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ELECTRICAL POWER ROBBERY DETECTION AND TRANSFORMER FAULT DETECTION

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Abstract - *Electrical power robbery detection system is utilized to identify an unapproved tapping on conveyance lines. Existing system is not ready to recognize the correct area of tapping. This system really discovers on which electrical line there is a tapping. This is a constant system. Remote information transmission and accepting strategy is utilized. This will give an extra office of remote meter perusing with a similar method and in same cost. This will shield conveyance arrange from control robbery done by tapping, meter altering and so forth. Dispersion transformers are a standout amongst the most vital hardware in control arrange. In light of, the huge number of transformers appropriated over a wide region in control electric systems, the information securing and condition observing is an essential issue. This task demonstrates the plan and execution of a portable implanted system and a novel programming to screen and analyse state of transformers, by record key operation indicators of a conveyance transformer like load streams, transformer oil, encompassing temperatures and voltage of three stages. The proposed on-line checking system incorporates a Global Service Mobile (GSM) Modem, with remain solitary single chip microcontroller and sensor bundles. Information of operation state of transformer gets in type of SMS (Short Message Service).*

Key Words: **Fault detection, Transformer management, Wireless data transmission, GSM, Power theft.**

1. INTRODUCTION

In practically every place where individuals live and work you will notice no less than one transformer. In any case, as much long as it keeps work and giving energy to the elevator of the retail chain, the motel lift, the work environment PC, the broiler alongside the neighborhood bread shop, the storage facility gear and the petrochemical plant no one offers that a misgiving. However, transformers are one of the most important units among each production process. Without them the interior activities of almost every commercial enterprise and manufacturing facility would come to a standstill with serious financial consequences. Distribution Transformers have a long service life if they are operated underrated conditions. The operation of these transformers under conditions such as like overloading then voltage unbalance for a long period intention reduce their life significantly. To be aware of occurring these conditions, the operation of these transformers should be controlled continuously. Most power organizations utilize Supervisory Control and Data Acquisition (SCADA) System for online Control of energy transformers, however expanding the SCADA System in view of internet observing about conveyance transformers is an expensive suggestion. Communication network and GSM devices such as GSM modems have a large attraction in wide area network applications. To conquer the transferring and collecting problem of this large amount of data about transformer's condition, these devices would be so useful to transfer and acquire the large amount of data about the transformer's condition. So with development of infrastructure of wireless communication, offer new and cost effective possibilities to monitor distribution transformers. We propose structure of a cost effective method for monitoring for distribution transformers with help of communication network and Distribution Transformer Monitoring and Analysis Software (DTMAS) compatible with this system.

Assume in that place is tapping done by somebody unapproved individual on hold to interface his machine. Over a specific period there will be distinction between meter perusing and post based absolutely perusing. Microcontroller will inspect these two esteems or if the deliberate cost over shaft is more than values send by meter by some resistance after power exchange is happening over line. This burglary flag created over shaft arrangement may likewise stay transmitted to substation by the utilization of electrical cable correspondence method, Tolerance be provided on the grounds that misfortunes over line. Since over a long span there will remain contrast between perusing meter on allot perspective and post side due as per loss of level of shaft at that point stack. Therefore, tolerance should be provided through programming of micro-controller. Due to introduction of modern electronic metering equipment's, power thieves are utilizing more technological methods. Recent instances over power theft determined by British inspectors included customers tunneling out to roadside mains cables or splicing into the supply, a storage reception its night-time power supply from the nearest lamp post and domestic customers drilling holes into meter boxes and attempting to stop the counter wheels from turning. Another approach about

Power theft is with the aid of maintaining a strong magnet in front of the disc into the energy meter or therefore arresting the rotation of the disc, connecting Already Exists the load without delay to the monitoring line bypassing the energy meter.

2. LITERATURE SURVEY

Power can be delivered through numerous ways which is then synchronized on a fundamental System for use. The principle issue for which we have composed this study paper is misfortunes in electrical System. Design or improvement of Automatic meter reading (AMR) system. AMR rule is a growth for remote monitoring then control domestic energy meter. This paper offers with automated meter reading then theft limit system of energy meter. This model reduces the manual manipulation work and theft control.

In the paper, I referred to that wireless electrical energy theft detection system the use of Zigbee technological know-how present an efficient and less costly way according to sophisticated the wireless approach used in that research paper.

