

DISTRIBUTED TRANSFORMER ENERGY METER USING GSM TECHNOLOGY

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ABSTRACT

The Distributed transformer meter is located in all user building blocks and a server is preserved from the facility contributor. The electricity is major part for consuming the energy level with cost and obtaining the energy used by customers can be maintain in every sequence of manual process is very difficult to identify. There are some common techniques that are used by customers for theft and leakage of power in one particular transformer and these robberies are detected using GSM. These meters provide the automatic readings data with help of Apriori algorithm. It will reduce the labor task and financial expenditure by adopting the automatic meter reading is to provide the bill entry process. This is very useful and helps to households consumers.

KEYWORDS

GSM, Energy meter, Grid, Automatic Meter Reading.

1. INTRODUCTION

Electricity theft and leakage is a serious problem in power sectors. The large amount of losing occurs every day due to power theft [1].The electricity division is required to be preserved for efficient power delivery to the consumer because electricity is indispensable to household and firm development proceedings. Every year the electricity division fare the losses at an average up to some percentage according to power ministry companies loss more than billions [2].The current meter reading system is very expensive and to take the manual reading from customers household to provide energy bill, which will use for future purposes.

In the existing system is that if one electronic meter damages or stopped due to some technical fault the person will go to inform in electricity office and then the wireman or repair engineer go to solve the problem or replace the damaged meter. This paper presents a smart proposed distribution system to detect illegal electricity consumption, by GSM based smart energy meter and a database installed at the central station. This helps in theft detection, billing and management purposes [3].This metering system have some features that can improve consumer's awareness of actual consumption [4].The reduction of interfering has help to justify the large funding shares in Automated Meter Reading(AMR) and currently some countries are leading countries with high discretion of Automatic meter reading[5].

1.1 Technical Losses

The electricity power is generated from the station and distributed through the networks and transformers. The full volume of power is not able to reach to the customer due to technical losses for example the heavy power is passed to the cable from source to destination but the energy power will losses some voltage and pass to users.

1.2 Administration Loss

Administration losses are not due to the illegal given by unknown connections or missing meters in network. These kinds of losses are happen in the organization data loss.

1.3 Illegal Use of Electricity

Here the illegal use of electricity is happening in hose hold for example the customer use the power supply type is single phase, but he is using the same connection for commercial use this is also an illegal connection. The illegal connection power theft is shown on figure1.

2. METHODOLOGIES OF DISTRIBUTED TRANSFORMER

The power theft monitoring is an important research in electricity power system and electricity stealing prevention became a big problem to the electricity. The proposed system contains GSM based smart energy meters, having the feature of automatic meter reading.

A GSM based energy meter will connect with transformer which will measure the voltage that is going to distribute. The measured values are sending via GSM to the database station. Customer's energy consumption is also measured by an energy meter connected to the specific consumer. The consumer energy meter is also sends the measured value through GSM to the database after the some interval of time. Both of sending values are compared by central database and if any difference occurs between the values then it indicates illegal usage of specific transformers.

2.1 Gsm Based Smart Energy Meter

A smart meter is an electric meter that records the consumption of electric energy in intervals of an hour or less and communicates that information at least daily back to the utility for monitoring and billing purposes. The GSM transceiver is used for the two-way communication between smart meter and central base station. This smart meter will send readings with specified interval of time and also send message in case of any illegal acts by the consumer. Global system for mobile communications (GSM) is the world standard system for mobile communication system. The GSM Technology is used by, most of the people across the world.

The GSM network is used for flexibility and security to the consumer. The meter reports the exact theft locations to the server. The Electricity manager is having response to send the technical employee to check the reported area and can detect the particular problem.

