

SMART SENSOR NETWORK FOR SOCIETY AUTOMATION-A REVIEW

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Abstract - In this paper the design and development of a smart sensor network for monitoring and controlling system for household electrical appliances in real time has been reported. The WSNs are increasingly being used in the home for energy controlling services. WSNs installed in the home can monitored and controlled the regular household appliances. The modernity of this system is the implementation of the controlling mechanism of appliances in different ways. The developed system is a cheap and flexible in operation and thus can save expense of the consumers on electricity.

Key Words: *Wireless communication, security, ZigBee, Automation*

1.INTRODUCTION

WSNs are spatially distributed and can monitor physical or environmental conditions. The development of wireless sensor network was motivated by military applications, hence nowadays such networks are used in many industrial and consumer applications. A WSN is a group of specialized transducers having communication infrastructure for monitoring and recording conditions at different nodes. A sensor network consists of several detection status called sensor nodes, which are tiny, portable and lightweight. A smart home or smart society is nothing but the home or society having special structure wiring to allow occupants to remotely control or program an array of automated home electronic devices by entering a single command. The field of home automation is expanding rapidly as electronic technologies coverage. It is foreseen that service and personal care wireless mechatronic systems will become more and more ubiquitous at home in the near future and will be very useful in assistive healthcare particularly for the elderly and disabled people [2]. Wireless mechatronic systems consist of numerous spatially distributed sensors with limited data collection and processing capability to monitor the environmental situation. Wireless sensor networks (WSNs) have become increasingly important

because of their ability to monitor and manage situational information for various intelligent services. Due to those advantages, WSNs has been applied in many fields, such as the military, industry, environmental monitoring, and healthcare [3][5]. The WSNs are increasingly being used in the home for energy controlling services.

2. NEED FOR AUTOMATION

Automation is the use of various control system for operating different equipments. The biggest benefit of automation is that it saves labor, and also it is very useful in saving energy and materials and to improve quality, precision and accuracy. In recent years, the home environment has seen a rapid introduction of network enabled digital. This technology offers new and exciting opportunities to increase the connectivity of devices within the home for the purpose of home automation. However, the adoption of home automation systems has been slow. This paper identifies the reasons for this slow adoption and evaluates the potential of ZigBee for addressing these problems through the design and implementation of a flexible home automation architecture. A ZigBee based home automation system and Wi-Fi network are integrated through a common home gateway. The home gateway provides network interoperability, a simple and flexible user interface, and remote access to the system. A dedicated virtual home is implemented to cater for the system's security and safety needs. To demonstrate the feasibility and effectiveness of the proposed system, four devices, a light switch, radiator valve, safety sensor and ZigBee remote control have been developed and evaluated with the home automation system.

2.1 TECHNOLOGY USED IN AUTOMATION:

ZigBee is a radio frequency (RF) communications standard based on IEEE 802.15.4. The Zigbee coordinator is responsible for creating and maintaining

the network. Each electronic device (i.e. Washing Machine, Television, Lamp etc) in the system is a ZigBee device managed by the coordinator. All communication between devices propagates through the coordinator to the destination device. The wireless nature of ZigBee helps overcome the intrusive installation problem with the existing home automation systems identified earlier. The ZigBee standard theoretically provides 250kbps data rate, and as 40kbps can meet the requirements of most control systems, it is sufficient for controlling most home automation devices. The low installation and running cost offered by ZigBee helps tackle the expensive and complex architecture problems with existing home automation systems.