In the paper, as depicted so much Electrical power robbery location System is utilized as a part of agreement with perceive an unapproved tapping touching conveyance lines. Execution put about that System is an appropriation arrange concerning electric power supply System. Existing System is not ready to select the particular area on tapping. Wireless data transmission and receiving technique is used. This will shield appropriation organize from control robbery done by utilizing tapping.

Unique In the current past, a few procedures were proposed for recognizing the area concerning direct tapping over a feeder at that point make outing illicit buyers. On a parallel track, some non-specialized measures, for example, assessment of clients with suspicious load profiles and battling against illicit utilization, were additionally actualized to control power burglary. Interesting a few methods (proposed around the world) are depicted in this area.

The significance and the financial variables of robbery location are presented and the current practices and encounters are talked about. The paper also proposes another system for mechanized detection over illicit usage of power inside the future appropriation systems prepared along brilliant estimation foundation. The fundamental information prerequisites for smart meters and dispersion substations are characterized, keeping in mind the end goal to open this element in distribution arrange.

2.1 Objectives

- To give a basic approach to make out an electrical power robbery with no human help.
- To demonstrate correct zone and appropriation line on which unapproved taping is done continuously.
- To retailer time if distribution organization employees take analyzing with the aid of that wireless technique.
- To maximize revenue generation by the power utility companies.

3. PROPOSED SYSTEM

Consider a conveyance System appeared in Figure 1. Three wires 1 phase supply, 1 neutral & 1 road light are associated between the two poles. They are two C. T are set on the stage wire for measuring approaching and active current. By preparing these two approaching and active current we can identify the unapproved tapping.

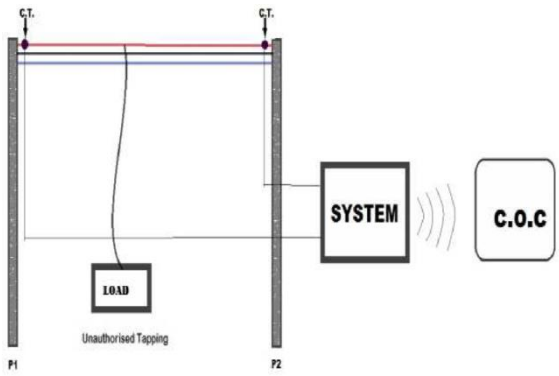

Fig-1: Proposed distribution system

Those present evaluations are identify by the System and that System microcontroller based reached by the GSM innovation that is send the SMS through the inside spectator System so they will effectively locate the correct area control robbery.

A high recurrence flag is presented in the distribution arranges which changes its adequacy and recurrence as the heap in the lines increments or reductions. The progressions will be make ousted through the pickup identifiers if any unlawful association is made between the posts at that point there will be alteration in the estimations of pick up and through which the illicit association in the power will be found and appropriate move will be made by the experts to kill such association however this approach is not striven for the burglary identification for the clients unlawful utilize and it is foundation based. Remote information transmission and accepting method is utilized. This will give an extra office of remote meter perusing with a similar method and in same cost. This will shield circulation arrange from control robbery done by tapping, meter altering and so on.

Utilization of GSM in our System gives a various favorable circumstance of remote system structure. The administration spares cash by the control of robbery in energy meter and furthermore more useful for client side and the administration side. The metering IC guarantees the exact and dependable estimation of energy devoured. Cost insightful low when contrasted with other vitality meter without programmed meter perusing and robbery control.

4. SYSTEM DESIGN AND IMPLEMENTATION

The System equipment consists of four equipment modules: Transducer box, GSM modem, GSM systems and PC-based server. The general structure of this System is delineated in Fig.2. The Transducer box is situated at the transformer site. It is utilized to influence estimation to flag perfect for sending by GSM modem. The second is the GSM module. It can be associated with a PC gadget by means of their serial ports. The GSM modem is utilized as a short message server (SMS) gadget that transmits the parameters as an SMS. It can send and get messages containing a most extreme of 160 characters. It is the connection between the Transducer box and people in general GSM organize.

