

Minimizing Electricity Theft by Internet of Things

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Abstract: IOT use things to things connection to access the internet of things, allow data to store and access services. Services over internet of things development according to need of person to person and thing to person, machine to machine interaction without human interaction. As there is limited non-renewable resources are present in our daily life, Electricity is one of them which utilized in every country that results abundant losses due to electricity larceny. Power theft is going to be the key challenges. A smart energy meter is used to minimize the electricity larceny. Basically energy meter is a device that calculates the cost of electricity consumed by homes, business, or an electrical device. It reduces the theft of electricity. In this paper a government person can find the dishonest user by showing the status of energy meter at the back end of electricity office. To attain this, energy meter communicate with raspberry pi through GPIO pins. GPIO pins fetch the effective data from energy meter and it send effective data to the raspberry pi and connect raspberry pi with the internet. At the backend, government person can see the status of energy meter in the form of graphs.

Keywords- IOT (Internet of Things), Electric Energy, Energy Meter, Raspberry pi.

I. INTRODUCTION

Generation, transmission and distribution of electrical energy involve many operational losses. Whereas losses implicated in generation can be technically defined, but transmission and distribution losses cannot be precisely quantified with the sending end information. This illustrates the involvement of nontechnical parameter in transmission and distribution of electricity. Overall technical losses occur naturally and are caused because of power dissipation in transmission lines, transformers, and other power system components. Technical losses in Transmission & Distribution are computed with the information about total load and the total energy bill. While technology in the raising slopes, we should also note the increasing immoral activities. With a technical view, Power Theft is a non-ignorable crime and at the same time it directly affected the economy of a nation. Electricity theft a social evil, so it has to be completely eliminated. Power consumption and losses have to be closely monitored so that the generated power is utilized in a most efficient manner. The system prevents the illegal usage of electricity. At this point of technological development the problem of illegal usage of electricity can be solved without any human control using GSM and IoT. The implementation of this system will save large amount of electricity, and there

by electricity will be available for more number of consumer then earlier, in highly populated country such as India, China. Power theft can be defined as the usage of the electrical power without any legal contract with the supplier.

With the increasing of internet connectivity in home environment electronic gadget used to create home network services. IOT use things to things connection to access the internet of things allow data to store and access services, such as remote home sensor. Services over internet of things development according to need of person to person and thing to person, machine to machine interaction without human interaction. Technology used in this system is radio frequency identification. Transmission and delivery of electricity is smartness from the utilize of renewable energies and advanced measurement and latest communication technologies as well utilities grow to be smart. So with smart utility latest measurement and energy sources and load efficiently manage. The key element of such a measurement and control network could be a smart meter. A smart energy meter is used to minimize the electricity larceny. Basically energy meter is a device that calculates the cost of electricity consumed by homes, business, or an electrical device. It reduces the theft of electricity. Electronic energy meter measures current in both Phase and Neutral lines and calculate power consumption

II. LITERATURE SURVEY

There are two types of power losses, technical losses and non-technical losses. Technical losses are naturally occurring losses due to power dissipation, for example I²R and copper losses. Non – technical losses are due to component break down and electricity theft. Component break down is due to environmental factors and weather conditions such as heavy rains. In [1] the power theft practices are meter tampering, illegal connection, billing irregularities and unpaid bills. There have been various discussions on how to detect and prevent the power theft. [2] Proposes a system design which incorporates an android application and also indicates the exact zone on which unauthorized tapping is done in the real time. It would provide a digital record in case of any judicial dispute current. If the line current is greater than the meter then an alert message is sent to the concerned authority with the help of GSM System.

III. COMPONENTS USED

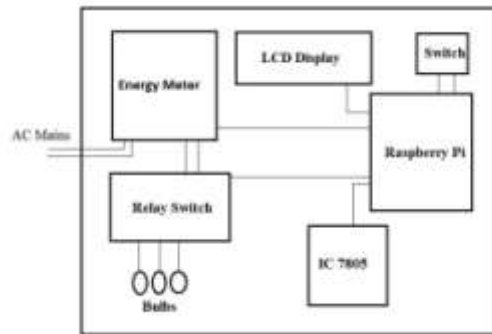


Figure 1: Block Diagram

A. Raspberry Pi: Product Description the Raspberry Pi 3 Model B is the third generation Raspberry Pi. This powerful credit-card sized single board computer can be used for many applications and supersedes the original Raspberry Pi Model B+ and Raspberry Pi 2 Model B. Whilst maintaining the popular board format the Raspberry Pi 3 Model B brings you a more powerful processor, 10x faster than the first generation Raspberry Pi. Additionally it adds wireless LAN & Bluetooth connectivity making it the ideal solution for powerful connected designs

B. LCD Display: The Liquid Crystal Display shows the display messages generated by the Microcontroller chip, which is depending upon the Zone Code received.

