

A SURVEY ON RESIDENTIAL POWER MANAGEMENT SYSTEM BASED ON WSN

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Abstract-A survey of monitoring and controlling the household electrical appliances has been proposed in this paper. The power management system which monitors and controls the electrical appliances in order to consume the low power. The electrical parameter such as voltage and current are sensed by using sensors and subsequently calculates the power. The power management system also controls the electrical appliances by manually or remotely or automatically.

Index Terms— Energy management, home automation, intelligent control system, Wireless sensor network, ZigBee.

I. INTRODUCTION

In recent days, the energy demand is increased due to increase in industrial application and use of home appliances. Nowadays, the people use more home appliances. So the power required for these devices are more. According to the recent Annual Energy Outlook report of the U.S. Energy Information Administration, residential electricity demand is forecasted to increase by 24% for several decades while the global electricity consumption trend is also reported to be increasing continuously. As more and more home appliances and consumer electronics are installed, residential energy consumption tends to grow rapidly. The power consumed by the devices can be controlled and monitored by using the Technology called

Wireless Sensor Network (WSN). A large number of home devices increase power consumption in two aspects, standby power and normal operation power. Wireless Sensor Networks (WSNs) have become important because of their ability to monitor and manage situational information for various intelligent services. Due to these advantages, WSNs has been applied in many fields such as military, industry and environmental monitoring. The WSNs are being used in the home for energy controlling services. The regular household electrical appliances are monitored and controlled by WSNs installed in the home. The ZigBee Alliance, wireless communication platform is presently examining the smart home wireless system. The ZigBee, Internet Protocol (IP) specification and IEEE 802.15.4 standard are used to create smart homes that improve energy management and efficiency. The ZigBee technology widely used in home automation for security and power management.

II LITERATURE REVIEW

[1] Wireless Sensor Networks (WSNs) play a key role in the extension of the smart grid towards residential premises. In this paper, it evaluates the performance of In-Home Energy Management (IHEM) application. The performance of IHEM is compared with an Optimization based

Residential Energy Management (OREM) scheme. The objective of OREM is to minimize the energy expenses of the consumers. HEM application is more flexible as it allows communication between the controller and the consumer utilizing the Wireless Sensor Home Area Network (WSHAN). IHEM reduces the expenses of the consumers for each case. It shows that packet delivery ratio, delay and jitter of the WSHAN which improve the packet size of the monitoring application.

[2] The Ontario Ministry of energy and infrastructure has mandated the every residential home in Ontario is to have a smart meter installed. This model was created from the perspective of an Ontario local distribution company to assist in determining the feasibility level for the utility. The minimum functionality smart meters, smart meters with In-Home Display and smart meters with a demand control unit are the three functionality levels are compared based on the annual profit and overall reduction in energy consumption achieved. An appropriate strategy for a utility would be to invest in the functionality level that optimizes between the annual profit, the reduction in peak energy and capital costs.

[3] Wireless Personal Area Network and Wireless Sensor Network are rapidly gaining popularity and IEEE 802.15.4 WPN. The innovative system transparently unifies various home appliances, smart sensors and energy technologies. The smart energy market requires two types of ZigBee networks for device control and energy management. Nowadays, the organization use IEEE 802.15.4 and ZigBee effectively deliver solutions for a variety of areas including consumer electronic device control, energy management and efficiency, home and commercial building automation as well as industrial plant management. This paper designs

smart home device descriptions and standard practices for demand response and load management “smart energy” application needed in smart meter energy based residential or light commercial environment. This paper introduces smart home interfaces and device definition is to allow interoperability among ZigBee devices produced by various manufacturers of electrical equipment meters and smart energy enabling products.

[4] The recent worldwide measures for energy savings for a larger awareness of the household energy consumption give the relevant contribution of domestic load to the national energy balance. On the other hand, electricity smart meters is to gather with gas, heater and water meters can be interconnected in a large network offering a potential value to implement energy savings and other energy related services, as long as an efficient with the final user is implemented. The interface of such devices is mostly designed and addressed at the utilities supervising the system, while the communication with household is often underestimated. This paper refers the topic by proposing the definition of a local interface for smart meters.

[5] The supply with electrical power needs the development of smart grids. To solve the control problems of these grids, smart metering devices and energy information systems (SCADA) are needed on the carrier level. Consider the private households and small enterprises are required to replace plain old energy meter by modern smart metering components. An embedded in-house energy information system with a smart energy controller (SEC) will be proposed which displays the real-time data information and analysis of power consumption as well as power generation.

The concept is also useful to combine smart home application with smart grid functions.

[6] This paper describes more efficient home energy management system to reduce the power in home area. In this, the room is controlled by using IR remote control of a home device. The home has automatic standby power cut-off outlets, a light and a ZigBee hub. The automatic standby power cut-off outlet has a waiting time before cutting of the electric power. It consumes standby power during that time. The waiting time can be eliminated by turn off the home device through IR remote control. This method gives more efficient energy saving Home Energy Management System (HEMS).

[7] In recent year, the home environment has seen an introduction of network technology. This technique offers a new opportunity for home automation system. The adoption of home automation system has been slow. This paper identifies the reason for this slow adoption and evaluates the potential of ZigBee for addressing these problems. A ZigBee and WI-FI network are integrated through a common gateway and this gateway provides network interoperability. It is a simple and flexible user interface and remote access to the system. In this paper, the flexibility and effectiveness of devices, light switch, radiator valve, safety sensor and ZigBee remote control have also been developed and evaluated with home automation system.

[8] Recently, a wireless sensor network has been widely discussed in many applications. In this paper, a WSN based intelligent light control system has been proposed. Wireless sensors are responsible for measuring current illumination. Whole lighting device and local lighting devices are the two lighting devices which are used to provide background and concentrated

illuminations. An illumination requirement is the combination of background and concentrated illumination demands. The binary satisfaction and continuous satisfaction models and two decision algorithms are used to determine the proper illumination of devices and it is used to achieve the desired optimization goals. The closed loop device control algorithm is applied to adjust the illumination level of lighting devices.

[9] This paper describes the design and implementation of a home monitoring system based on hybrid sensor network. In this, the three layer architecture is used which combines hybrid-node networking with web access. An enhanced sensor node has been designed and fabricated to add controlled mobility to wireless sensor networks. The mobile node is capable of simple planar motions and it is easy to be controlled through different user interface. Network repair and event tracking capabilities of the mobile sensor node are tested. Stability of the proposed system in long-time home monitoring tasks is also verified.

[10] The home network has gained wide spread attentions due to its seamless integration into everyday life. This innovative system transparently unifies various home appliances, smart sensors or actuators and wireless communication technologies. A new intelligent home control system based on wireless sensor or actuator system is suggested to develop the ubiquitous home network. The proposed intelligent home control system which divides and assigns various home network tasks to appropriate components. A new routing protocol LQIR (Link Quality Indicator Based Routing) is developed to improve the performance of active sensor network. This paper introduces the proposed home control system design that provides intelligent service for users.

VCONCLUSION

In the above papers, the different sensor networks are used to monitored and controlled the home appliances. The proposed work conclude that the electrical parameters are measured by using a Hall Effect sensor. It produced the accurate output compared to other sensors.

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