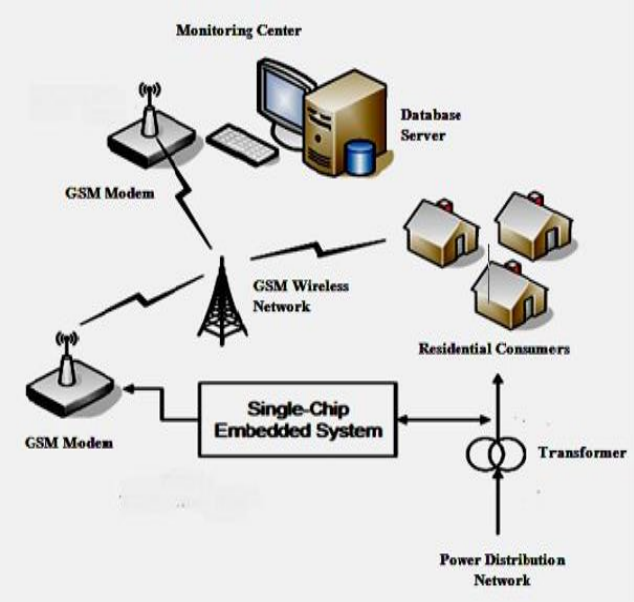

Fig-2:Hardware scheme diagram

An IR-Sensor is utilized to detect if any theoretical go through that sensor way and it will work in low voltage, which implies the power utilization is low. The yield of sensor is given to the pre-enhancer for adding additional quality to the signs in light of the fact that the yield of sensor can't drive any circuit specifically. So this area is utilized to open up the powerless flags and changing over it into solid one. A 89C51RD2BN microcontroller, which works as the Central Processing Unit (CPU) of our task which keeps running according to the program written in it. A 16x2 LCD Display is utilized to show the status of the different sensors utilized and the messages that are to be sent to the individual at the cautiousness division. Here we utilize an I2C-EEPROM, which stores the refreshed information in the microcontroller, on the grounds that at whatever point the power goes off microcontroller memory is lost, so we can place data into I2C-EEPROM. The energy of the memory is controlled by CMOS battery.

A MAX-232 IC is utilized to impart between microcontroller unit and the GSM modem. It exchanges the information to GSM and gets the information from the microcontroller unit. This unit changes over microcontrollers TTL signals into RS232 flag sort as the GSM modem needs RS232 signals. For the support of the transformer, temperature sensor and an oil-coast sensor are utilized. Here a gadget named LM-35 is utilized as a temperature sensor to screen the temperature of the transformer and to screen the oil-level present in the transformer we utilize an oil-skim sensor. With a specific end goal to detect the power burglary, we utilize a present sensor. The messages with respect to the upkeep of the transformer are sent to the support office, utilizing the GSM-module.

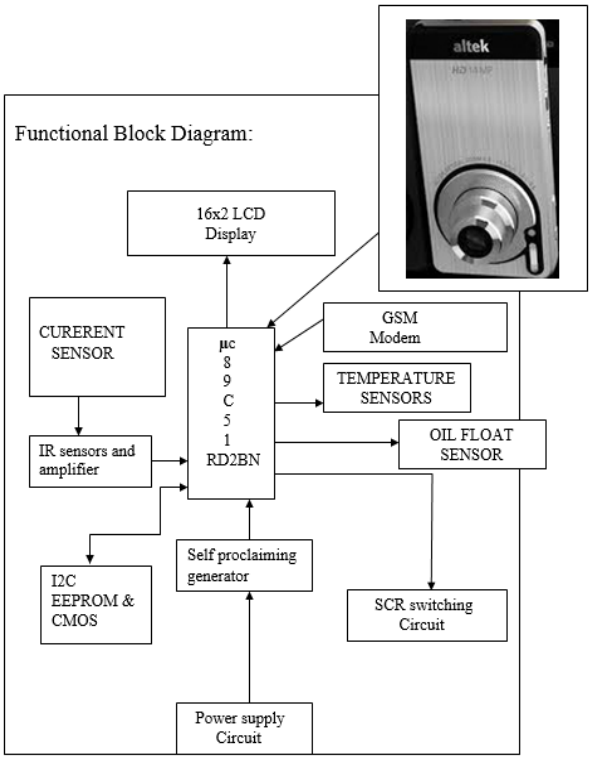

Fig-3:Functional Block Diagram

The components used to develop the system is described as,

- GSM Module : SIM300 is a Tri-band GSM/GPRS motor that takes a shot at frequencies EGSM 900 MHz, DCS

1800 MHz and PCS 1900 MHz. SIM300 highlights GPRS multi-opening class 10/class 8(optional) and underpins the GPRS coding plans CS-1, CS2, CS-3 and CS-4. An AT Command can be utilized to get data in SIM card. The SIM interface bolsters the usefulness of the GSM Phase 1 detail and furthermore underpins the usefulness of the new GSM Phase 2+ particular for FAST 64 kbps SIM (expected for use with a SIM application Tool-kit). Both 1.8V and 3.0V SIM Cards are upheld. The SIM interface is controlled from an interior controller in the module having ostensible voltage 2.8V. All pins reset as yields driving low.

