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Android Based Home Automation System

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Abstract: ***Home automation involves introducing a degree of computerized or automatic control to certain electrical and electronic systems in a building. A hardware system is installed to monitor and control the various appliances. The system would control the appliances based on its configuration. For example, it could automatically turn on the lights at a specified time in the evening, or it could measure the ambient light using a hardware sensor and turn on the lights when it grows dark. For example, one could turn on the air conditioning from the office, before leaving for home. This project demonstrates a simple home automation system that allows the user to control it with a wireless device such as a Bluetooth enabled mobile phone. The system allows the user to control each of the lights and fans individually. It can automatically turn off the main lights and turn on a night lamp at a specified time. By measuring the signal strength, it can detect when the user enters a room and automatically turn on the light and fans, and then automatically turn them off when the user leaves the room.***
Keywords: Home automation, electronics, hardware system, wireless devices and Bluetooth etc.

I. INTRODUCTION

A home automation system typically connects controlled devices to a central smart home hub (sometimes called a "gateway"). The user interface for control of the system uses either wall-mounted terminals, tablet or desktop computers, a mobile phone application, or a Web interface that may also be accessible off-site through the Internet.While there are many competing vendors, there are increasing efforts towards open source systems. However, there are issues with the current state of home automation including a lack of standardized security measures and deprecation of older devices without backwards compatibility.Home automation has high potential for sharing data between family members or trusted individuals for personal security and could lead to energy saving measures with a positive environmental impact in the future.The home automation market was worth US$5.77 billion in 2013, predicted to reach a market value of US$12.81 billion by 2020.

II. LITERATURE SURVEY

1) Paper Name: Wireless home automation networks: A survey of architectures and technologies
Author Name: Carles Gomez, Josep Paradells
Description: Wireless home automation networks comprise wireless embedded sensors and actuators that enable monitoring and control applications for home user comfort and efficient home management. This article surveys the main current and emerging solutions that are suitable for WHANs, including ZigBee, Z-Wave, INSTEON, Wavenis, and IP-based technology.

2) Paper Name: A zigbee-based home automation system
Author Name: Khusvinder Gill, Shuang-Hua Yang, Fang Yao, Xin Lu
In recent years, the home environment has seen a rapid introduction of network enabled digital technology. This technology offers new and exciting opportunities to increase the connectivity of devices within the home for the purpose of home automation. Moreover, with the rapid expansion of the Internet, there is the added potential for the remote control and monitoring of such network enabled devices. 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.

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3) Paper Name: Home automation in the wild: challenges and opportunities

Author Name: AJ Bernheim Brush, Bongshin Lee, Ratul Mahajan, Sharad Agarwal, Stefan Saroiu, Colin Dixon

Visions of smart homes have long caught the attention of researchers and considerable effort has been put toward enabling home automation. However, these technologies have not been widely adopted despite being available for over three decades. To gain insight into this state of affairs, we conducted semi-structured home visits to 14 households with home automation. The long term experience, both positive and negative, of the households we interviewed illustrates four barriers that need to be addressed before home automation becomes amenable to broader adoption. These barriers are high cost of ownership, inflexibility, poor manageability, and difficulty achieving security. Our findings also provide several directions for further research, which include eliminating the need for structural changes for installing home automation, providing users with simple security primitives that they can confidently configure, and enabling composition of home devices.

4) Paper Name: Java-based home automation system

Author Name: Abdul-Rahman Al-Ali, Mohammad Al-Rousan

This paper presents the design and implementation of a Java-based automation system that can monitor and control home appliances via the World Wide Web. The design is based on a stand alone embedded system board integrated into a PC-based server at home. The home appliances are connected to the input/output ports of the embedded system board and their status are passed to the server. The monitoring and control software engine is based on the combination of JavaServer pages, JavaBeans, and interactive C. The home appliances can be monitored and controlled locally via the embedded system board, or remotely through a Web browser from anywhere in the world provided that an Internet access is available. The system is scalable and allows multi-vendor appliances to be added with no major changes to its core. Password protection is used to block unauthorized users from accessing the appliances at home. If the Internet connection is down or the server is not up, the embedded system board still can control and operate the appliances locally.

III. PROBLEM STATEMENT

Today people are looking at ways and means to better their life-style using the latest technologies that area available. Any new facility or hope appliance that promises to enhance their life-style is grabbed by the consumers. The more such facilities and appliances are added, it becomes inevitable to have easy and convenient methods and means to control and operate these appliances. Conventional wall switches are located in different parts of a house and thus necessitates manual operations like to switch on or off these switches to control various appliances. It gets virtually impossible to keep track of appliances that are running and also to monitor their performances.

