

# IOT Based Energy Management System

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*Abstract* : Now a day's technology becomes ever additional invasive, the look challenges in home automation square measure increasingly apparent. Seamless dominant home, monitoring and programming by the top user have nonetheless to enter the thought. This might be legitimate to the challenge of developing a totally freelance and extensible home system which will support devices and technologies of differing functionalities and protocols. This paper describes the way to management and monitor home appliances mistreatment humanoid application over web. There square measure variety of economic home automation systems available in market. However, these square measure designed for restricted use. Therefore, home appliances will on an individual basis be controlled each from at intervals the house and remotely. This is very useful to physically challenged folks. The practical goal of this paper has been to make a virtual, however much usable, humanoid home automation system. The humanoid mobile is employed to send the commands to the Arduino to manage all the house appliances. The main feature of this method is to manage the voltage levels of home appliance in home like speed of fan supported temperature, intensity of sunshine supported candlepower etc. And another feature is we tend to could get the standing of our home appliances from our humanoid movable. During this system we use completely different sensors like temperature, smoke detector and LDR for various applications.

*IndexTerms* – Embedded system, IOT, Arduino, Sensors, MySQL.

## I. INTRODUCTION

IOT based mostly energy management system highlights the good Homes and it automation. Within the gift day, security systems play a crucial role within the protection of lives and investment. this can be achieved by the incorporation of assorted subsystems into the safety system with one management unit similar to police investigation, trespasser management, access management, fireplace detection, etc. a sensible house is one that's equipped with lighting, heating, and electronic devices which will be controlled remotely by good phone or via the web. Associate in Nursing IoT based mostly energy management system focuses on dominant home electronic devices whether or not you're within or outside your home. this method offers a personal the power to remotely or mechanically management things round the home. Appliance may be a device or instrument designed to perform a particular operate, particularly Associate in Nursing device, similar to aice box, for house use. The words appliance and devices ar used interchangeably. Automation is today's truth, wherever things are being controlled mechanically, typically the fundamental tasks of turning ON/OFF sure devices and on the far side, either remotely or in shut proximity. Automation lowers the human judgment to the bottom degree attainable however doesn't fully eliminate it. The idea of remote management of house devices over the web from anyplace, any time within the world these days are often a reality. Assume a system wherever from the work place table, the user may read the standing of the devices and decides to require management by calibration his boob tube to his favorite channel, activates the cooling system, say the air conditioning, and switches on or off a number of the lights. This user may walk back home and solely notice a really comfy, pleasant home.

The recent developments in technology which allow the employment of Bluetooth and Wi-Fi have enabled completely different devices to own capabilities of connecting with one another. employing a local area network defend to act as a small net server for the Arduino eliminates the requirement for wired connections between the Arduino board and pc that reduces value and permits it to figure as a standalone device. The Wi-Fi defend desires association to the web from a wireless router or wireless hotspot and this might act because then try way for the Arduino to speak with the web. With this in mind, an online based mostly home automation system for device of home appliances is intended.

## II. PREVIOUS WORK DONE

Automation is the process of having a machine or machines to accomplish tasks hitherto performed wholly or partly by humans. Home automation concerns automating the domestic tasks. There are number of applications addressing home automation and monitoring involving infrared/Bluetooth or Ethernet over Power techniques in remote controls. But there is no such publication on providing facility to control and monitor unlimited number of equipments at home via a mobile device at a very low cost using General Packet Radio Services (GPRS) networks. This paper presents a recent research and development effort in construing a real-time home automation and monitoring system named SmartEye which uses cellular networks, Internet based server, networked hardware equipments and GPRS networks. SmartEye accomplishes two tasks; they are home automation and monitoring through mobile phone. Under automation it addresses turning on/off household electrical appliances, such as electric bulbs, door locks etc. SmartEye uses an alerting mechanism together with security cameras to safeguard homes. And also it provides an interface to monitor and control the home through mobile devices. This is a system which integrates the home with the World Wide Web and mobile devices. This paper also discusses the architecture of the system which makes it an easily expandable, user-friendly, affordable and reliable real-time monitoring and remote controlling solution[1].

A smart home system which could supervise household appliances remotely and realize real-time monitoring of home security status through mobile phone. The paper also describes the realization of system hardware and software in detail. This System combined embedded technique with GSM. Design adopted the Liod platform for master control system which core processor is PXA270 Xscale and singlechip expansion module to realize the information collection, analysis and processing. GSM module communicated to transmit all the information gathered by this system. Design also realized the video data acquisition, which can be transmitted via wireless or cable network to monitoring center to remotely understand the house condition. On the whole, through this system we can remotely and real-time monitor house status[2].