- Micro-Controller: Microcontroller is the mind of the task, it will keep running as indicated by the program must be composed, here we have utilized as a SST 89C51 microcontroller.

- Current Sensor: A present sensor is a gadget that make outes electric current (AC or DC) in a wire, and produces the beats with settled interim of time.

- LCD-16X2: We are utilizing 16x2 LCD (fluid precious stone show) show, it will show the status of the System. It has 16 segments and 2 lines. It will show a 16 letters in a one column or a one line.

- SCR Relay Circuits: It goes about as a programmed switch. We can utilize this strong state transfer to stumble on and trip off the power.

- IR Sensor: It will detect if any conceptual go through that sensor way and it will work in low voltage, implies control utilization is low.

- Analog to Digital Converter (ADC): Since temperature sensor gives simple information and microcontroller acknowledges just computerized, we utilize a simple to advanced converter to change over the simple contribution to advanced info so that the microcontroller acknowledges the info.

- Switching Adapter: The exchanging connector is utilized to supply the voltage to the microcontroller unit. Which has input: 100-240V~50/60Hz 0.8A and yield: +12V, 2A.

- Android Phone: Android Phones are utilizes for the accompanying reason, Sending and accepting SMS, Voice notice, Tracking the area and Sending and getting photographs.

The need of utilizing small scale controller emerges from the way that, for an item plan which requires just a straightforward System, the utilization of microchip is undesirable. The miniaturized scale controller make outs all the capacity expected to make up a straightforward chip System and puts whatever number as could reasonably be expected in a solitary IC. The small scale controller utilized as a part of this task is AT 8951, which is a 40 stick plunge IC. It helps in filtering, decrying, System interpreting and serial transmission circuits and so on. IC 89c51 is second era 8-bit small scale controller. Parallel tallying of vitality meter perusing and concurrent examination of these readings are performed by the IC. The utilization of microcontroller has made the whole System more compelling and precise.

Point of the Remote power observing is to gauge the correct measure of energy that is devoured by the client at a given moment of time so the power estimation unit is basic and is associated on the purchaser side. The power is measured by utilizing the instrument transformers. Instrument transformers are utilized for estimation and defensive application, together with gear, for example, meters and transfers. Their part in electrical Systems is of essential significance as they area methods for “venturing dow" the current or voltage of a System to quantifiable esteems, for example, 5A or 1A on account of a present transformers or 110V or 100V on account of a voltage transformer. This offers the preferred standpoint that estimation and defensive gear can be institutionalized on a couple of estimations of current and voltage.

5. RESULTS AND DISCUSSION

The effective improvement of the remote programmed robbery observing System looks as appeared in figure 4. This incorporates every one of the parts other than portable. This photo gives an unmistakable likeness the whole System proposed in this examination.

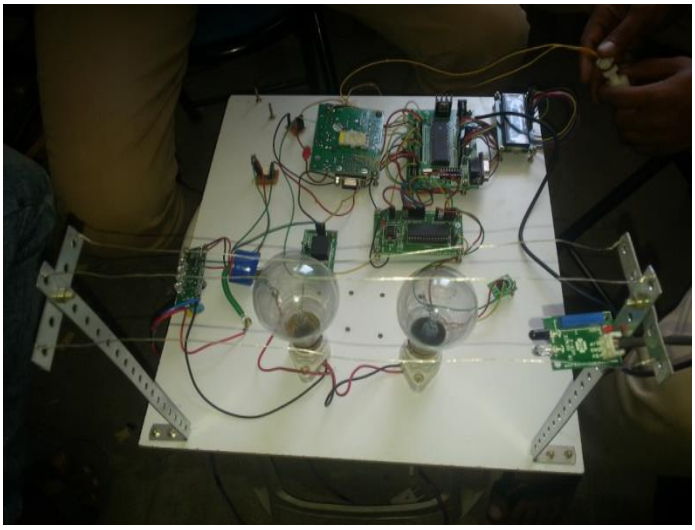

Fig-4: Functional Block Diagram

On the off chance that the power robbery happens, the present sensor detects it and the "POWER THEFT" message is sent to the watchfulness office through the GSM module. It is additionally shown on the LCD show.

