A Review: Smart Home System and Extension to Smart Buildings with Security Feature

Avinash N. Patil[1], Prof. R. P. Patil[2],

PG Student [VLSI and Embedded Systems], Dept. of E&TC, Smt. Kashibai Navale College of Engineering, Pune, Maharashtra, India[1]

Professor of PG, Dept. of E& TC, Smt. Kashibai Navale College of Engineering, Pune, Maharashtra, India[2]

ABSTRACT: With technological advancement in the field of Automation, life is getting simpler and easier in all aspects. In this Era people prefer Automatic systems over manual systems. With the rapid increase in the number of users of internet over a last few decade has made Internet a part of the humans life, and IoT is the latest and emerging internet technology. The main objectives of the proposed project will be design and implement a home automation system using IoT that is capable of controlling and automating most of the house appliances through an easy manageable web interface. In the proposed solution for a home automation system employs Android, wireless communication, to provide the user with remote monitor of various lights, fans, and appliances within their home and storing the data in the database. This system uses Android based program to provide a means of user interface to the consumer.

KEYWORDS: Home automation, Appliance control, Real time system, Smart home, WSN.

I.INTRODUCTION

These days, people tend to work for longer duration and there are many people who have to commute to work. Most of the home owners seek a comfortable and convenient way of living. The idea of having control over home environment from anywhere, any-time had instigated many developers in developing better technique to remotely control and monitor home appliances [1]. However, the cost require for the system to install and maintain are still the major concern to many people. The proposed system's motivation was to find a suitable technique to implement a remote home control system (a prototype system) with price affordable to everyone; So later in the future this system could be real system. In addition to the cost, user functionality and security accessibility were also taken into account. Innovations in the technology mostly emerge from human society need. The 21st century is the era of rapid advancement in the field of digital technology. Most of this technology is focused on monitoring and controlling different activities in a proficient way. Everywhere from mega-structure building are getting automated to small smart homes, big industrial assembly machines to a kindergarten toys, a college research laboratory to an international space research centre, and even health care services through wireless sensors and networks, wireless sensor networks (WSN), these all have become fundamental devices [2].

The sufficiently great development offered by introducing wireless technology is that it helps to reduce the complex harness wired transmission process, while facilitating the installation of sensors, controllers, and actuators. The estimate price and establishment efforts require maintaining numbers of sensors in an urban environment are exponentially reduced by innovations in the field of wireless technology. There are various wireless communication mediums (technology) in which a wireless sensor network can be devised with respect to their applications and strengths [3]. Home automation technology is become larger or greater over a period of time in a extreme fashion and its requirement is increasing in a wide range of sectors. There are multiple aspects that are responsible for home automation's growing importance [4].

II.RELATED WORK

Home automation technology is becoming greater and its demand is increasing in a wide range of sectors. There are a large number of factors having control over home automation's growth. Some important benefits of home automation are listed below [5]:

1 Affordable
2 Easy to use
3 Enhanced performances
4 Improves the security features
5 Safe
6 Energy saving

Mingfu Li, Hung-Ju Lin worked on Smart home control system: Wireless sensor networks (WSNs) and power line communications (PLCs) are used in this work to establish a smart home which will automate the network. The goals are to decrease the influence of wireless disturbance on a smart home control network and not needed energy consumption of a home. A secluded WSN with one coordinator which is unsegregated into the PLC transceiver is established in each room. The coordinators are used for transformation of environmental parameters obtained by WSNs to the management station connected via PLCs. The messages for home appliances to be control are straight away transferred by using PLCs rather than WSNs. According to preparatory results, the impact of wireless intervention on the suggested smart home control network is substantially mitigated. Additionally, a algorithm used for lighting systems to be control and an analysis of illumination of a fluorescent lamp were presented. The energy saving of fulmination systems relative to those without smart control was evaluated. Numerical results indicate that the electricity utilization on a sunny or cloudy day can be reduced by at least 40% under the smart control. Moreover, a prototype for the proposed smart home to automate & control network with the smart control algorithm was implemented. Experimental tests clearly shows in given in fig.1.1, the existence that the proposed system for smart home control network is practically feasible and performs well [1].
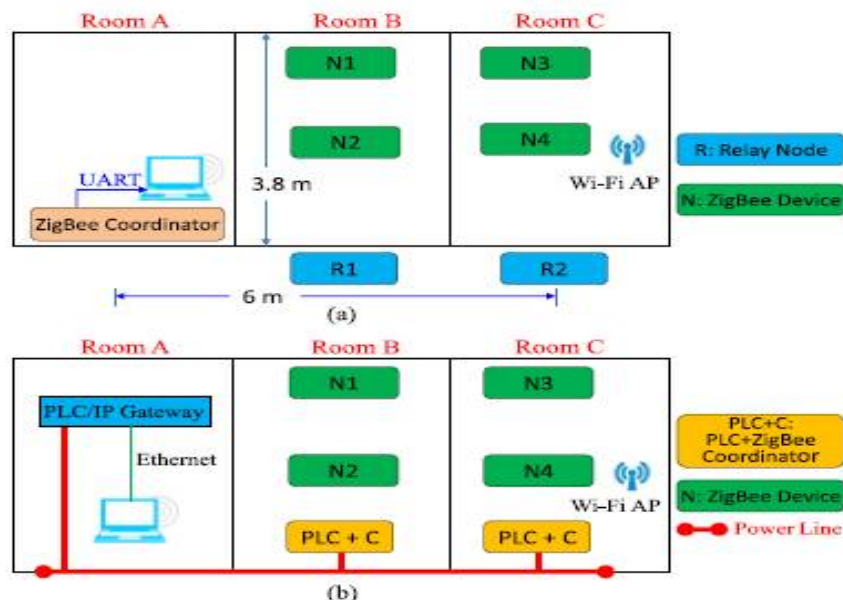

Figure 1.1: Conventional infrastructure of WSNs

Kwang-il Hwang, Byoung-Jo Choi worked on Self-Configuration Scheme for a Robust ZigBee-based Home Automation: In recent times, ZigBee is thought to be potential consideration for a scalable and flexible home automation system. However, several constraints of the ZigBee usage might result into node failure or frequent link breakages, which could eventually cause some nodes in the network to become orphans. This node-orphan issue of ZigBee might be very confusing for home automation environment in which a number of consumer devices are

interdependent in the multi-hop manner. Therefore, this paper proposes an enhanced self-configuration (ESC) scheme, which could improve the robustness of the traditional ZigBee-based home automation systems by working in tandem to resolve orphan propagation problem and dynamic error environments. This paper also details on the experiments carried out on real system implementation to demonstrate that the ESC is superior to the traditional ZigBee network in terms of delay and robustness [5].