With the rapid expansion of the Internet, the owners have been requesting remote control and monitoring of these in-home appliances. This leads to networking these appliances to form a kind of home automation system. In this paper, an Android based home automation system that allows multiple users to control the appliances by an Android application or through a Web site is presented. The system has three hardware components: a local device to transfer signals to home appliances, a Web server to store customer records and support services to the other components, and a mobile smart device running Android application. Distributed cloud platforms and services of Google are used to support messaging between the components. The prototype implementation of the proposed system is evaluated based on the criteria considered after the requirement analysis for an adequate home automation system[3].

The home automation today needs to make use of the latest technological components available. In this paper, we present the design and implementation of a home automation system where communication technologies GSM (Global System for Mobile Communication), Internet, and speech recognition have been used. All these techniques are successfully merged in a single wireless home automation system. This system offers a complete, low cost, powerful and user friendly way of real-time monitoring and remote control of a house[4].

Due to progress in wired and wireless home networking, sensor networks, networked appliances, mechanical and control engineering, and computers, we can build smart homes, and many smart home projects are currently proceeding throughout the world. However, we have to be careful not to repeat the same mistake that was made with home automation technologies that were booming in the 1970s. That is, [total?] automation should not be a goal of smart home technologies. I believe the following points are important in construction of smart homes from users viewpoints: development of interface technologies between humans and systems for detection of human intentions, feelings, and situations; improvement of system knowledge; and extension of human activity support outside homes to the scopes of communities, towns, and cities[5].

Technology is a never ending process. To be able to design a product using the current technology that will be beneficial to the lives of others is a huge contribution to the community. This paper presents the design and implementation of a low cost but yet flexible and secure cell phone based home automation system. The design is based on a stand alone Arduino BT board and the home appliances are connected to the input/ output ports of this board via relays. The communication between the cell phone and the Arduino BT board is wireless. This system is designed to be low cost and scalable allowing variety of devices to be controlled with minimum changes to its core. Password protection is being used to only allow authorised users from accessing the appliances at home[6].

### III. PROPOSED SYSTEM

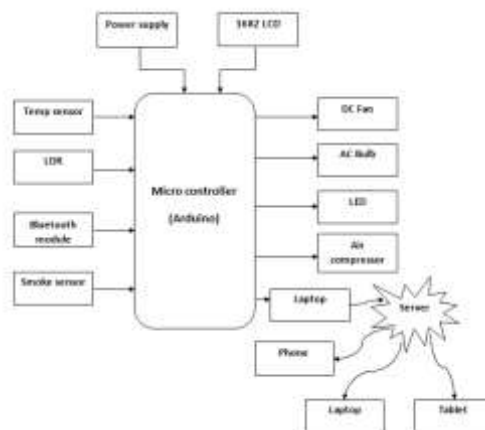


Fig1. System Architecture

### IV. WHY ARDUINO?

Arduino is open source prototyping platform. Arduino based language is available for developing inputs and interacting with other softwares. Supported in all operating systems. Main aspect of it is less expensive than other prototyping systems available. You can get Arduino board with LOTS of different I/O and other interface configurations. The Pi is pretty much what it is and has a lot less time in the field. Pi - for \$35 you get video, audio, Ethernet, and USB. That will cost you 2X that to get the same on top of an Arduino UNO. The Arduino UNO runs comfortably on just a few milliamps. The Pi needs more like 700mA whereas arduino requires less power.

**Sensors:**

In the broadest definition, a sensing element is an object whose purpose is to notice events or changes in its environment, then offer a corresponding output. A sensing element could be a sort of transducer; sensors could provide varied styles of output, however generally use electrical or optical signals. For instance, a thermometer generates a identified voltage (the output) in response to its temperature (the environment). A mercury thermometer, similarly, converts measured temperature into expansion and contraction of a liquid, which may be read on a mark glass tube. The types of sensors employed in this technique square measure lm35 i.e temperature sensing element and ldr i.e light-weight detection sensing element. Both of those sensors are connected to arduino uno board and can be organized consequently. These sensors can sense the sunshine and temperature within the area and can enable user to manually put on and off the lights. Lm35 sensing element can facilitate the user to grasp the room temperature and therefore the ldr sensing element can facilitate the user to possess management over the sunshine remotely.