C. Energy Meter: Energy meter and watt hours meter is a device which calculate amount of electricity energy which is utilized by consumer. Energy meter is install at each place like as home, organization and industries to measured the consumption of electricity by load like fans, lights and many more. Being a limited and very important resource the metering of electricity consumption is essential. Generally people don't care for the consumption of electricity in their day to day processes and are concerned about it when they get their electricity bills or in case of power shortage. Measuring of electricity consumption was started with Electromechanical Induction meter which operates by counting the revolutions of a metal disc rotating at a speed proportional to the power. The number of revolutions is proportional to the energy usage. The electric meter had taken more important roles in power system. The power meter can be utilized to detect or measure the presence of voltage, current, power and other parameters.

D. IC 7805 Voltage Regulator: The 7805 Voltage Regulator IC. A regulated power supply is very much essential for several electronic devices due to the semiconductor material employed in them have a fixed rate of current as well as voltage. The device may get damaged if there is any deviation from the fixed rate.

E. Python (programming language): Python is an interpreted high-level programming language for general-purpose

programming. Created by Guido van Rossum and first released in 1991, Python has a design philosophy that emphasizes code readability, notably using significant whitespace. It provides constructs that enable clear programming on both small and large scales.

Python features a dynamic type system and automatic memory management. It supports multiple programming paradigms, including object-oriented, imperative, functional and procedural, and has a large and comprehensive standard library.

Python interpreters are available for many operating systems. CPython, the reference implementation of Python, is open source software and has a community-based development model, as do nearly all of its variant implementations. CPython is managed by the non-profit Python Software Foundation.

IV. WORKING PRINCIPLE

i) Install OS in SD card Firstly we have to download operating system which is recommended and then extract the downloaded file. After this download software win 32diskimager and insert SD card into PC. Then open win 32diskimager software and select the extracted select derive where extract file have to written.

ii) Configure WIFI Module Make sure our Wi-Fi adapter is plugged into the Raspberry Pi. Before the Wi-Fi adapter can be configured it needs to check that the correct drivers are installed. With the help of SSH connection establish wifi USB dongle provide raspberry pi remote desktop application. This provides a major role because with this remote desktop application we able to connect raspberry pi over the everywhere in word.

iii) Coding section: Coding section is divided into two parts.

1) Write code: In this we write the code in python language according to the application and save it with extension .py.

2) Run Code: To run the code firstly open the LX terminal which is placed on the raspberry pi desktop. Now enter the command to run the program.

iv) Show result on website: Now login your website page by user id and password. After login meter status is show.

V. IMPLEMENTATION

To implement our objective, get hardware raspberry pi and install the operating system. Energy meter communicate with raspberry pi through GPIO pins. GPIO pins fetch the effective data from energy meter and it send effective data to the raspberry pi, then connect wifi module with raspberry pi. After this, connect raspberry pi with the internet. At the backend, where government person see the status of energy meter after successfully login with username and password and the status of energy meter are shown in the form of

graphs. The entire implementation is being taken place in PYTHON surroundings. From the results it has been concluded that if there is any dishonest user then government person can find that dishonest user.



Figure 3: Working Model of our Project

VI. APPLICATIONS

- The project is used to secure and avoid the power theft.
- Used in distribution system.
- Can be used in AMR.
- Power Grid

VII. ADVANTAGES

- Security is automated
- Economy of country is saved.
- Alert can be generated through GSM even in the case of failure of internet.
- Does not affect the power transfer capability of line.

VIII. CONCLUSION AND FUTURE SCOPE

The planned system has mentioned implementation of IOT. It is concluded that by using IOT technology the government person can find the dishonest user, it can make the assignment of the agents impracticable to steal the electricity. This analysis work has been implemented to find the dishonest user. To implement our objective, get hardware raspberry pi and install the operating system. Energy meter communicate with raspberry pi through GPIO pins. GPIO pins fetch the effective data from energy meter and it send effective data to the raspberry pi, then connect wifi module with raspberry pi. After this, connect raspberry pi with the internet. At the backend, where government person see the status of energy meter after successfully login with username and password and the status of energy meter are shown in the form of graphs.

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