

Review on Electrical Power Theft Detection

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Abstract: This paper presents a detection of power theft in every house and in industry for different methods of theft. Electrical energy is very important for everyday life and spine for the industry. Electricity is indiscipline to our daily life with increasing need of electricity the power theft is also increasing, power theft is a problem that continues to plague power sector across whole country the objective of this project is to design such a system which will try to reduce the illegal use of electricity and also reduce the chances of theft. This project will automatically collect the reading and also detect the theft this model reduces manual manipulation work and try to achieve theft control.

Now a day's electricity theft is a major issue face by all electricity companies. Since electricity theft directly affect the profit made by electricity companies, detection and prevention of electricity theft is necessary. In this paper we present a broad introduction about electricity theft. We also presented the work done in this area up till now, talk about techniques used and their performance. Finally comparison of these techniques is done.

Keywords: GSM Modem, Current Transformer, ATMega238, Energy Meter.

1. INTRODUCTION:-

As we know electricity theft is a major problem for all electricity companies. This problem is not related to Indian companies only; other country's electricity companies also face this problem. Electricity companies losses money every year due to theft. There are two types of losses namely transmission loss and non-transmission loss, some research papers uses term technical loss and non-technical loss respectively. Transmission loss occurs while transmitting energy form generation side to consumer's side. Non-Transmission losses occur due to wrong billing, false meter reading, electricity theft, etc. First two losses can be prevented by taking proper meter reading and calculating accurate bill for electricity consume, but electricity theft hard to prevent since no one predict about which consumer is honest or dishonest. Still losses due to electricity than can be reduce by detecting theft or fraud consumer and taking actions accordingly. Theft detection is done manually by inspecting consumers. This is time consuming process and requires large number of field staff. The cost for this process is too high and detection rate is not so high. To overcome these costs, now a day some data mining, knowledge discovery methods, etc. are used to detect theft.

2. LITERATURE REVIEW

In this paper, [1] G. L. Prashanthi, K. V. Prasad had proposed with GSM modules helps company to monitor the amount of usage by this specified costumer and generate bill periodically and send it to costumer via SMS, thus saving lot of labour work, time and cost of reading .The proposed found to be little bit complex as far as distribution network is concerned, but it's an automated system of theft detection. It saves time as well as

help to maximize profit margin for utility company working in electrical distribution network.

In this paper,[2] S.Anusha, M.Madhavi,R. Hemalatha had done the project model to reduces the manual manipulation work and theft. Use of GSM in our system provides a numerous advantages of wireless network system. The government saves money by the control of theft in energy meter and also more beneficial for customer side and the government side. The metering IC ensures the accurate and reliable measurement of power consumed. Cost wise low when compared to other energy meter without automatic meter reading and theft control.

In this paper,[3] Kalaivani. R, Gowthami. M, Savitha.S, Mohanvel.S had done the system, in which service provider can collect the bill any time with a single message. The data collection and manipulation task becomes fast and easier. Any modification can be made to the code in less time. Changes in rate or unit calculation can be done very effectively. The project model reduces the manual manipulation work and theft. Use of GSM in our system provide the numerous advantages of wireless network systems. The metering IC ensure the accurate and reliable measurement of power consumed. Hence we are trying to manipulate cost wise low when compared to other energy meter without automatic meter reading and theft control.

In this paper,[4] In this paper we are going to proposed GSM based Electricity theft detection system. The system would provide a simple way to detect an electrical power theft without any human interface. This project can be implemented and validated in remote areas. In this system we are looking forward to implement temperature sensor to avoid the short circuit in the system.

In this paper,[5] In this proposed system, RF transmission is used to transmit the meter(M1) reading to PIC microcontroller and second reading from pole side meter(M2) directly taken for comparison. If PIC result is negative then theft is occur. This then send consumer meter number with pole number through a message to authority by using GSM technology.

3. POWER THEFT

Theft of electricity is the illegal practice of thieving electrical power. It is a crime and is punishable by fines and/or imprisonment. According to the annual Emerging Markets Smart Grid Outlook 2015, study by the Northeast Group, LLC, the world loses US\$89.3 billion annually to electricity theft. The highest losses were in India (\$16.2 billion), followed by Brazil(\$10.5 billion) and Russia (\$5.1 billion). The state of Maharashtra which includes Mumbai alone loses \$2.8 billion per year, more than all but eight countries in the world. Nationally, total transmission and distribution losses approach 23% and some state's losses exceed 50%.