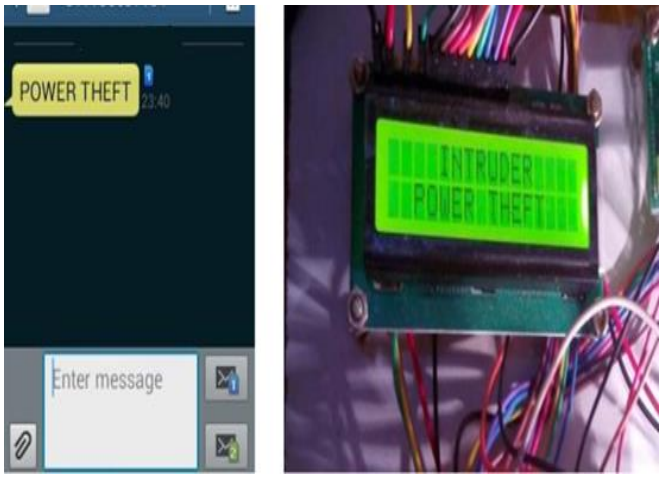

Figure-5:Power theft detection

If any intruder is found, the IR sensor gets activated and the "INTRUDER" message is sent to the person at the maintenance department through the GSM module. The message is also displayed on the LCD display.

Fig-6:Intruder found detection

If the temperature of the transformer is going abnormal, the temperature sensor gets activated and the message "TEMPERATURE HIGH" is sent to the person at the maintenance department through the GSM module. The temperature value is displayed on LCD display.

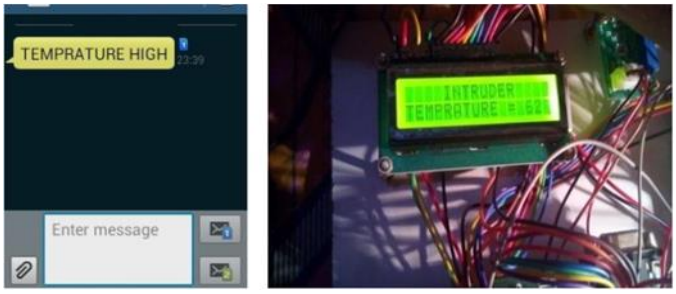

Fig-7: Temperature high detection

If the oil-level in the Transformer goes to the minimum level, the oil-level sensor gets activated and the message "OIL LEVEL LOW" is sent to the person at the maintenance department through the GSM module. The message is also displayed on the LCD display.

Fig-8: Oil level low detection

6. CONCLUSIONS

The System configuration for the most part focuses on single stage electric dispersion System, particularly. The proposed System gives the answer for a portion of the fundamental issues confronted by the current Indian matrix System, for example, wastage of vitality, control burglary, and transmission line blame. The advance in innovation about electrical circulation arranges is a constant procedure. New things and new innovation are being concocted. The proposed System detected to be smidgen intricate to the extent appropriation arrange is concerned, yet it's a mechanized arrangement of burglary location. It spares time and also help to amplify net revenue for service organization working in electrical appropriation arrange. Service organization can watch out for its client. We have depicted a propelled remote observing System for conveyance transformers using the current GSM correspondence organize, which has low speculation and operation costs. It is likewise simple to introduce and utilize. For this reason, we have presented novel programming (DTMAS) and utilized it for three distinct sorts of circulation transformers so as to investigate voltage unbalance condition.

In the future, this venture can be actualized and approved in remote ranges. Future upgrades can be consolidated to suit the System for three stage electric conveyance System in India. Alongside this new design segments can be consolidated, with the goal that the System can be totally utilized for upgrading the vitality utilization. This strategy will decrease the vitality wastage and spare a considerable measure of vitality for some time later. Rather than utilizing remote information transmission strategy, one can utilize control line correspondence. In control line correspondence information flag is tweaked on control flag and sent it through a same electrical dispersion organizes. This will diminish the cost for particular correspondence line.

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