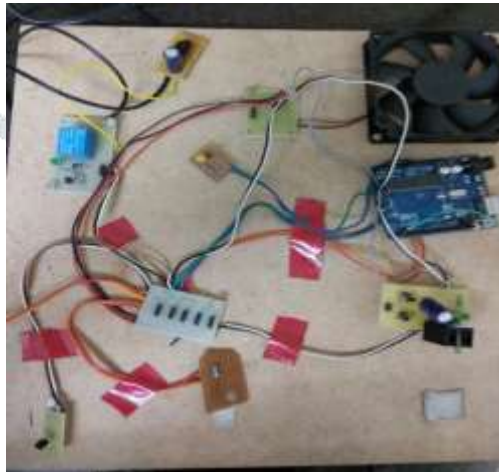
**IV. RESULTS**

Fig2. Experimental Setup



Fig3. Web Page

**V. CONCLUSION**

A Smart Home system integrates electrical devices in a house with each other. The techniques which are going to use in home automation include those in building automation as well as the control of domestic activities, such as TV, fan, electric tubes, etc. After studying and understanding literature survey and other existing works, we proposed a Novel technique that will gives us better understanding of the Environmental conditions in home. Our system not only just monitors environmental conditions but it acts according to inhabitant requirement. In this paper we are planning to eliminate most of the human interaction by providing intelligent system. Development of such Smart Home achieve by using Internet of Things technologies. By using these system we can actually manage to make low cost, flexible smart homes to adjust its environmental conditions and resolve its errors with energy saving.

**REFERENCES**

- [1] Atukorala K., Wijekoon D., Tharugasini M., Perera I., Silva C., (2009), "SmartEye Integrated Solution to Home Automation, Security and Monitoring Through Mobile hones", Next Generation Mobile Applications, Services and Technologies, IEEE Third International Conference on, pp.64–69.
- [2] Zhai Y., Cheng X., (2011), "Design of Smart Home Remote Monitoring System Based on Embedded System", Control and Industrial Engineering, IEEE 2nd International Conference, pp.41-44 .

- [3] Gurek A., Gur C., Gurakin C., Akdeniz M., Metin S. K., Korkmaz I., (2013), "An Android Based Home Automation System", High Capacity Optical Networks and Enabling Technologies, IEEE 10th International Conference on, pp.121- 125.
- [4] Tan K. K., Lee T. H., Soh C. Y., (2002), "Internet Based Monitoring of Distributed Control Systems an Undergraduate Experiment", Education, IEEE Transactions on, vol.45, no.2, pp.128-134.
- [5] R.Naresh Naik , P.Siva Nagendra Reddy, S.Nanda Kishore and K.Tharun Kumar Reddy published a Paper Titled "Arduino Based LPG gas Monitoring & Automatic Cylinder booking with Alert System" in IOSR Journal of Electronics and Communication Engineering (IOSR-JECE) , Volume 11, Issue 4, Ver. I (Jul.-Aug .2016), PP 06-12 e-ISSN: 2278-2834,p- ISSN: 2278-8735.
- [6] Yükksekaya B., Kayalar A. A., Tosun M. B., Özcan M. K., Alkar A. Z., (2006), "A GSM, Internet and Speech Controlled Wireless Interactive Home Automation System", Consumer Electronics, IEEE Transactions on, vol.52, no.3, pp.837-843.
- [7] Yamazaki T., (2006), "Beyond The Smart Home", Hybrid Information Technology, IEEE International Conference on, vol.2, pp.350-355.
- [8] Ogawa M., Tamura T., Yoda M., Togawa T., (1997), "Fully Automated Biosignal Acquisition System For Home Health Monitoring", Engineering in Medicine and Biology Society, IEEE Proceedings of the 19th Annual International Conference on, vol.6, pp.2403-2405.
- [9] Sriskanthan N., Tan F., Karande A., (2002), "Bluetooth Based Home Automation", Microprocessors and Microsystems, Elsevier Science B.V. vol.26, no.6, pp.281-289.
- [10] Al-Ali A. R., Al-Rousan M., (2004), "Java Based Home Automation System", Consumer Electronics, IEEE Transactions on, vol.50, no.2, pp.498-504.
- [11] Deepti S., (2014), "Home Automation System with Universally Used Mobile Application Platform", IOSR Journal of Electronics and Communication Engineering, vol.9, no.2, pp.01-06.
- [12] Piyare R., Tazil M., (2011), "Bluetooth Based Home Automation System Using Cell Phone", Consumer Electronics, IEEE 15<sup>th</sup> International Symposium on, vol.45, no.3, pp.192-195.
- [13] Javale D., Mohsin M., Nandanwar S., Shingate M., (2013), "Home Automation and Security System Using Android ADK", International Journal of Electronics Communication and Computer Technology, vol.3, pp.382-385.
- [14] EASAMBATTU, Thejaswini; REDDY, P. Ajay Kumar; RAMAIAH, G. N. Kodanda. Controlling Home Appliances through GSM Modem and Internet. International Journal of Electronics Engineering Research, [S.l.], p. 1-7, oct. 2013. ISSN 0975- 6450290

