



Intelligent Power Theft Detection System

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ABSTRACT

In the modern world, intelligent control has become a priority, although the services for providing energy are still being controlled with conventional methods.

The conventional method is expensive and time consuming as well as it requires man power for monitoring and data collection of the consumers which may also lead to human errors.

Nowadays the main problem in energy supply is that of power theft being done on various scales

The proposed system integrates digital energy meters installed at consumer unit with an electric supply.

Relay circuit and LCD display is provided to update information like Voltage, Current, Units and sudden power cut to the energy supplier company and is displayed on GUI.

Our system can also send an alert to the energy supplier in case of any power theft at the consumer side and cut off the supply automatically until the power theft is not being cleared.

INTRODUCTION

- The smart EB is an advanced platform to the way we receive electricity today. In earlier times the demand for electricity was substantial compared to that presently. Since the demand for electricity has tremendously increased, a redesign of the current grid system is much needed.
- With the technology available in these modern times, the smart grid could be designed in such a manner, that it uses digital communications technology to detect and react to local changes in usage.
- The system will feature a two-way dialog where electricity and information can be exchanged between the consumer and utility.
- This can increase or decrease the amount of energy a consumer needs by analyzing the feedback of the two-way dialog.
- In this system a smart energy meter is installed in every consumer unit and a server is maintained at the service provider side. Both the meter and the server are equipped with which facilitates communication between the two ends using Server.
- The Arduino gets the tariff data from the Energy meter and sends the acquired data to the server.
- The transfer of electricity and information between consumer and utility would increase efficiency, reliability and security. The smart grid also enables renewable energy technology to be integrated into the system for a greener, more environmentally friendly method.

LITERATURE SURVEY

Smart Grid Infrastructure Using Hybrid Network Architecture

AUTHOR: F. Salvadori, C. S. Gehrke, A. C. de Oliveira, M. de Campos.

PUBLISH: IEEE Transactions on Smart Grid 4(3):1630-1639 · September 2013

- Implement the data storage, analysis, and user interface by means of a local server, assigning to the user the task to maintain and configure the system.
- The installation and configuration of this device makes the deployment of the system out of the reach of many end users.
- The system is based on hybrid network architecture (HNA), consisting of a wired infrastructure, a wireless sensor network (WSN), a power line communications (PLC) and a controller area network (CAN).
- The system is based on three hardware topologies: remote data acquisition units (RDAUs), intelligent sensors modules (ISMs) and a Power line communication(PLC modem).

WSN-Based Smart Sensors and Actuator for Power Management in Intelligent Buildings

AUTHOR: Nagender Kumar Suryadevara, Subhas Chandra Mukhopadhyay, Sean Dieter Tebje Kelly, and Satinder Pal Singh Gill.

PUBLISH: IEEE/ASME Transactions on Mechatronics (Volume: 20 , Issue: 2 , April 2015)

- The design and development of a smart monitoring and controlling system for household electrical appliances in real time.
- The system principally monitors electrical parameters of household appliances such as voltage and current and subsequently calculates the power consumed.
- The novelty of this system is the implementation of the controlling mechanism of appliances in different ways.
- The developed system is a low-cost and flexible in operation and thus can save electricity expense of the consumers.
- The prototype has been extensively tested in real-life situations and experimental results are very encouraging.

Last-Meter Smart Grid Embedded in an Internet-of-Things Platform

AUTHOR: Elisa Spanò, Luca Niccolini, Stefano Di Pascoli, and Giuseppe Iannaccone

- **PUBLISH:** IEEE Transactions on Smart Grid(Volume: 6 , Issue: 1 , Jan. 2015)
- The customer domain of the smart grid naturally blends with smart home and smart building systems, but typical proposed approaches are “distributor-centric” rather than “customer-centric,” undermining user acceptance, and are often poorly scalable.
- The architecture and an implementation of a “last-meter” smart grid-the portion of the smart grid on customer premises-embedded in an internet-of-things (IOT) platform.
- Our approach has three aspects of novelty and advantages with respect to the state of the art:
 1. seamless integration of smart grid with smart home applications in the same infrastructure.
 2. data gathering from heterogeneous sensor communication protocols.
 3. secure and customized data access.

Smart Metering in Electric Power Distribution System

AUTHOR: Karan Gandhi and Hari Om Bansal

PUBLISH: 2013 International Conference on Control, Automation, Robotics and Embedded Systems (CARE), Dec 2017

- Electric Energy is a vital resource in everyday life and a backbone to the industry. Being limited its proper use and measurement is very important. Restructuring of power system, penetration of distributed generation and power theft are going to be the key challenges in the near future.
- The operational information will be crucial for the functioning of the power distribution networks.
- The Author tells control and automation of the smart grid EB then this method more drawbacks are contain one is the meter reading process is done by the help of manpower.

Existing system vs Proposed system

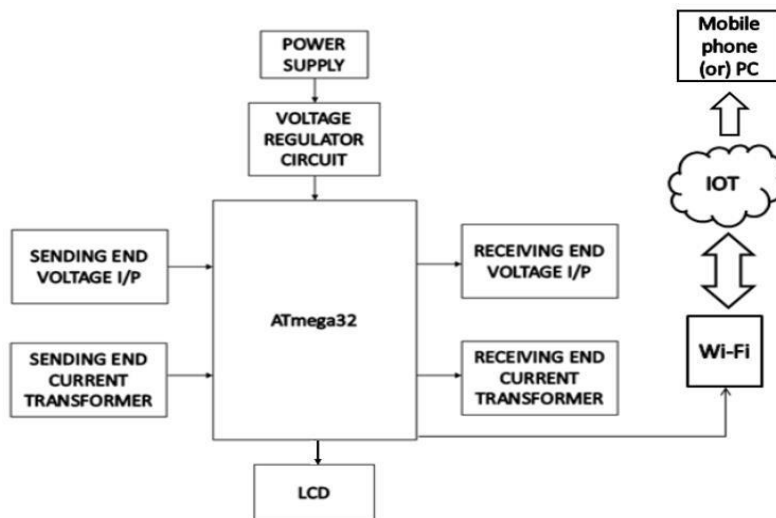
EXISTING SYSTEM

- In the existing system, the power consumption by the common people is monitored but if there is a power theft, we will not be able to know that theft has occurred

PROPOSED SYSTEM

- In the proposed system, the power theft can be easily detected. We use ATmega32A microcontroller. The sending end and receiving end power are constantly monitored via IOT.
- When there is a decrease in the receiving end power value, the IOT alerts the user and user can take immediate action

Block Diagram of the Project



Modules of the Project

- ATmega32A microcontroller
 - Current transformers
 - Voltage regulator circuit
 - Wi-Fi module
- Hardware Requirements
- ATmega32A microcontroller
 - Current transformers
 - Voltage regulator circuit
 - Wi-Fi module
 - LCD
 - Mobile phone (or) PC
 - Power supply

Software Requirements

- EMBEDDED C
- WinAVR
- pHp

Advantages of the Project

- Continuously monitoring
- Current sensor sense the AC and DC current
- Control the appliance at anywhere in the world
- Does not affect the power transfer capability of line

Disadvantages of the Project

- The disadvantages of this project is that only it has high installation cost. But it can be bearable because it requires only once installation cost and can be used for life time.

Applications of the Project

- This system can be incorporated for almost all type of users.
- The concept well suited for villages and interior areas.
- The proposed design like to conclude that the power theft can be effectively curbed by detecting where the power theft occurs inform the authorities

Progress of the Project so far

- In the Last semester we have completed the presentation work.
- In this semester we have purchased components and we are going to start the project.

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