MN Nachappa and project coordinators for their patient, encouragement and valuable assessments of this research work.

7. REFERENCES

[1] M. BM and H. Mohapatra, "Human centric software engineering," International Journal of Innovations & Advancement in Computer Science (IJIACS), vol. 4, no. 7, pp. 86-95, 2015.
[2] H. Mohapatra, C Programming: Practice, Vols. ISBN: 1726820874, 9781726820875, Kindle, 2018.

[3] H. Mohapatra and A. Rath, Advancing generation Z employability through new forms of learning: quality assurance and recognition of alternative credentials, ResearchGate, 2020.
[4] H. Mohapatra and A. Rath, Fundamentals of software engineering: Designed to provide an insight into the software engineering concepts, BPB, 2020.
[5] V. Ande and H. Mohapatra, "SSO mechanism in distributed environment," International Journal of Innovations & Advancement in Computer Science, vol. 4, no. 6, pp. 133-136, 2015.
[6] H. Mohapatra, "Ground level survey on sambalpur in the perspective of smart water," EasyChair, vol. 1918, p. 6, 2019.
[7] H. Mohapatra, S. Panda, A. Rath, S. Edalatpanah and R. Kumar, "A tutorial on powershell pipeline and its loopholes," International Journal of Emerging Trends in Engineering Research, vol. 8, no. 4, 2020.
[8] H. Mohapatra and A. Rath, "Fault tolerance in WSN through PE-LEACH protocol," IET Wireless Sensor Systems, vol. 9, no. 6, pp. 358-365, 2019.
[9] H. Mohapatra, S. Debnath and A. Rath, "Energy management in wireless sensor network through EB-LEACH," International Journal of Research and Analytical Reviews (IJRAR), pp. 56-61, 2019.
[10] H. Mohapatra and A. Rath, "Fault-tolerant mechanism for wireless sensor network," IET Wireless Sensor Systems, vol. 10, no. 1, pp. 23-30, 2020.
[11] H. Mohapatra and A. Rath, "Detection and avoidance of water loss through municipality taps in india by using smart tap and ict," IET Wireless Sensor Systems, vol. 9, no. 6, pp. 447-457, 2019.
[12] M. Panda, P. Pradhan, H. Mohapatra and N. Barpanda, "Fault tolerant routing in heterogeneous environment," International Journal of Scientific & Technology Research, vol. 8, pp. 1009-1013, 2019.
[13] D. Swain, G. Ramkrishna, H. Mahapatra, P. Patra and P. Dhandrao, "A novel sorting technique to sort elements in ascending order," International Journal of Engineering and Advanced Technology, vol. 3, pp. 212-126, 2013.
[14] H. Mohapatra, "HCR using neural network," 2009.
[15] V. Nirgude, H. Mahapatra and S. Shivarkar, "Face recognition system using principal component analysis & linear discriminant analysis method simultaneously with 3d morphable model and neural network BPNN method," Global Journal of Advanced Engineering Technologies and Sciences, vol. 4, p. 1, 2017.
[16] R. Kumar, S. Edalatpanah, S. Jha, S. Gayen and R. Singh, "Shortest path problems using fuzzy weighted arc length," International Journal of Innovative Technology and Exploring Engineering, vol. 8, pp. 724-731, 2019.
[17] R. Kumar, S. Jha and R. Singh, "A different approach for solving the shortest path problem under mixed fuzzy environment," International Journal of fuzzy system Applications, vol. 9, no. 2, pp. 132-161, 2020.
[18] R. Kumar, S. Jha and R. Singh, "Shortest path problem in network with type-2 triangular fuzzy arc length," Journal of Applied Research on Industrial Engineering, vol. 4, pp. 1-7, 2017.
[19] S. Broumi, A. Dey, M. Talea, A. Bakali, F. Smarandache, D. Nagarajan, M. Lathamaheswari and R. Kumar, "Shortest path problem using Bellman algorithm under neutrosophic environment," Complex & Intelligent Systems, vol. 5, pp. 409--416, 2019.
[20] R. Kumar, S. Edalatpanah, S. Jha, S. Broumi, R. Singh and A. Dey, "A multi objective programming approach to solve integer valued neutrosophic shortest path problems," Neutrosophic Sets and Systems, vol. 24, pp. 134-149, 2019.
[21] R. Kumar, A. Dey, F. Smarandache and S. Broumi, "A study of neutrosophic shortest path problem," in Neutrosophic Graph Theory and Algorithms, F. Smarandache and S. Broumi, Eds., IGI-Global, 2019, pp. 144-175.
[22] R. Kumar, S. Edalatpanah, S. Jha and R. Singh, "A novel approach to solve gaussian valued neutrosophic shortest path problems," International Journal of Engineering and Advanced Technology, vol. 8, pp. 347-353, 2019.
[23] R. Kumar, S. Edaltpanah, S. Jha, S. Broumi and A. Dey, "Neutrosophic shortest path problem," Neutrosophic Sets and Systems, vol. 23, pp. 5-15, 2018.
[24] R. Kumar, S. Edalatpanah, S. Jha and R. Singh, "A Pythagorean fuzzy approach to the transportation problem," Complex and Intelligent System, vol. 5, pp. 255-263, 2019.
[25] J. Pratihar, R. Kumar, A. Dey and S. Broumi, "Transportation problem in neutrosophic environment," in Neutrosophic Graph Theory and Algorithms, F. Smarandache and S. Broumi, Eds., IGI-Global, 2019, pp. 176-208.
[26] J. Pratihar, S. E. R. Kumar and A. Dey, "Modified Vogel's Approximation Method algorithm for transportation problem under uncertain environment," Complex & Intelligent Systems (Communicated).
[27] J. Sakhnini, H. Karimipour, A. Dehghantanha, R. Parizi and G. Srivastava, "Security aspects of Internet of Things aided smart grids: A bibliometric survey," Internet of Things, pp. 100-111, 2019.

