GSM Based Model to Detect Electricity Theft and Irregular usage Across Globe

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Abstract:- **Science and technology with all its astounding developments has spellbound impact on human life. This impact has reached to such an extent that imagining a world without these innovations is nearly impossible. India, is on a road of rapid growth in economy as energy in form of Electricity, is a key input for fast- tracking financial development.**
While technology is on levitation utilization, one should also make a note of the increasing immoral activities.
In India, year after year increase in the number of electricity thefts across domestic as well as industrial electricity supply, finally results in loss of electricity companies' energy due to which we face the frequent problems of load shading in urban as well as rural area. In order to overcome the need of electricity for whole country, detecting and eradicating such crimes with the assistance of the developing scientific field is the "Need of the Hour".
In this paper, we are trying to find the power theft in house or in industries by many ways.
We would like to propose an electricity theft detection system to detect the theft where the proposed system will be hidden in such meters and as soon as an attempt is made for the theft, it will send an SMS to the registered mobile number and email address as well as to the control unit of electricity board.
In this paper, the input and output current of a particular pole is compared by using current transformer. If there is any negative value means it is indicated that the particular polehas drawn more current as theft/problem. Here one current transformer is placed in input part of the post line. Other current transformers are located at the inbuilt ADC converter. After that PIC compares the input current and the sum of output currents. If compared result has any negative value then this particular post is detected as theft point. This compared value is conveyed through RF transmitter. RF receiver is placed in electricity board office. This RF receiver receives this value and given as input to PIC. PIC displays this value in LCD display. The information will then be quickly processed by the microcontroller and a SMS will be sent through the GSM technology.

Key words: Current sensor, voltage sensor, liquid crystal LCD display, GSM 16bit PIC16F877A, Relay Energy Meter.

I. INTRODUCTION

We would like to propose an electricity theft detection system to detect the theft where the proposed system will be hidden in such meters and as soon as an attempt is made for the theft, it will send an SMS to the registered mobile number and email address as well as to the control unit of electricity board. In this paper input and output current of a particular pole is compared by using current transformer. If there is any negative value means it is indicated that the particular pole has drawn more current as theft/problem. Here one current transformer is placed in input part of the post line. Other current transformers are located at the inbuilt ADC converter. After that PIC compares the input current and the sum of output currents. If compared result has any negative value then this particular post is detected as theft point. This compared value is conveyed through RF transmitter. RF receiver is placed in electricity board office. This RF receiver receives this value and given as input to PIC. PIC displays this value in LCD display. The information will then be quickly processed by the microcontroller and a SMS will be sent through the GSM technology.

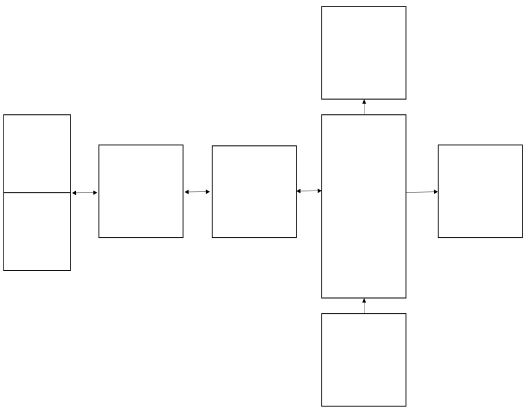

Fig. 1.Block Diagram of Power Theft

ERROR SIGNAL= MAXIMUM DEMAND-UTILIZATION LOAD

II. EXISTING METHODS

As we come to the existing methods wireless communication system of energy meter used with Zigbee, relay control and GPRS. The cryptographic method is utilized to protect the communication channel and Zigbee for the transmission of data in a serial method.

III. PROPOSED METHODS

Now in the projected method GSM technology used to communicate the meter reading to the government with the essential cost. Fig 1 given above demonstrates the schematic diagram ofpower theft.

A. Energy Meter

Energy meter is a device that analyses the cost of

electricity consumed by a household, commercial, or electrically powered device. In this paper our meter box made of current transformer, IR sensor and magnetic reed switch. According to the energy meter calculates the reading with the help of the current transformer. IR sensor and magnetic reed switch are used to detect the theft in energy meter. Fig 2 shows the maximum demand of load