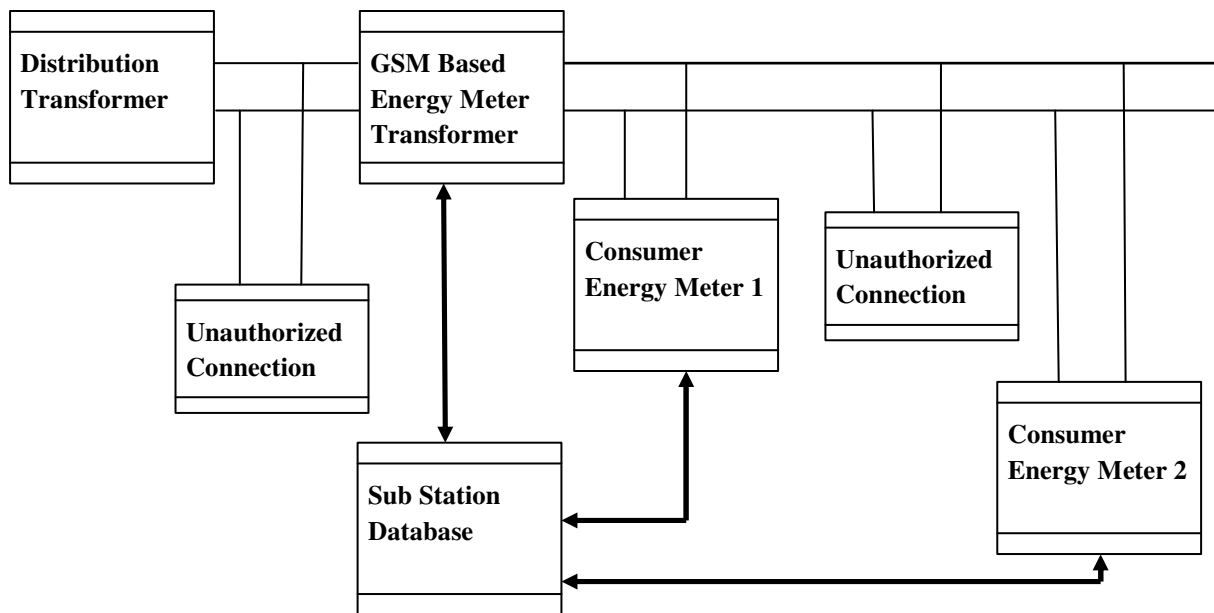


Figure : 1 GSM Based Smart Distribution System(illegal connection taken direct from the distributor)

3. ALGORITHM

In this system we are using the Apriori algorithm for frequent item sets maintain and association rule learning from the databases. It is used proceed the frequent items in the database and extending them to larger item sets as long as those item sets appear sufficiently often in the database.

Apriori algorithm is designed to operate on databases for transactions. Apriori uses a bottom up approach because the frequent subsets are extended one at a time. The pseudo code algorithm is given the transaction database T and support threshold of ϵ .

Step1

Reading is generated automatically through GSM.

Step2

Obtaining the data from the database for finding the customer system

Step3

Locate the customer system with help of GSM through Apriori function.

Step4

Locate the customer by,

$\text{Apriori}(T, \epsilon)$

$L_1 \leftarrow \{\text{large 1-itemsets}\}$

$K \leftarrow 2$

while $L_{k-1} \neq \emptyset$

$C_k \leftarrow \{a \cup \{b\} \mid a \in L_{k-1} \wedge b \in L_{k-1} \wedge b \notin a\}$

For transactions $t \in T$

$C_1 \leftarrow \{c \mid c \in C_k \wedge c \subseteq t\}$

For candidates $c \in C_i$
 Count[c] \leftarrow count[c] + 1
 $L_k \leftarrow \{c \mid c \in C_k \wedge \text{count}[c] \geq \epsilon\}$
 $K \leftarrow k + 1$
 Return $\cup_k L_k$

Step5

Sending the energy meter to the consumer and stop the process.

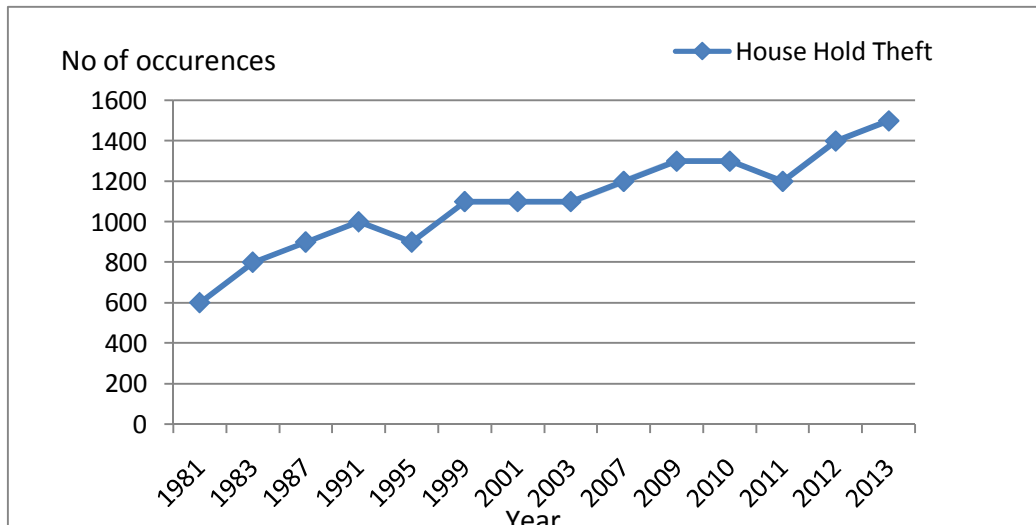
4.COMPARISON RESULT

Figure: 2 Electricity Theft Level Increasing (House Hold)