Jinsung Byun and Boungju Jeon talks about Self-Adjusting Sensor for Smart Home on ZigBee Communications: Wireless sensor networks have been become increasingly essential in recent years because of their capacity to manage real-time situational information for various innovative services. Recently, the scope of WSN technologies has been expanded to fields such as home, to provide residents with various intelligent services, such as home appliances control services or home energy management services. However, due to their architectural constraints, such as the trade-off between a process involving a great deal of unnecessary time, effort and cost, WSNs are not effectively implemented in home environments. Therefore, their paper proposes a ZigBee-based intelligent self-adjusting sensor (ZiSAS) in order to locate the given concerns. These proposed systems a situation-based self adjusting scheme, an event-based self-adjusting sensor network and hardware and middle-ware implementation. They also introduce some smart home services using the proposed system. They are implemented system with real test bed and conducted an experiment. Their experiment shows in below fig. 1.2, that they reduce the system's energy consumption [6].
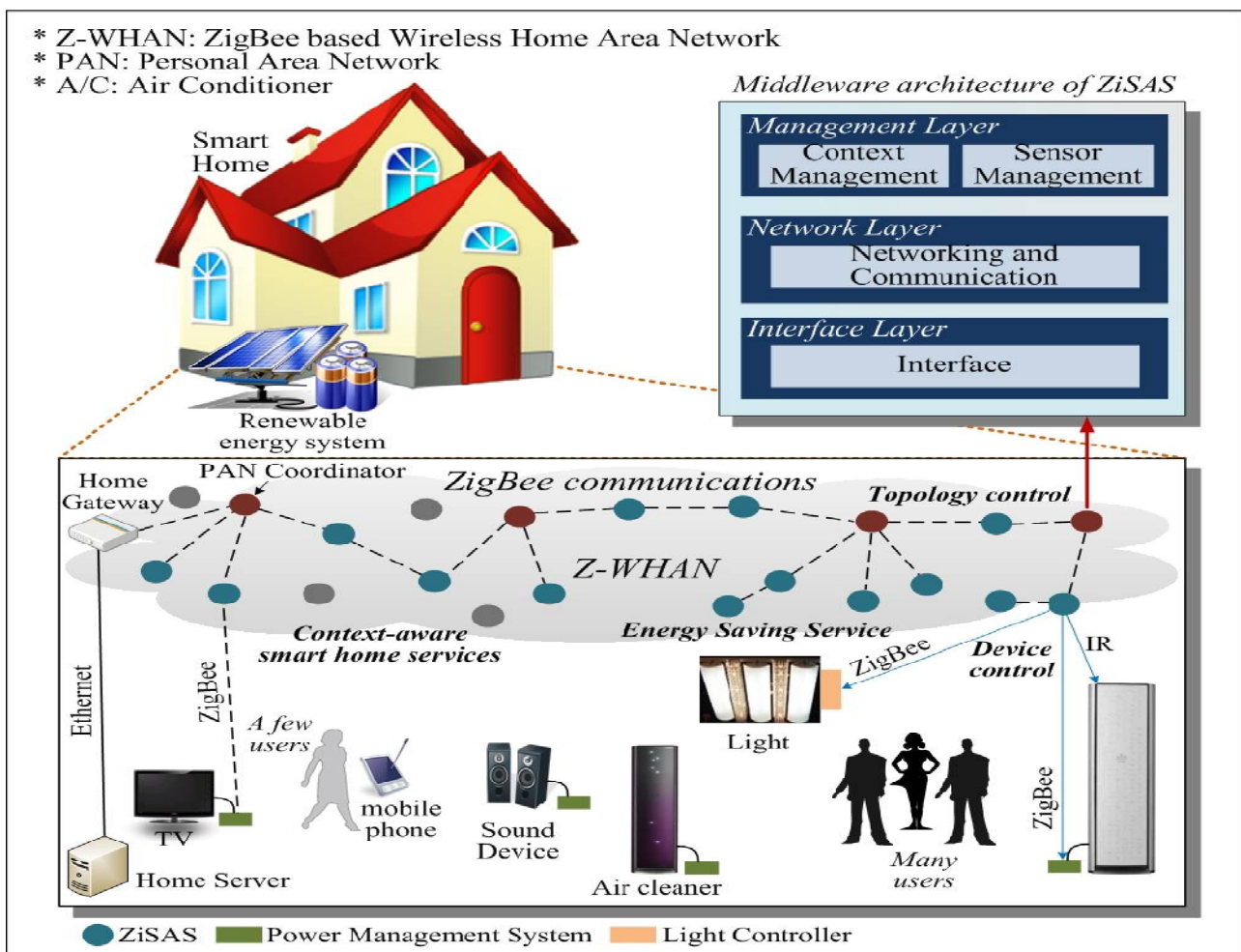

Figure 1.2: Overview of the ZigBee based self-adjusting sensor (ZiSAS)

III.PROPOSED METHODOLOGY

All of the old generation smart home systems don't have any automated security feature along with home automation system. The proposed system provides automated home security and aids in reducing the power consumption by electrical appliances such as Tube light, fan etc. As per the environmental parameters system can able to control the electrical appliances. These all process users can monitor from anywhere in the world, system is going to use Android application feature for the same. System will combine the both results one coming from appliances and another from security system and intimate this to user via IoT feature by using Android application. The system is proposed and implemented on two levels; hardware and software. The hardware level consist of, wide-ranging sensors are deployed for multiple activities and events; these wireless sensor nodes are configured with Wi-Fi Mesh topology and data is received by central supervisor node and it will get collected by local home computer which is connected by gateway. The software modules are further divided into three levels, 1) Data logging 2) Data extraction 3) Data storage; but their final task is to forecast the change in activity and correspond it with the well-being of incumbent in real time or near time.

IV.CONCLUSION

Wireless Sensor Networks (WSN), IoT and Android based smart home is becoming an important ambient-assisted living environment for exclusives where care can be provided if necessary and wellness can be measured and predicted. A home constructed in 1938 had been converted into a smart home with the help of sensing technology and was in operation since May 2013. The proficiency and comprehension of smart home have been explored to extend it to an intelligent building. Android interference in this system describe the system is based on features which meets the market requirement, as android is spreading everywhere in the world the use of that is well known and effectively increasing. As android is known so that anyone can use this system without any technology knowledge. And its effectiveness increase with the open source platform use for the purpose of forming different application. More results will be reported in our future works.

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