4. TYPES OF THEFT

There are more ways to snaffle power. Some techniques are very simple, but effective, while others are sophisticated and difficult to detect including tapping a line or bypassing the energy meter. According to a study, 80% of worldwide theft occurs in domestic consumers and 20% on commercial and industrial premises. The various types of electrical power thefts are as follows.

A) Direct hooking from line

Hooking is the most used method. 80% of world's power theft is by direct tapping from the line. The thief taps into a power line from a point ahead of the energy meter. This energy consumption is immeasurable and procured with or without switches.

B) Bypassing the energy meter

In this method, the input and output terminals of the energy meter is short-circuited, preventing the energy from recording into the energy meter.

C) Injecting foreign element into the energy meter

Meters are controlled via remote by installing a circuit inside the meter, so that the meter can be slowed down at any time. This type of changes can evade external inspection attempts because the meter is always shows correct reading, unless the remote is turned on.

D) Physical obstruction

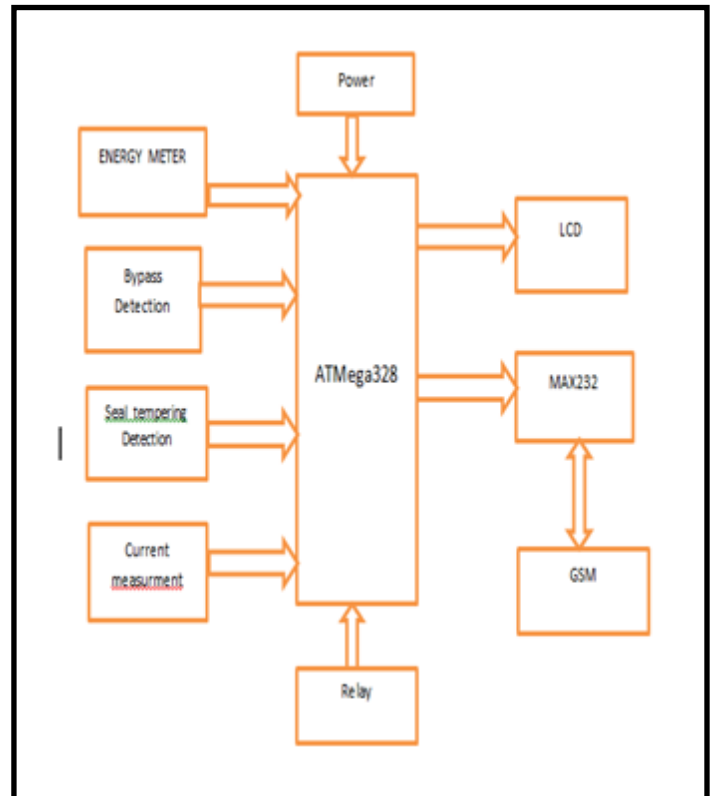
This type of theft is done to electromechanical meters with a rotating element. Foreign material is placed inside the meter to disturb the free movement of the disc. A slower rotating disk signals less energy consumption.

5. PROPOSE OF SYSTEM

In this proposed system GSM and IOT technology used to send the energy theft message to the substation. This process will be happen when needed that means If the person use the power without connecting to energy meter, that means if he is bypassing the connection in energy meter without any reading in energy meter the person use power in houses at time our circuit

send a message to substation controller through GSM with the help of microcontroller and cut the power supply automatically by using relay. Then the energy theft controlled by micro switch, means If the person theft the power in energy meter like, if he remove the seal which on energy meter then Micro switch will send the signal to ATmega238 microcontroller then it will send the message to substation controller mobile through GSM modem

6. BLOCK DIAGRAM



7. CONCLUSION

The project model reduces the manual manipulation work and theft. Use of GSM in our system provides the numerous advantages of wireless network systems. In this way we design a microcontroller based power theft detector circuit. The purpose of designing such system will ultimately reduce the illegal use of electricity, because power theft is non-ignorable crime which has to be minimized. This system will be beneficial to consumer as well as for government. It requires only one time installation cost and can be used further. The big advantage of this system is that it will increase the revenue.

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