Embedded Systems:An Advanced Controlling System Using Zigbee

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***Abstract*— We are standing on the threshold of an exciting new age of information technology that will change our lives and the future forever. Soon we shall see more and more digitization of appliances, and these will be fuelled by human need. Embedded systems and Information appliances have virtually entered every sphere of our life and they will truly change the way we live.**

This paper, discuss an embedded platform that can be used to design and implement embedded control systems in a rapid and cost-efficient fashion. This platform is built on ZigBee and GSM technology. Therefore, the system development cost can be minimized. Since the platform provides a unified environment in which the users are able to perform all phases of the development cycle of control systems, the development time can be reduced while the resulting performance may potentially be improved. In addition to industrial control, the platform can also be applied to many other areas such as optimization, image processing, instrument, and education. The future work includes test and application of the developed platform in real-world systems where real sensors and actuators are deployed.

A novel architecture of computer lab automation system is proposed and implemented; using relatively new wireless communication technology which is Zigbee.The use of Zigbee technology helps the lower expenses.

***Key words* —Embedded System, Zigbee, Proposed Controlling System.**

I. INTRODUCTION

All Embedded systems contain programmed instruction running via processor chips. They perform control, protection and monitoring tasks. In broad terms Embedded systems are programmable devices or systems which are generally used to control or monitor things like processes machinery, environmental equipment and communications.[1] The range of Embedded system is vast and includes all industrial and commercial sectors. Embedded systems are rapidly becoming a catalyst for change in the computing, data communication, telecommunications, industrial control and entertainment sector.

II. ZIGBEE TECHNOLOGY

Zigbee is a new wireless technology that looks to have applications in a variety of fields. It is developed to overcome the limitations of blue tooth and Wi-Fi. ZigBee is a wireless protocol that was developed as an International standard to enable wireless, machine to machine communication, and networks. It is based on reliable network communications, a long battery life, and can be simply operated. The technology allows for devices to communicate with one another with very low power consumption, allowing the devices to run on simple batteries for several years. The ZigBeel was designed to provide an easy-to-use wireless data solution characterized by secure, reliable wireless network architectures. ZigBee is the set of specs built around the IEEE 802.15.4 wireless protocol[7].

The ZigBee Alliance has been set up as an association of companies working together to enable reliable, cost-effective, low-power, wirelessly networked, monitoring and control products based on an open global standard[8].

The wireless nature of zigbee helps to overcome the installation problem that arises with physical wiring systems.

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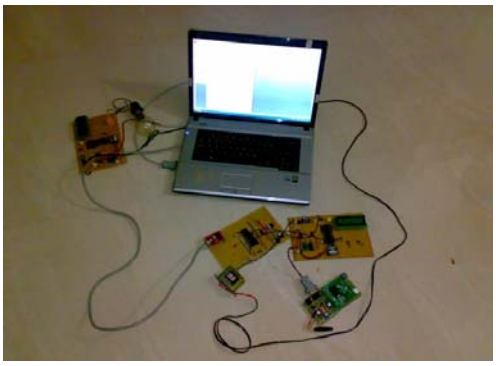
III.SYSTEM IMPLEMENTATION

The implementation of proposed system is illustrated in following figure no.1.

Fig. 1.Proposed System Implementation



As depicted in fig.1 an advanced controlling system using zigbee is implemented for controlling labs PCs and other equipment like lights, fans air conditioners etc.

The proposed system consists of Atmega162 transmitter, receiver, Zigbee module,GSM module, ATmega 32 server and other devices. This works in following way:

ATmega32 consist of the server which will connect to the network. We can use our web browser to open the page in this server to control the devices. This ATmega32 will send the received information to the ATmega162. This ATmega162 will also have GSM module and a keypad, using them also we can control the devices. This ATmega162 will send the command to another ATmega162 using zigbee. This ATmega162 will control the device (equipments) like fans, tubs, air conditions etc. or if we want to shut down our computer then this ATmega162 will send the respective command to the computer through the serial port. The computer will have one C program running. This C program in the computer will accept the command through the serial port and will finally shutdown the computers.

The resulting energy savings are significant; it informs user, system personal and server about unused client PCs and takes necessary action to ensure to avoid power consumption due to idle clients.

Energy saving techniques for computer technology could be applied to help reduce costs attributed to inefficient energy practices. This system is especially significant due to the lack of similar studies at educational institutions across India. As Indian institutes and companies cannot think without computer resources, they have the potential to save a significant amount of financial and environmental wealth by using efficient and environmentally sound equipment. Although general computer usage of computers is increasing. An appropriate strategy would include guidelines that integrate the acquisition of energy efficient and environmentally responsible products specially to handle mass resources like labs.

Environmental technology (EnviroTech) or green technology (GreenTech) or clean technology (CleanTech) is the application of the environmental sciences to conserve the natural environment and resources, and to curb the negative impacts of human involvement. Sustainable development is the core of environmental technologies. When applying sustainable development as a solution for environmental issues, the solutions need to be socially equitable, economically viable, and environmentally sound. As this model also intend to save energy, will be a green computing initiative.

IV.CONCLUSION

The objective of this paper is to enlighten the application of Embedded systems and it presents novel, low cost and flexible controlling system .The architecture is designed to reduced systems complexity and lower cost. This architecture also reduces amount of physical wiring. Hence the system endeavors not to incorporate complex and expensive components. The system is scalable and flexible so one can add other additional devices with minimum efforts. The system allows owner to control connected devices in the lab.

A novel architecture of computer lab automation system is proposed and implemented, using relatively new wireless communication technology which is Zigbee.The use of Zigbee technology helps the lower expenses of the system.

This paper also identifies evaluates the potential of ZigBee for addressing these problems through the design and implementation of a flexible controlling system architecture for computer labs. A ZigBee based controlling system. This system provides a simple and flexible user interface, and remote access to the system.

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