

IOT BASED POWER THEFT DETECTION

¹Dr. A. Rajasekaran, ²P. Ajay Sai ³P. Bhanu Teja ⁴P.G.S. Swetha Priya

¹Assistant Professor, ^{2,3,4}UG Scholar

^{1,2,3,4} Department of Electronics & Communication Engineering

^{1,2,3,4} SCSVMV, Kanchipuram, India

Abstract: Science, and technology with its miraculous advancements fascinated human life to an honest extent that will imagine a world without these innovations is hardly possible. While technology is on the raising slope, we should always also note increasing immoral activities. With a technical view, "Power Theft" is also a non-ignorable crime that's highly prevalent, and at the same time, it directly affects the economy of a nation. Detecting and eradicating such crimes with the help of the developing scientific field is that the "Need of the Hour". With these views the was paper conceived and designed. Our paper provides an entire and comprehensive tool to stop power theft which is extremely simple to understand and easy to implement. It includes some sections -transmitting, receiving, and processing sections. The most objective of this project is to point power theft to the electricity board. It's carried over through embedded technology. Here a wireless method is utilized to hunt out electrical theft.

Index Terms: Microcontroller, sensors, GSM modem, LCDINTRODUCTION

Power theft is that the most important problem in recent days which causes a lot of loss to electricity boards. In countries like India, these situations are more often, if we are ready to prevent these thefts we will save a lot of power. The electrical power theft detection system is used to detect unauthorized tapping on distribution lines. Implementation of a neighbourhood of this system might be a distribution network of the electrical power supply system. The existing system isn't ready to identify the precise location of tapping. This proposed system finds which electrical line there is a tapping. This is often a real-time system.

The power grid has become a necessity within modern society. Without a stable and reliable power system, tens of many people's lifestyles are going to be degraded dramatically. for example, the India blackout in July 2012 affected quite 60 million people (about 9% of the planet population) and plunged 20 of Indian 28 states into darkness. Indeed, the normal power grid, which is surprisingly still grounded on the planning more than 100 years ago, cannot be suitable for today's society. With the event of a data system and communication technology, many countries have been modernizing the aging power grid into a smart grid, which is featured with the two-way transmission, high reliability, real-time. Demand response, self-healing, and security. —A smart grid is an electrical grid that includes a variety of operational and energy measures including smart meters, smart appliances, renewable energy resources, and energy efficiency resources.\

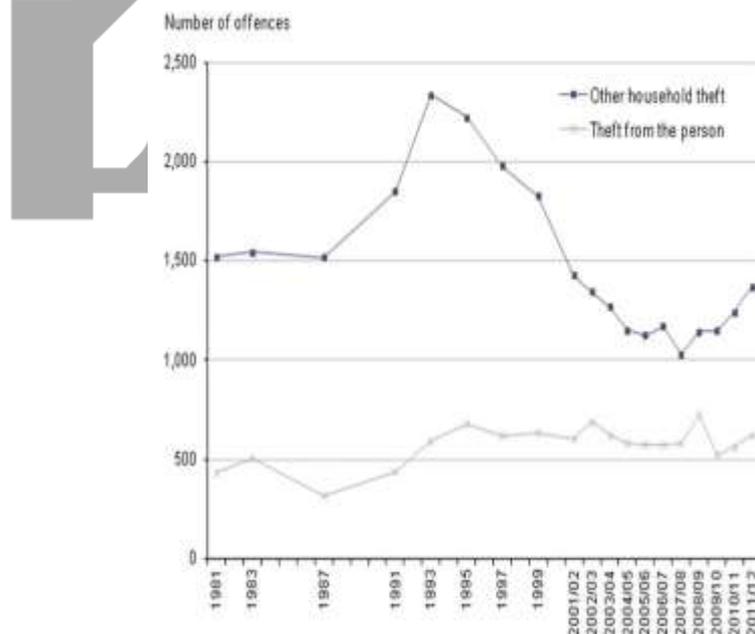


Figure 1: statistics of electricity theft in India

The problem challenging power utilities worldwide is that the electricity, in other words using electricity from utility company without the company's consent. Significantly, it's enough to destroy the whole power sector of the country. Consistent with source 20% losses means the masses would have to be compelled to pay an extra 20% in terms of electricity tariffs. This paper discusses the matter of electricity theft and the proposed system to calculate and judge the seal braking and also whether electricity stealing has happened or not.

REVIEW STAGE

The existing system for detecting power theft isn't an efficient one. The facility theft happening is detected while taking the energy meter readings by calculating the difference between the facility received within the transformer which received within the destination. No measure is taken to forestall it.

Final Stage

The proposed system involves detecting power theft and also takes necessary actions on the spot. Using IOT application we can detect the power theft and send the status of the transmission lines, capture the photos of the facility theft and also track location.