[28] S. Gayen, F. Smarandache, S. Jha and R. Kumar, "Interval-valued neutrosophic subgroup based on interval-valued triple t-norm," in Neutrosophic Sets in Decision Analysis and Operations Research, M. Abdel-Basset and F. Smarandache, Eds., IGI-Global, 2019, p. 300.
[29] S. Gayen, F. Smarandache, S. Jha, M. Singh, S. Broumi and R. Kumar, "Introduction to plithogenic subgroup," in Neutrosophic Graph Theory and Algoritm, F. Smarandache and S. Broumi, Eds., IGI-Global, 2020, pp. 209-233.
[30] S. Gayen, S. Jha, M. Singh and R. Kumar, "On a generalized notion of anti-fuzzy subgroup and some characterizations," International Journal of Engineering and Advanced Technology, vol. 8, pp. 385-390, 2019.
[31] S. Gayen, F. Smarandache, S. Jha, M. K. Singh, S. Broumi and R. Kumar, "Introduction to plithogenic hypersoft subgroup," Neutrosophic Sets and Systems, vol. 33, p. Accepted, 2020.
[32] S. Gayen, S. Jha and M. Singh, "On direct product of a fuzzy subgroup with an anti-fuzzy subgroup," International Journal of Recent Technology and Engineering, vol. 8, pp. 1105-1111, 2019.
[33] Behura and H. Mohapatra, "IoT Based Smart City with Vehicular Safety Monitoring," EasyChair, vol. 1535, 2019.
[34] P. H, M. H and R. A.K, "WSN-Based Water Channelization: An Approach of Smart Water," Smart Cities—Opportunities and Challenges. Lecture Notes in Civil Engineering, vol. 58, pp. 157-166, 2020.
[35] D. M. V. K. Prof. M. S. Sujatha, "Online monitoring and analysis of faults in transmission and distribution lines using GSM technique," vol. 33 No.2, 30 Nov 2011.
[36] P. D. M. N. R. K. Ms. Devjani Banerjee, "Three PhaseParameter Data Logging and Fault Detection Using GSM Technology," vol. 3, no. 2, feburary feburary 2013.
[37] N. B. A. C. L. V. Z. Andrea Zanella, "Internet of Things for Smart," Internet of Things Journal, vol. 1, pp. 22-32, feburary 2014.
[38] S. D. H. R. S. K. Poonam Borle, "Automatic Meter Reading for Electricity," International Journal of Advanced Research in Electrical Electronics and Instrumentation Engineering, vol. 2, pp. 982-987, March