ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

Designing a Home Parameters Monitoring and Controlling System Based on IOT

R.Anuradha
PG Scholar,
Dept of Electronics and communication Engineering,
Shri Sai Institute of Engineering and Technology.

Y.Raghuram Prasad
Associate Professor,
Dept of Electronics and communication Engineering,
Shri Sai Institute of Engineering and Technology.

ABSTRACT:

The advancements in Wireless Sensor Networks (WSN) & Internet technologies, a new trend in era of ubiquity is being realized. The Enormous increase in users of Internet & modifications on internetworking technologies enable networking of everyday objects. The "Internet of Things (IoT)" is about physical items talking each other, machine to machine communications and person to computer communications will extended to "things". The Key technologies that drive future IoT related to Smart sensor technologies including Nanotechnology, WSN and Miniaturization .The integrated network architecture and the interconnecting mechanisms for reliable measurements of parameters by smart sensors and transmission of data via internet .The proposed system which can use to update the values or parameters in home by internet via different communication protocols. The proposed system is designed as three nodes, one is sensor node, second one is coordinator node which will be interfaced with internet through PC and the third one is Supervision node from where we can monitoring and control parameters . The two nodes can communicate by Zigbee wireless protocol. The Coordinator node will update data in to internet via PC. Then we can view status of parameters and can control it via internet.

Keywords:

Internet of Things (IOT), Zigbee, Wireless Sensor network, Home Automation, Zigbee, Energy Management.

1 INTRODUCTION:

The Internet of Things (IoTs) can be described as connecting everyday objects like smart-phones, Internet TVs, sensors and actuators to the World Wide Web where the devices are intelligently linked together enabling new forms of communication between things and people, and between things themselves.

Building IoTs has advanced significantly in the last couple of years since it has added a new dimension to the world of information and communication technologies. According to [1], in 2008, the number of connected devices surpassed connected people and it has been estimated by Cisco that by 2020 there will be 50 billion connected devices which is seven times the world population. Now anyone, from anytime and anywhere can have connectivity for anything and it is expected that these connections will extend and create an entirely advanced dynamic network of IoTs. The development of the Internet of Things will revolutionize a number of sectors, from wireless sensors to nanotechnology.

In fact, one of the most important elements in the Internet of Things paradigm is wireless sensor networks (WSNs). WSNs consist of smart sensing nodes with embedded CPUs, low power radios and sensors which are used to monitor environmental conditions such as temperature, pressure, humidity, vibration and energy consumption [2]. In short, the purpose of the WSN is to provide sensing services to the users. Since, the number of users of the Internet is increasing therefore; it is wise to provide WSN services to this ever growing community.

In this paper, we present the design, development and integration of an extensible architecture forWSN with the IOT based sensor data platform, where info-graphic of different data streams can be displayed, accessed and shared from anywhere with Internet connectivity. The collected data from the sensor nodes are processed, and analyzed server via an Application Programming Interface (API). We have used REST based Web services as an interoperable application layer that can be directly integrated into other application domains like e-health care services, smart homes, or even vehicular area networks (VAN). For proof of concept in a smart industry/home, we have implemented a REST based Web services on an IP based low power WSN test bed, which enables data access from anywhere for the smart industry/home.

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

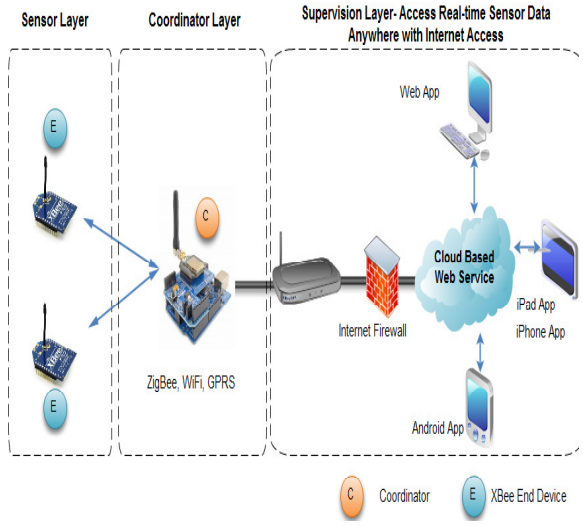


Figure1.Architecture of IOT Based monitoring system

2.RELATED WORK:

Wireless sensor platforms have been widely deployed in a number of applications ranging from medical such as Alarm-Net [6], or CodeBlue [7] to environmental monitoring [8-10]. The architecture of these systems has been designed in a very ad hoc fashion and is not flexible to adapt to other applications or scenarios while the core problem is the same, remote monitoring using sensor networks. During the last few years, many researchers have investigated on ways to connect wireless sensor networks to the Cloud [11]. Authors in [5, 6] have presented Internet protocols for connecting wireless sensor networks to the Internet but no real implementations have been shown. Much of the previous work has been on theoretical aspects of system architecture rather than actual deployment and testing of wireless sensor networks with the Clouds. Use of Web services to connect sensor networks with external networks have also been suggested by researchers in [7, 8]. However, their work was mainly focused on the feasibility of SOAP based Web services in terms of energy and bandwidth overheads. SenseWeb [1] is one of the first architectures being presented on integrating WSN to the Internet for sharing sensor data. Users were able to register and publish their own sensor data using the SenseWeb API. The main drawback of SenseWeb is that all the decision making process is executed at a single central point called the Coordinator. The Coordinator is the central point of access for all applications and sensor contributors where all the sensor data is stored and analyzed.

That is, all the intelligence to control and to make a decision is located at this central point and if the Coordinator fails, the entire network is disrupted.

3.DESCRIPTION OF PROPOSED ARCHITECTURE:

The block representation of the proposed system is divided into four nodes (Figure 1): (1)Sensor Nodes (2) the Coordinator Node and (3) the Supervision node.

Block diagrams
Sensor Node-1.1

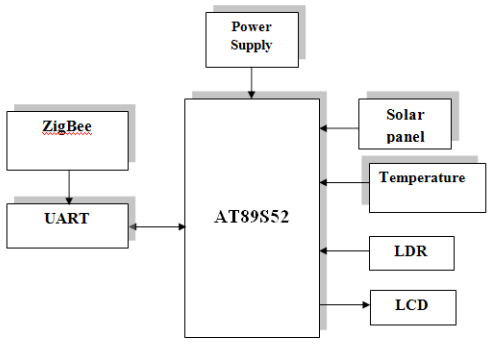


Fig 1 Sensor node1.1

The above section is having the sensing unit, which measure attributes of hot water system in home. This unit heats the water by electricity and solar heater which uses sunlight. Measure the parameters Current supplied to hot water, water temperature in solar water heater & in hot water of cylinder. It consists of AT89S52 microcontroller, power supply, Solar panel, temperature sensor, LDR, ZigBee, UART and LCD.

Sensor node-1.2

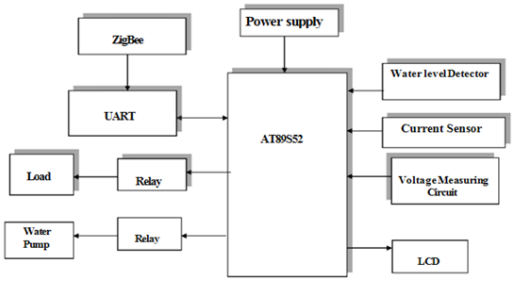


Fig 2 Sensor node 1.2

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

The sensing unit measures current and voltage parameters,water level detector of house hold appliance, indicating power consumption,water usage indication and conditioning of respective usage of appliance. The status of appliance can be monitored through remotely by IOT gateway integrated with WSN ZigBee coordinator and if any parameters conditions changes then they can be control remotely via internet.This unit consists of Current sensor, Voltage measuring circuit, water level detector ,Zigbee,LCD are interfaced to microcontroller AT89S52,with an appliances of light ,motor .

Sensor node-1.3

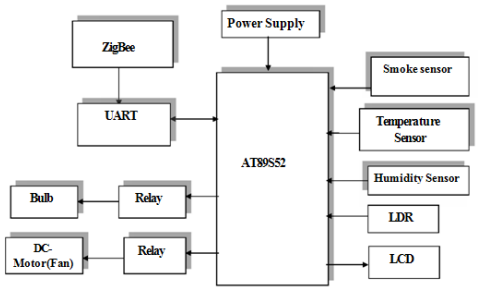


Fig 3 Sensor Section 3

This unit measures environmental conditioning values such as Humidity, light intensity, temperature,smoke etc. Through IOT application and IOT gateway, the fabrication of types of sensing units enabled in remote monitoring & controlling of household appliances. The ZigBee, UART, AT89S52 ,LCD,appliances of bulb ,DC motor fan are interface to microcontrolled by the sensors Temperature, humidity, LDR,smoke .