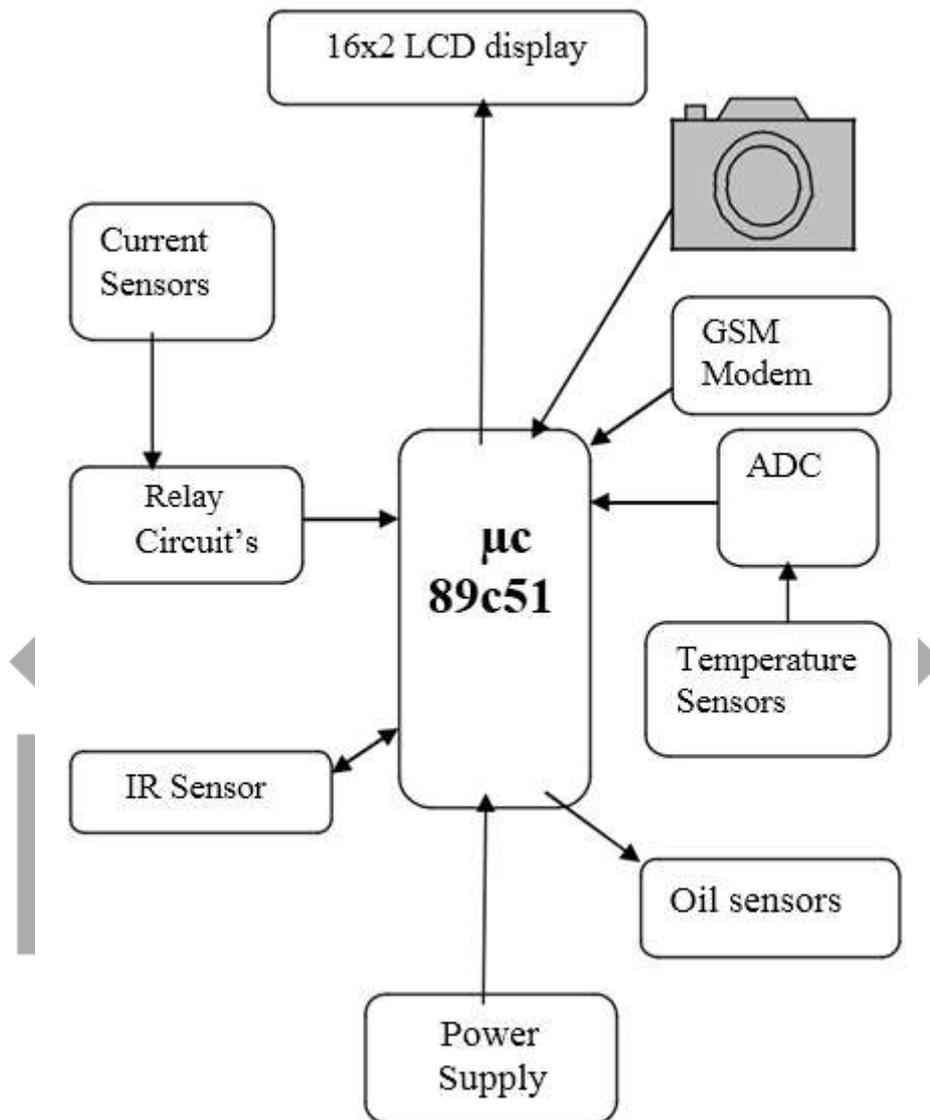


Figure 2: block diagram of the project

II. PROPOSED SYSTEM

In this project, we'll use an IOT (internet of things) technology also as a GSM modem. The project describes the automated POWER THEFT detection system. Here we used an IR sensor, it's been placed near the electricity measuring device, and it will sense the people or any object kept near the electrical poles for power theft. And therefore the current sensor generates the pulses, and microcontroller read that pulses and count it and watches a message from GSM module. If any message received from GSM, microcontroller processes the data consistent with the program, the road is meant to require specific load, if just in case more load is drawn. It'll send a theft message to the concerned vigilance department. The message sent once received by the top it'll convert the smartphone using ARM 11 processor from silent mode to general mode and provides announcement in an exceedingly very high voice. Once he gets the intimation about the theft he can take global photos by sending a photo message to the arm 11 device to the vigilance team mail id. He can register an online complaint to the police, through the device. Using solid-state relay other sensors are wont to protect transformers by sending appropriate messages. Generally, all transformers are oil types in nature.

III. COMPONENTS REQUIRED CURRENT SENSOR

A current sensor may be a device that detects current (AC or DC) in a wire and generates the pulses with a fixed interval of your time.

LCD DISPLAY-16X2

We are using 16x2 LCD (liquid crystal display) display; it will display the status of the system. It has 16 columns and 2 rows. It displays 16 letters in one row.



