Home Monitoring System using wireless Sensor Network via Internet

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***Abstract*— Wireless Sensor Networks (WSNs) have become indispensable for different purposes like monitoring and security realization of smart homes. This paper focuses on development of WSN which can be used to construct a system for monitoring a smart home. During the implementation of this paper, the wireless sensor nodes are used to identify different physical changes inside and outside the smart home and to report the changes to the house owner via Internet network by emailing the incidence. Implementation of the wireless sensor network is realized using ZigBee technology. A monitoring system is built by taking advantage of an Internet network.**

I. INTRODUCTION

The rapid development of microelectronics, micromechanics, integrated optics and other related technologies has enabled develop various kinds of sensors, both wired and wireless, which enable us to sense and measure data more efficiently and accurately [1]. Many communication technologies such as IrDA, Bluetooth and ZigBee, GSM/GPRS (General Packet Radio Service), etc., have been developed for different applications. A kind of real time systems in which multiple sensors connected simultaneously to gateway unit become necessary, and they are transformed into wireless sensor networks (WSNs) [1].It is widely seen that applications using wireless sensor technologies have existed in such fields as home automation and remote monitoring of houses, environmental monitoring including humidity, temperature and radiation using the mobile communication networks(more specifically, GPRS), Fault tracking and fault management using 3G technologies and GPRS communications and Health monitoring which uses ZigBee-based WSNs[2-4]. ZigBee is particularly suited for the implementation of a wide range of low cost, low power consumption, reliable control and real-time monitoring applications within the secured and smart home situations [5-9].

In this paper, attempts are made to develop and simulate a new system using ZigBee sensor networks and the GPRS network connecting the ZigBee networks for home monitoring. Rest of the paper is arranged as follows. Section II deals with wireless sensor networks and the applications of wireless sensor networks with ZigBee. Section III deals with the hardware design for home automation; whereas section IV discusses the simulation results and conclusions are presented in section V.

II. SYSTEM DESIGN OF HOME MONITORING USING WIRELESS SENSOR NETWORKS

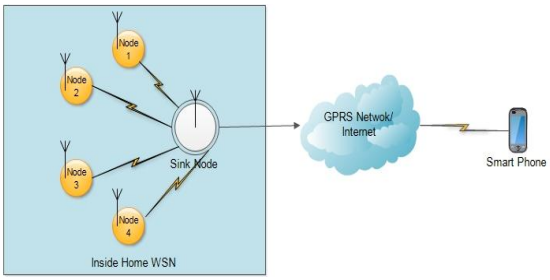

Fig. 1: Home Monitoring System General Block Diagram

The smart home monitoring system consists of source node, wireless channel, sink node, Internet and Endpoint-Mobile. Source node is the wireless ZigBee equipment which has both physical change detector sensors and the wireless ZigBee transmitter for sensing the environmental and physical changes happening inside and outside the smart home.

The transmitter transmits the sensed signal of suitable form for transmission to the wireless receiver through wireless media. Wireless channel is the suitable transmission channel through which the wireless sensor network communication is achieved. Sink node will receive and recover the information obtained from wireless environment.

In wireless sensor networks (WSNs), all the data collected by a sensor are forwarded to a sink node. The placement of a sink node has a great impact on the energy consumption and lifetime of WSNs. The information in the wireless environment is the signal sent from each source nodes of the network. This sink node incorporates both ZigBee receiver and processor (MATLAB based) capable of receiving the wireless signal sent from the ZigBee transmitter through the Multipath Rician Fading Channel. Then, demodulates this signal using the OQPSK method of demodulation. The received signal will be converted into its relevant e-mail message inside this process system and transmitted to the Internet.

The Source node consists of physical change detecting sensor with its ZigBee transmitter. The repeating sequence stair generator will generate a noncomplex discrete Boolean signal. Therefore the two parts have