Co-ordinator/ internet Section:

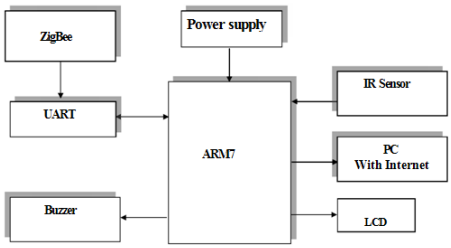


Fig 4 Coordinator node

The Coordination Layer is responsible for the management of the data received from the sensor network. It temporarily stores the gathered data into buffer and sends it to the Supervision layer at predefined intervals. Base station which comprises of ARM7, UART shield and XBee is connected to the PC using RS232 cable and is powered using power supply circuit. It serves as a server between the wireless sensors and the dedicated network and has more advanced computational resources compared to the End Devices found in Sensor Layer. At the base station, the sink node gathers data from wireless sensors using the ZigBee protocol and sends this data to Cloud based sensor data platforms. Here the ARM7 microcontroller read the sensor information from different wireless sensor networks through Zigbee and fed to the PC where the data tobe uploaded into the internet.

C). SUPERVISION NODE:

Finally, the Supervision Layer accommodates the base station with a Web server to connect and publish the sensor data on the Internet. This layer stores the sensor data in a database and also offers a Web interface for the end users to manage the sensor data and generate statistics. For the Supervision Layer, we have used Gmail HTTP Service which provides a REST based API to publish and access the sensor data. Thus, allowing existing networks to be connected into other applications with minimal changes. Open.Sen.se offers a graphical interface for real-time monitoring of systems using info graphic data streams and to retrieve the sensor values using device type and timestamp. Alerts can also be automatically generated to notify the user each time if the desired event has been sensed by the domain rules programmed in the base station.

LM35 (Temperature sensor)

The LM35 series square measure exactitude integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature.

ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

The LM35 therefore has a plus over linear temperature sensors tag in ˚ Kelvin, because the user isn't needed to cipher an outsized constant voltage from its out place to get convenient Centigrade scaling.

LDR (light dependent resistor)

A photo resistance or light-weight Dependent resistance or CdS (Cadmium Sulphide) Cell may be a resistance whose resistance decreases with increasing incident strength. It also can be brought up as a photoconductor. a photograph resistance is formed of a high resistance semiconductor. If light-weight falling on the device is of high enough frequency, photons absorbed by the semiconductor offer certain electrons enough energy to leap into the conductivity band. The ensuing electron conducts electricity, thereby lowering resistance.

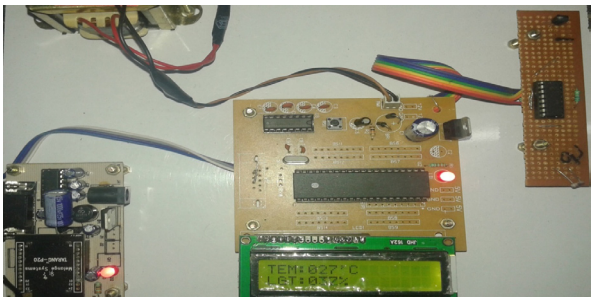
ZIGBEE Module

Zigbee is that the name of a specification for a set of high level communication protocols exploitation tiny, low-power digital radios supported the IEEE 802.15.4-2006 commonplace for wireless personal space networks (WPANs), like wireless headphones connecting with cell phones via short-range radio. The technology is meant to be less complicated and cheaper than alternative WPANs, like Bluetooth.

4.RESULTS:

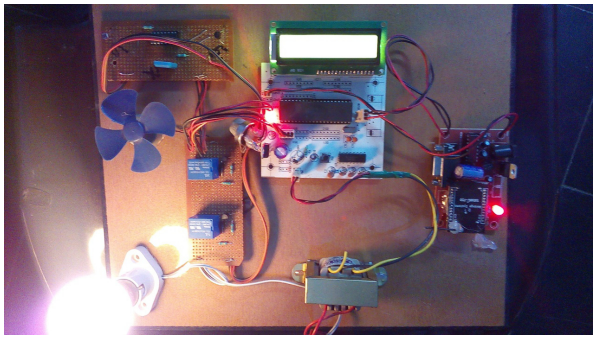
The proposed system was fully developed and tested to demonstrate its feasibility and effectiveness. The screen-shots of the developed system has been presented in Figure below.