Figure 3: LCD display-16x2

SCR RELAY CIRCUITS

It acts as an automatic switch. We can use a solid-state relay to trip on and to trip off the electricity.

GSM MODEM

GSM circuit receives the message and provides it to the microcontroller, then microcontroller sends the correct message or suitable message to HESCOM using the GSM module.



Figure 4: GSM modem

IR SENSOR

It will sense if any abstract experience that sensor path and it'll operate in very low voltage, means power consumption is incredibly low.

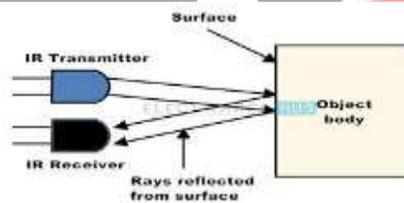


Figure 5: IR sensor

OIL FLOAT SENSOR

An oil float sensor is a device used to detect the level of liquid within a transformer.

TEMPERATURE SENSOR

It is a device used to check the temperature level in the transformer.



Figure 6: Temperature sensor

ANALOG TO DIGITAL CONVERTER (ADC)

Since the temperature sensor gives an analog input and microcontroller accepts only digital, we use an analog to digital converter to convert the analog input to digital input so that the microcontroller accepts the input.

MICRO-CONTROLLER

The microcontroller is that the brain of the project, it'll run consistent with the program has got to be written, here we've used as an SST 89C51 microcontroller.

FEATURES

- 8-bit 8051-Compatible Microcontroller (MCU)with Embedded Super Flash Memory.
- It operates at 0 to 40 MHz and it requires a power supply of 5V.
- 1 Kbyte Internal RAM.
- Programmable Watchdog Timer (WDT).
- TTL- and CMOS-Compatible Logic Levels.
- Temperature Ranges for two cases: Commercial (0°C to +70°C) and Industrial (-40°C to +85°C).

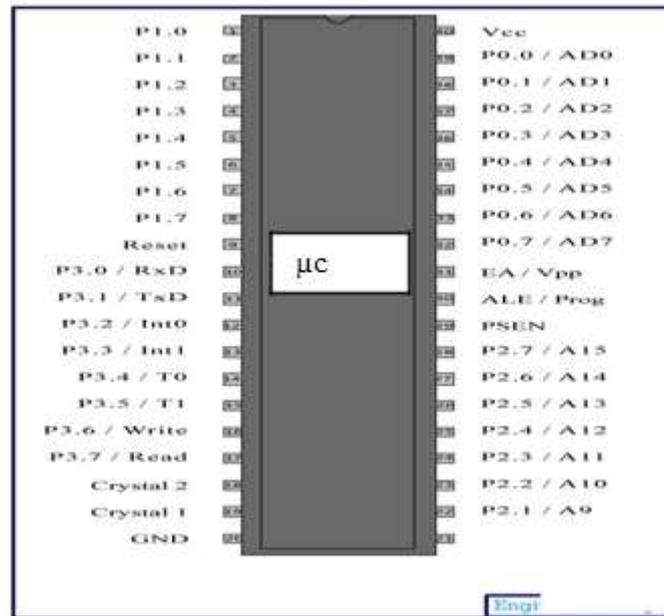


Figure 7: pin diagram of 8051

FUTURE SCOPE

- As mentioned above, we all know that electricity is low and at such time we can't afford power being theft. If this technique is implemented then the sole the quantity of power required is going to be consumed and there'll be no wastage of power. Moreover even the money spent is often saved. Hence it'll how of helping within the economic process of the country.
- In the present system, IOT energy meter consumption is controlled by Wi-Fi and it helps consumers to avoid wastage use of electricity. The performance of the system can be managed by connecting all household electrical appliances to IOT to consume power.
- So, in future following measures can be achieved to save power and avoid thefts.
- We can make an IOT system where an owner can monitor energy consumption and can pay the bill online.
- We can make a system where an owner can receive SMS when he/she crosses the threshold of electricity usage slab.
- We can make a system that can send SMS to the preferred meter reading man of that area when theft detected at the consumer end.

CONCLUSION

In the era of smart city advancement, this project is targeting the connectivity & networking factor of the IOT. during this project, we are detecting the facility theft, identifying the fault and also tracking the location of the fault area to require necessary measures. The proposed system provides the answer for a few of the most problems faced by the prevailing Indian grid system, like wastage of energy, power theft, and cable fault.

SOFTWARE USED

- Embedded c.
- Keil-c compiler.
- Flash magic burner software.

IV. TECHNICAL SPECIFICATIONS

- The Operating voltage of embedded circuitry is 5vdc.
- The Current consumption of the device in active mode is 200 mill amp.
- The Operating frequency of the device is 11.0592MHZ.

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