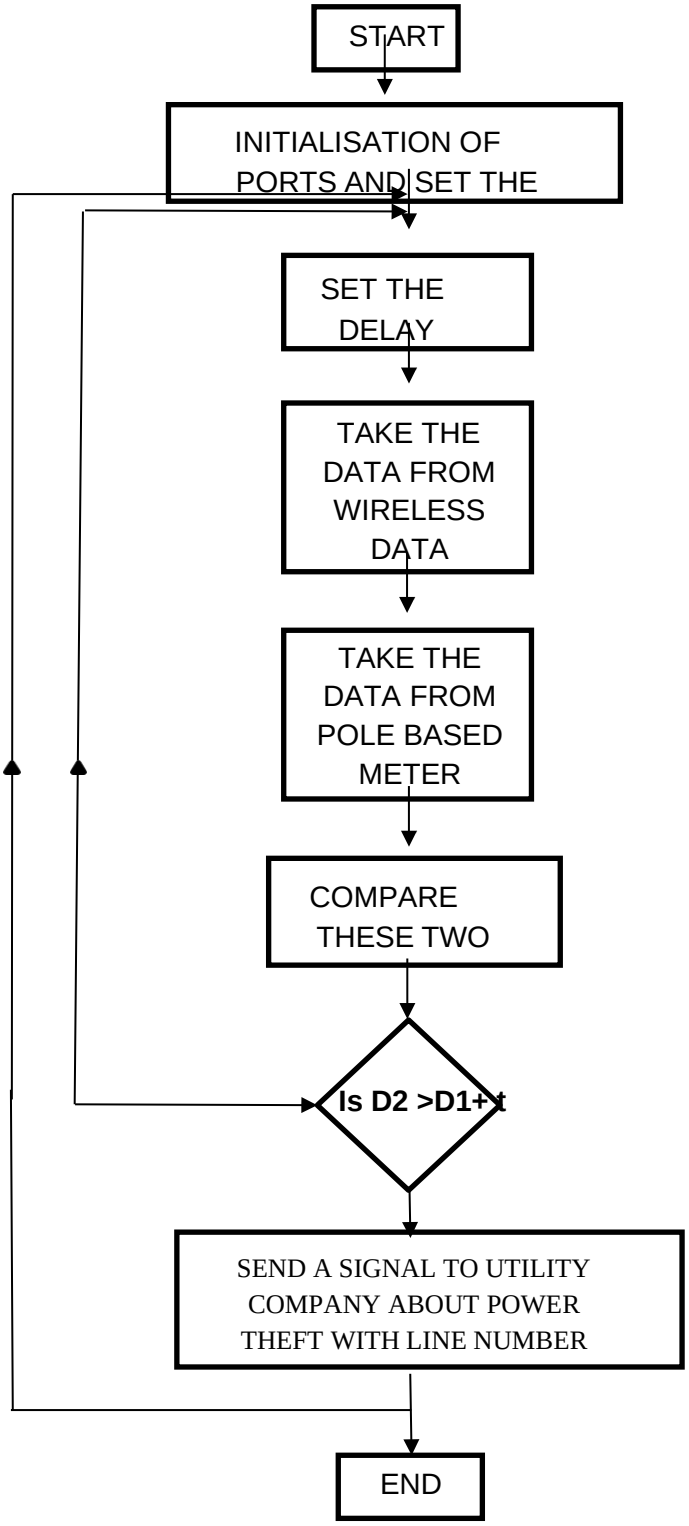

Fig. 2. Maximum Demand

IV. POWER SUPPLY

The input to the circuit is applied from the controlled power supply. The AC input i.e., 230V from the mains supply is step down by the transformer to 12V and is fed to a rectifier. The output attained from the rectifier is a pulsating DC voltage. So, in order to get a pure DC voltage, the output voltage from the rectifier is fed to a filter to remove any AC components present even after rectification.

Now, this voltage is given to a voltage regulator to obtain a pure constant dc voltage.

V. CURRENT TRANSFORMER

Current Transformers (CT's) can be used for monitoring current or for transforming primary current into reduced secondary. Current used for meters, relays, control equipment and other instruments. CT's transform current insulates the high voltage primary, permit grounding of the secondary, and step-down the magnitude of the measured current to a standard value that can be safely held by the instrument.

VI. GSM TECHNOLOGY

GSM was designed with a moderate level of service security. The system was designed to validate the subscriber using a pre-shared key and challenge-response. The development of UMTS introduces an optional Universal Subscriber Identity Module (USIM), that uses a longer authentication key to give greater security, as well as mutually authenticating the network and the user - whereas GSM only authenticates the user to the network (and not vice versa). Communications between the subscriber and the base station can be encoded. The security model therefore offers confidentiality and authentication, but limited authorization capabilities, and no non-repudiation.

VII. PIC PROCESS OF THE SYSTEM

The PIC is the main part of theft control. It is based on low power 16bit PIC16F877A processor. PIC consists of high performance and low cost of network technology. The memory organization of PIC consists of three memory blocks. The program memory organization consists of 13bit program count memory space. Data memory split into number of banks and it consist of GPR and SFR. The general-purpose register file can be accessed in a straight line or in some way through the file select register. SFR is used in the processor and peripheral for controlling the system.

VIII. FLOWCHART

To program a micro-controller to detect a power theft on one-line following flowchart as shown in Fig 3 is used. Firstly, initialize ports of micro- controller as input or output as per required. Set the tolerance in program depending on the lossof line for which this system is installed. Setting of the delay time (say 10min) which is depending on after how much time interval system scan the line for theft detection. Take the data from wireless data

receiver at present time interval (10min). It represents power consumed by load over given time. Take the data from meter installed on pole at the same time. It will represent the power sent over that line for present value (10min). If power sent on line is more than power consumed by that load over a given time considering tolerance the power theft or the problem which is occurring on that line. Send the signal of power theft with the line number and its area to utility company. For this wireless transmission or power line communication can be used. If power theft is not occurring on that line then again take the data after say 0min. t's an endless program that goes on and on.

IX. CONCLUSION & FUTURE SCOPE

The project model lessens the manual manipulation work and theft. With the use of GSM in the system there are numerous advantages as it use wireless network systems. The government not only saves money by the control of theft in energy meter but it is also advantageous for customers. The metering IC ensures the accuracy and provides a reliable measurement of power consumed. Cost wise low when compared to other energy meter that are not automatic and have theft controlfeatures.

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