2.2 SURVEY OF WORK DONE:

P. Cheong, K.F. Chang, Y.H. Lai, S.K. Ho, I.K. Sou, and K.W. Tam [4] describes a ZigBee-based wireless sensor network node for the ultraviolet (UV) detection of flame. The sensor node is composed of a ZnSSe UV photodetector, a current-sensitive front end including a high gain current to voltage amplifier with 120 db and a logarithm. converter, and a transceiver operated at a 2.4-GHz industrial, scientific, and medical band. A passive photodetector is designed to have a cutoff at 360 nm and convert the UV emission of flame into picoamperes. Including mixed signal processing and ZigBee transmission, the speed of flame detection is as fast as 70 ms. The sensor node consumes only an average of 2.3 mW from a 3.3-V supply. The performance of a prototype sensor node was verified when the luminous flame was imaged onto the sensor node with different angles ranging from -30. to 30. And distances of 0.1, 0.2, and 0.3 m enabling effective fire safety applications. Fire is considered as one of the serious threats in our daily life with fast spreading speed and totality of property destruction. Low cost, reliable, and wide coverage fire alarm systems are indispensable in industry to protect the equipment and assets. The damage can be mitigated if fire is detected as soon as possible. The most commonly used fire detector in the fire safety sector is the smoke detector even if they always have false alarms. Some estimates are as high as 11 to 1 for the ratios of false to actual alarms. Their applications are also limited in a confined area as the smoke concentration may be diluted in a large monitoring area, which delays or even worst desensitizes the alarm triggering. Being able to compensate the aforementioned disadvantages of smoke detectors, optical flame detectors offer higher reliability, good long-term stability, and prompt response to accidents.

Man Han and J. Hyun Lim[7] designed smart home device descriptions and standard practices for demand response and load management Smart Energy applications needed in a smart energy based

residential or light commercial environment. The control application domains included in this initial version are sensing device control, pricing and demand response and load control applications. This paper introduces smart home interfaces and device definitions to allow interoperability among ZigBee devices produced by various manufacturers of electrical equipment, meters, and smart energy enabling products. They introduced the proposed home energy control systems design that provides intelligent services for users and demonstrate its implementation using a real testbed.

M. S. Pan, L.W. Yeh, Y. A. Chen, Y. H. Lin, and Y. C. Tseng[11] ,Recently, wireless sensor networks (WSNs) have been widely discussed in many applications. In this paper, they propose a WSN based intelligent light control system for indoor environments. Wireless sensors are responsible for measuring current illuminations. Two kinds of lighting devices, namely, whole lighting and local lighting devices, are used to provide background and concentrated illuminations, respectively. Users may have various illumination requirements according to their activities and profiles. An illumination requirement is as the combination of background and concentrated illumination demands and users locations. We consider two requirement models, namely, binary satisfaction and continuous satisfaction models, and propose two decision algorithms to determine the proper illuminations of devices and to achieve the desired optimization goals. Then, a closed-loop device control algorithm is applied to adjust the illumination levels of lighting devices.

Nagender Kumar Suryadevara, and Subhas Chandra Mukhopadhyay proposed [13] proposed Wireless-sensor-network-based home monitoring system for elderly activity behavior involves functional assessment of daily activities. In this paper,they reported a mechanism for estimation of elderly well-being condition based on usage of house-hold appliances connected through various sensing units. We defined two new wellness functions to determine the status of the elderly on performing essential daily activities. The developed system for monitoring and evaluation of essential daily activities was tested at the homes of four different elderly persons living alone and the results are encouraging in determining wellness of the elderly. A normal person performs daily activities at regular interval of time. This implies that the person is mentally and physically fit and leading a regular life. This tells us that the overall well-being of the person is at a certain standard. If there is decline or

change in the regular activity, then the wellness of the person is not in the normal state. Elderly people desire to lead an independent lifestyle, but at old age, people become prone to different accidents, so living alone has high risks and is recurrent. A growing amount of research is reported, in recent times on development of a system to monitor the activities of an elderly person living alone so that help can be provided before any unforeseen situation happened. In the present work, an intelligent home monitoring system based on ZigBee wireless sensors network has been designed and developed to monitor and evaluate the well-being of the elderly living alone in a home environment. Wellness of elderly can be evaluated for forecasting unsafe situations during monitoring of regular activities.

3 . CONCLUSION:

The system effectively monitor and controls the smart sensor network. The sensor networks are programmed with various user interfaces suitable for users of varying ability and for expert users such that the systems can be maintained easily and interacted very easily. We have to integrate all these sensors to make the home and society fully automated. The developed system will be robust and flexible in operation. High level of security can be achieved with the use of automation.

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