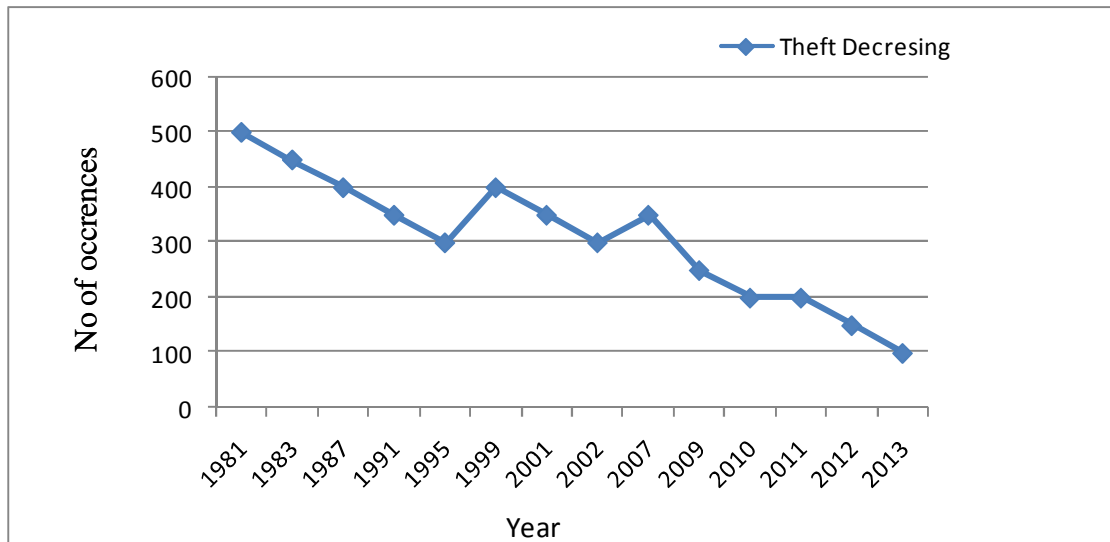


Figure: 3 Electricity Theft Level Decreasing

5. SIMULATION RESULT

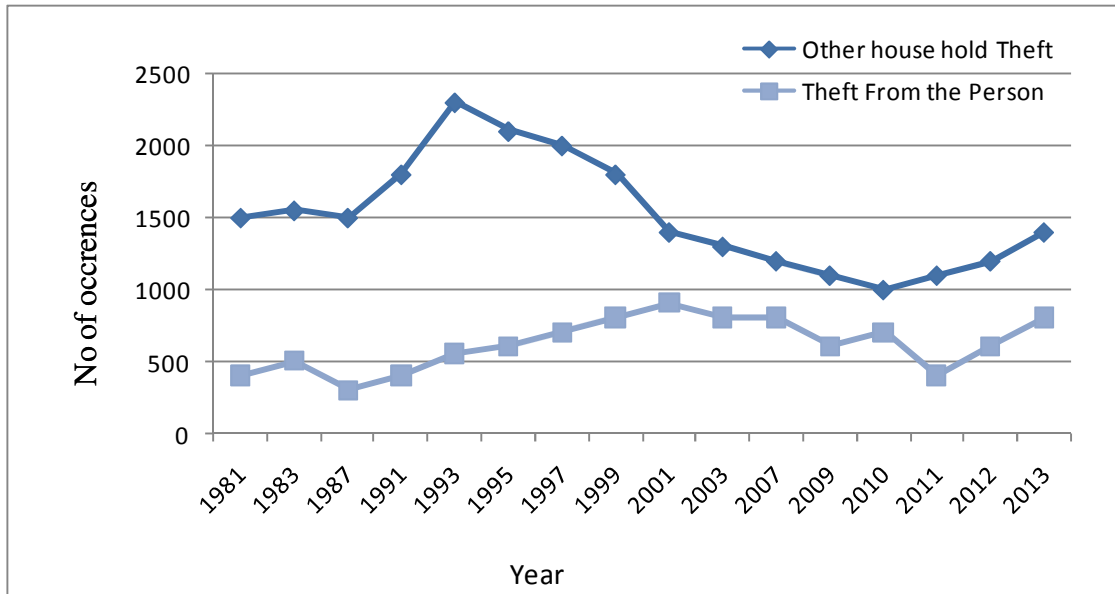


Figure: 4 Statistics of In Electricity Theft in India

6. ADVANTAGES

- Decrease meter reading costs since the load of travelling to read the energy meter reading are removed by using GSM technology, the costs are considerably reduced.
- Reduce the power theft and leakage using the Global system for mobile communication technology.
- In this system all power information can be collected at a centralized at one point.
- The customer can get all the details about his energy consumption form a database without any loss of data.
- Using the energy meter the power theft can be extremely decreased and removed.

7. CONCLUSION

In this paper, we proposed an energy meter which takes advantage of the GSM network that has virtually access household and area across different countries. To control energy theft using our smart energy meter. To solve these kinds of problem the governments provide help in terms to manage the issues. The energy meter is highly useful for power utilities for reducing electricity theft and ensuring proceeds collection. The data collection and manipulation task becomes fact and easier. Changes in rate of unit calculation can be done very effectively.

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