Review of A Design Approach for Load balancing in Wireless Sensor Smart Grid Network by prioritizing least used paths.

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***Abstract*— The smart grid is an intelligent power transferring system. It makes use of the communication platform to exchange the information and optimizes the operation of interconnected power units to improve the performance, accuracy, and sustainability of electricity services In this paper, we utilise the different characteristics of smart grid traffic including multimedia and put forth a priority-based traffic scheduling method the smart grid system depending on different traffic types of smart grid such as controlling commands, multimedia meter readings. Explicitly, we develop traffic scheduling schemes taking into an account of channel switch and spectrum sensing errors, and solve a system utility intensification problem for smart grid communication system. Our explanation are demonstrated through both analyzes and simulations. This research made passable a new vista for upcoming smart grid communications.We proposed new traffic scheduling scheme and an intensified framework to support various smart grid traffic types, including multimedia over smart grid communication platform.**

***IndexTerms*— Smart grid networks, WSN (Wireless sensor networks), CRN (cognitive radio network), Power Control, Sleep Control, Scheduling.**

I. INTRODUCTION

Wireless sensor networks (WSN) have been diagnosed as a connected and comprehending monitoring system platform for smart grid systems. For example, low-cost wireless sensor nodes can be distributed over large fields where the power plants are positioned and can boost utility asset monitoring capabilities. The control center can collect the data from remote wireless sensors in order to detect the working of the power setup and manage the stability of power grid. WSNs will play an vital role in remote system monitoring, automatic meter reading, remote customer site monitoring, equipment defect diagnosing and etc. Latter, wireless multimedia sensor networks (WMSNs) using sensors such as video, acoustic sensors can increase the reliability, safety and security of smart grid system by providing rich surveillance information for grid failure identification and recovery, energy source monitoring, equipment management, etc. For example, using smart camera sensors for scanning solar power plants can adumbrate the amount of generated energy and thus easy scheduling the power distribution. A main point for the success of smart grid system is how to fulfill the different communication requirements such as high accuracy and low remission requirement, mostly under harsh environmental conditions. Smart grid requires high quality of services (QoS) and resource efficiency as well as the system expenses and bandwidth. The communication challenge demands more research and customized resolutions for smart grid applications. For example, large information amount of system monitoring and power unit control commands would be delivered through the smart grid communication infrastructure and it utilizes high radio bandwidth, and improves the interference and competition over the limited and crowded radio frequency. In this paper, we proposed new traffic scheduling scheme and an intensified framework to support different smart grid traffic types.

II. LITERATURE REVIEW

Jingfang Huang [1] In this paper they consider the different characteristics of smart grid traffic including multimedia and proposed a priority-based traffic scheduling approach for CR communication infrastructure based smart grid system according to the different traffic types of smart grid such as control commands, multimedia sensing data and meter readings. Specifically, they develop CR channel allocation and traffic scheduling schemes taking into consideration of channel switch and spectrum sensing errors.

Xi Fang [2] In this paper, they surveyed the literature on the enabling technologies for Smart Grid. They explore three major systems, namely the smart infrastructure system, the smart management system, and the smart protection system. They also proposed possible future directions in each system. Mostly, for the smart infrastructure system, they explore the smart power subsystem, the smart information subsystem, and the smart communication subsystem. For the smart management system, they explore various management objectives, such as improving energy efficiency, profiling demand, maximizing utility, reducing cost, and controlling emission, they also explore various management methods to achieve these objectives. For the smart protection system.

Huan-Chao Keh [3] in this paper, the author shows how sleep mechanism are used to save the energy of sensor nodes. They dynamically adjust the sleep and active time according to the remaining energy of sensor nodes. It had saved much power of sensor nodes and make extend the life time of the entire wireless sensor networks. By the simulation results, they demonstrated that the proposed mechanism could effectively reserve the energy of sensor nodes and prolong the network lifetime.

Robert Caiming Qiu, Zhen Hu [4] this paper systematically investigates the novel idea of applying the next generation wireless technology, cognitive radio network, for the smart grid. In particular, system architecture, algorithms, and hardware test bed are studied. They also studied micro grid test bed supporting both power and information flow.

Rong Yu [5] In this article, they worked on identification of the fundamental challenges in the data communications for the smart grid and introduced the ongoing standardization effort in the industry. Then they present an unprecedented cognitive-radio-based communications architecture for the smart grid, which is mainly motivated by the explosive data volume, diverse data traffic, and need for QoS support. Their architecture was decomposed into three subareas: cognitive home area network, cognitive neighbourhood area network, and cognitive wide area network, dependent on the service ranges and potential applications. They also focus on dynamic spectrum access and sharing in each subarea. They also identified a very unique challenge in the smart grid and the necessity of joint resource management in the decomposed NAN and WAN geographic subareas in order to achieve network-scale performance optimization.

Xiao Ma [6]. In this paper, they proposed to communicate through a cognitive radio link between the sensors at the consumer side and the control centre of the smart grid. In this way, the state estimator needs to adjust to that new communication link as the link is affected by primary users. This link was governed by multiple semi-Markov processes each of which can capture and model one channel of the cognitive radio system. State estimation algorithms under this structure were developed for two cases: one with arrival acknowledge and the other without. They showed just numerical examples to illustrate the performance of the estimation algorithm.

Jianfeng Wang [7]In this paper, they have reviewed the work related to system reliability, failure protection mechanism, security and privacy in smart grid. However, they also noted that the advanced infrastructure used in smart grid on one hand empowers us to realize more powerful mechanisms to defend opposite attacks and handle failures, but on the other hand, opens up much new such vulnerability. More thorough research on the smart protection system is desirable. This article presents a view on how cognitive radio primarily from a dynamic spectrum access perspective would support such applications, the benefits that cognitive radio would bring, and also some challenges that were yet to be resolved. They also illustrate related standardization that uses cognitive radio technologies to support such emerging applications.

Shih-Jung Wu[8]. In this paper, they offer the optimal sleep control for wireless sensor networks by randomly putting the sensor nodes in the whole network and determining the sleeping probability by the distance between the sensor node and sink. Their method reduces the transmission frequency of the sensor nodes that are closer to the sink and effectively reaches the network's loading balance but the sensor nodes process their sleeping schedules according to their own residual power to save energy.

III. CONCLUSION

In this paper we put forth an effective sleep mechanism in order to balance the network traffic and to preserve the power of sensor nodes in the network. We effectively adjust the sleep and ON time according to the remaining power of sensor nodes resulting into proper usage of network. It preserves much power of sensor nodes and increases the life time of the whole wireless sensor smart grid networks. With the help of simulation results, we can demonstrate that the proposed mechanism would effectively balance the traffic of the network and preserve the power of sensor nodes increasing the network Lifetime. The throughput of a system without priority control decreases slightly since its throughput depends mainly on the available channel resource instead of the traffic density It is observed that the prioritized system is more superior than a system where all types of traffic are treated the same in terms of SG traffic transferring. The performances of a CR network system with or without priority control for smart grid communications have been studied in the paper. The research in this paper opens a new era of upcoming smart grid communications and has great potential in increasing the adaptability and flexibility, and accuracy of SG system. The proposed architecture and solutions have yielded significant results and momentum for latter developments.

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