Sensor Section-1

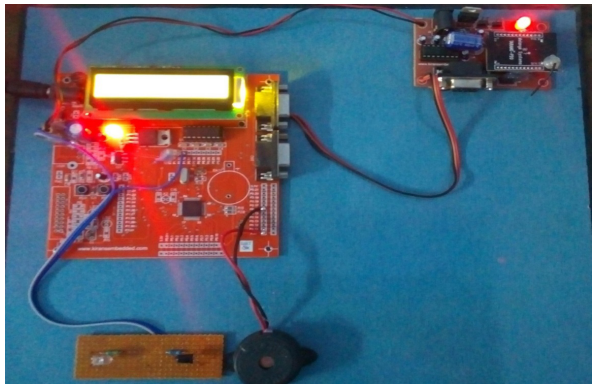


Sensor Section-2

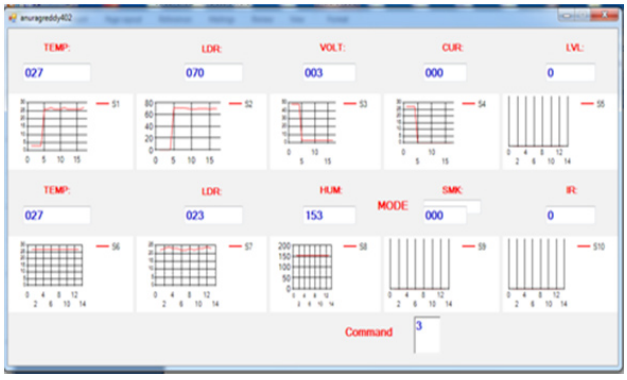
Sensor Section-3



Co-ordinator Node:



Supervision node:



ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

Real-time Graphical representation of different types of sensing information on the IOT system.

5. CONCLUSION AND FUTURE SCOPE:

Design And implementation of observation and automatic controlling in homes and industries that has the potential of analyzing and to possess larger management over security and customization and conjointly ability to adapt to alternative wireless device networks and sends the device data to laptop and transfer to web server and might send an SMS so as to grasp the conditions of the system. In future scope implementation of project as conjointly check the sensor's knowledge in mobile and that we can provide time schedule's to every and each sensor's and can also store the report and knowledge collected from the sensor's.

REFERENCES:

[1] M. Swan, "Sensor Mania! The Internet of Things, Wearable Computing, Objective Metrics, and the Quantified Self 2.0," Journal of Sensor and Actuato r Networks, vol. 1, pp. 217-253, 2012.

[2] W. Wei, K. Lee, and D. Murray, "Integrating sen sors with the cloud using dynamic proxies," in Personal Indoor and Mobile Radio Communications (PIMRC), 2012 IEEE 23rd International Symposium on,, 2012, pp. 1466-1471.

[3] Perumal.B, P. Rajasekaran.M, and Ramalingam.H.M, "WSN INTEGRATED CLOUD FOR AUTOMATED TELEMEDICINE (ATM) BASED e-HEALTHCARE APPLICATIONS," in 4th International Conference on Bioinformatics and Biomedical Technology, Singapore, 2012, pp. 166- 170.

[4] C. Alcaraz, P. Najera, J. Lopez, and R. Roman, "Wireless Sensor Networks and the Internet of Things: Do We Need a Complete Integration?," presented at the 1st International Workshop on the Security of the Internet of Things (SecIoT'10), Tokyo ,Japan, 2010.

[5] (2012, 20th December, 2012). Open.Sen.se. Avail able: http://open.sen.se/sensemeters/tab/3114/ [6] A. Wood, G. Virone, T. Doan, Q. Cao, L. Selavo, Y. Wu, et al., "ALARM-NET: Wireless sensor networks for assisted-living and residential monitoring," University of Virginia Computer Science Department Technical Report, 2006.

[7] D. Malan, T. Fulford-Jones, M. Welsh, and S. Mo ulton, "Codeblue: An ad hoc sensor network infrastructure for emergency medical care," in International workshop on wearable and implantable body sensor networks, 2004.

[8] G. Werner-Allen, K. Lorincz, M. Ruiz, O. Marcil, J. Johnson, J. Lees, et al., "Deploying a wireless sensor network on an active volcano," Internet Comp uting, IEEE, vol. 10, pp. 18-25, 2006.

[9] J. Tooker, X. Dong, M. C. Vuran, and S. Irmak, "Connecting soil to the cloud: A wireless underground sensor network testbed," in Sensor, Mes h and Ad Hoc Communications and Networks (SECON), 2012 9th Annual IEEE Communications Society Conference on, 2012, pp. 79-81.

[10] F. Kausar, E. Al Eisa, and I. Bakhsh, "Intelli gent Home Monitoring Using RSSI in Wireless Sensor Networks," International Journal of Computer Networks & Communications (IJCNC), vol. 4, pp. 33-46, 2012.

[11] H. ElAarag, D. Bauschlicher, and S. Bauschlich er, "System Architecture of HatterHealthConnect: An Integration of Body Sensor Networks and Social Networks to Improve Health Awareness," International Journal of Computer Networks & Communications, vol. 5, p. 22, 2013.