IV. SOLUTION

A simple home automation system was designed and developed using GSM technology that controls electrical devices at home from a remote location by a simple android smart phone. This is achieved by sending an SMS to receiver present at home which is in turn connected to a hardware kit. The SMS received by the receiver is transmitted to the microcontroller which reads the message and controls the appropriate device. Solution

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V. PROPOSED METHODOLOGY

The CIM level captures user requirements using the defined domain-specific languages (DSLs). The PIM level considers a UML-like component model. At the PSM level, we provide models for different specific platforms and several code generation strategies.

VI. CONCLUSION

The IoT device market has undergone radical changes in only a few short years. Starting with disparate devices and no ecosystems to speak of, the market has now grown to encompass enterprise players working together to create ecosystems, tailored for mobile technology, which allows IoT devices to become interconnected. Automaton of the home may have once seemed like a peculiar and unlikely concept, but as our devices become smarter and more investment is poured into the development of ioT consumer products, we are likely to see increased competition spur on further innovation in the field. Returning for its third year, Smart Homes Summit continues to move connected technology forward in the ever-changing Smart Home Market. This year the focus of the event is on voice AI capabilities driving service innovations for the home.

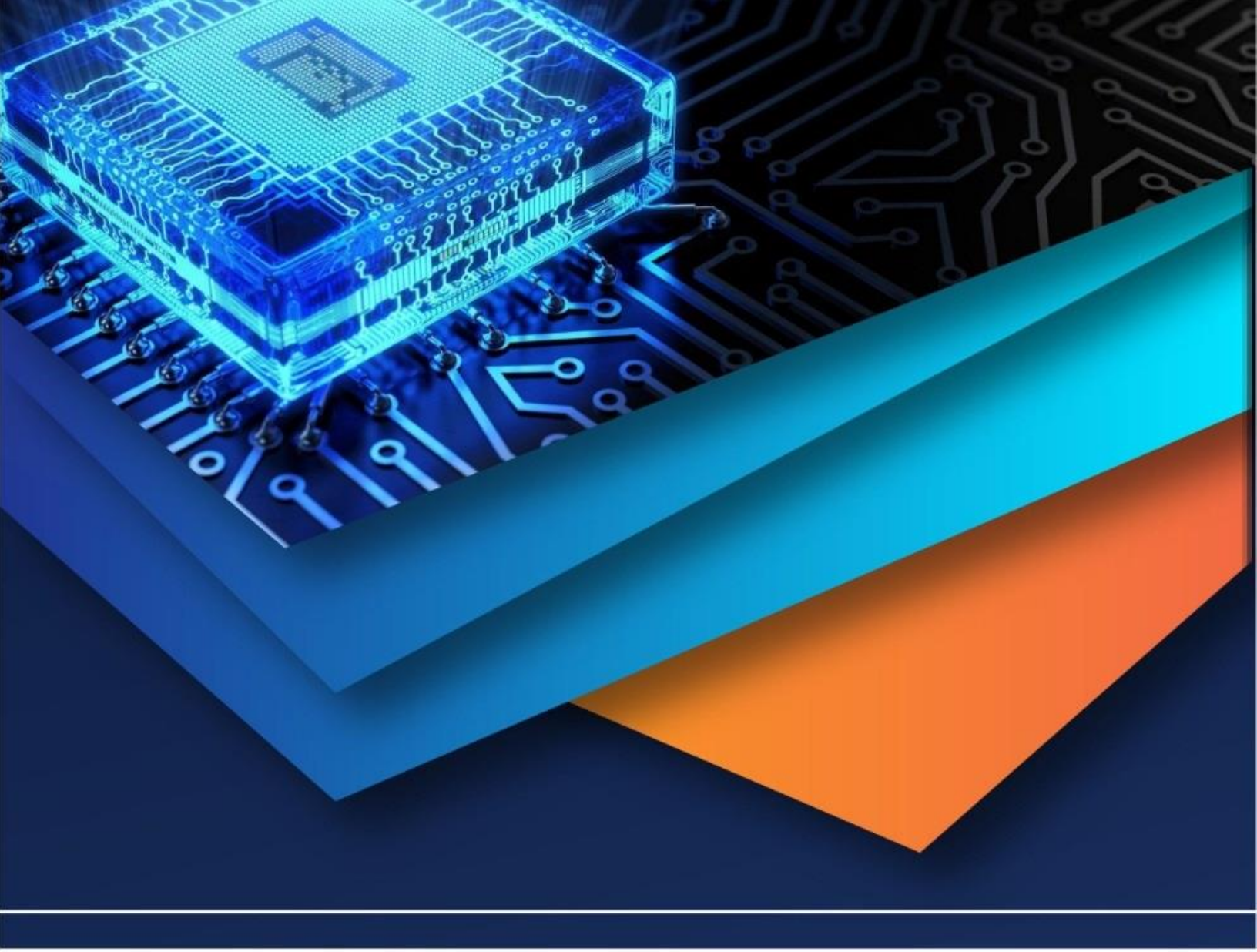
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