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A Review: Design of Interface Worked On Solar Powered Wireless Sensor Node for IOT Gateway

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***Abstract**: The internet of things is an illustrative technologies modernization for future computing and communication. Sensors have cumulated vast consideration in both academia and industry. After all, the expected fast assumption and dispersal of IoT technologies have not still taken place till an insufficiency of understanding about IoT and how industries can apply IoT well. To understand IoT usage, conclude the dispersal orientations as IoT, and hand over decent instructions for potential IoT adopters. Zigbee , a one and only communication standard designed for wireless personal area networks, has an acutely low complication, worth, and power devastation for wireless connectivity in reasonable, convenient, and mobile devices. In this paper, we present a compact circuit of the wireless sensor node and low power consumption circuit. Wireless sensor node senses the data and this collecting data sends towards gateway by the zigbee transmitter. In this paper, we use solar for alternate power supply.*

Keywords: IOT, WSN, ZigBee Transmitter, ZIGBEE Receiver, Wi-Fi.

I. INTRODUCTION

The internet is a combination of so many networks which enables devices to communicate globally by using some protocols .in early years Internet is represented by website and electronic mail called as E- mail. These days we are able to see many forms of Internet around us. As a part of our life internet is providing plenty of services and applications. The user-friendly and automated mechanism is the main cause behind the digitalization.

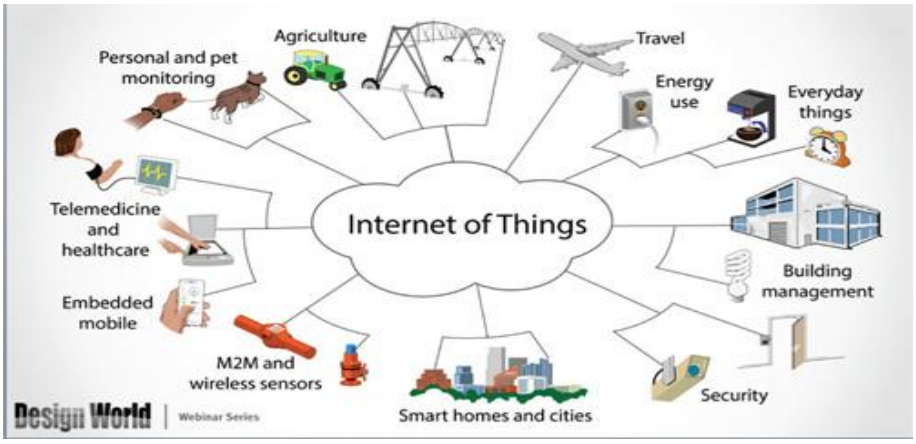

Fig 1 Applications of IoT

Although IoT does not accept a definitive communication technology, it will perform an important role, and in particular, WSNs will increase quickly many applications and many industries. The teeny, rugged, cheap and flat powered WSN sensors will attend the IoT to alike the smallest objects installed in any particular kind of environment, at applicable costs. Integration of these objects into IoT will be an important development of WSNs.

A WSN can mainly be described as a network of nodes that accordingly sense and be allowed to containment the environment, permissive interplay between persons or computers and the encircling environment. In actuality, the action of sensing, handling, and communication with a bounded amount of energy, starts up a cross-layer design accession, as usual, compelling the joint cogitation of allocated signal/data handling, medium access approach checkout, and communication protocols.

Various applications of Internet of Thing (IOT) technology is affecting the backbone of network development as its one of the emerging and blooming technology.The ideal architecture of IOT combined of three layers first would be sensing layer allows for sensing data and get identified, many sensor devices are connected to this layer ,then second is network layer ,it will connect devices using ZigBee, RFID, Wi-Fi, Ethernet etc and third is application layer in this layer data can be used and communicated by users.

The demand of using internet technology is affecting every individual's life, devices become mobile and closer to each other.Today the smart devices making their place in the world and providing end to end connectivity thus each year no of devices increasing rapidly. So it requires devices should communicate automatically. Therefore one of the good solutions would be the internet of things (IOT).This is a network of devices which would interact with the each other by Unique Identifier (ID).

The development of WSNs was stim by military applications, especially supervision in ware fare zones. Today, they contained delivered independent devices that use sensors to oversee the physical conditions with their applications elongated to industrial surrounding, automation, health, traffic, and many purchase areas.

II. LITERATURE REVIEW

Yu-Kai Huang, Ai-Chun Pang, Pi-Cheng Hsiu, Weihua Zhuang Pangfeng LiuIn [3] A manufactured WSN, information about an area of suspicion may be required for further analysis, which means that more traffic can be propagated. In this paper, we have proposed an adoptive-parent-based framework for a ZigBee cluster network to increment the bandwidth fulfillment without acquiring any extra message exchange.

M.J. Lee, Jianliang Zheng, Young-Bae Ko , D.M. Shrestha [2] This article presents an inspect often this appearing technology, focusing on the technical merits and correspondent standards activities of IEEE and ZigBee that are actively mentioning the concept of multi-hop mesh techniques in the field of wireless networking technologies, ranging from personal area networks (PANs) to metropolitan area networks (MANs)

Mr. Shaikh Mohammad Ali, Mr. Mohd Talha Ahmed [5] in this paper, we discussed an access to integrate the IoT with Cloud computing. Inappropriate, a system is presented detecting the different elements and how they collaborate with each other. In the end, we discussed how the all system works, advantages, technology and challenges in IoT devices are at the starting stage and, as discussed in this paper, they are not ready still to guide complicate Cloud scenarios, alike the roadmap toward contemporary Cloud IoT services begins to be tracked.

CHEE-YEE CHONG AND SRIKANTA P. KUMAR [4] MEMS technology, more responsible wireless communication and flat-cost casting have resulted in tiny, reasonable, and powerful sensors with embedded processing and wireless networking capability. Such wireless sensor networks can be used in more new applications, ranging from environmental monitoring to industrial sensing, equivalently traditional military applications. Completely, the applications are only limited by our cognition. Networks of tiny, perhaps, microscopic sensors embedded in the fabric of society: in buildings and machinery, and alike on people, performing automated continuous and discrete monitoring, could drastically enhance our understanding of our physical environment.

III. METHODOLOGY

A. Hardware

1. To propose an overall architecture for WSN.
2. To design printed Circuit Board (PCB) Layout for WSN.
3. Hardware implementation of Microcontroller (ATMega328P), Wi-Fi module (ESP8266) and XBee of WSN on PCB.

B. Software

4. To develop a C code for SPI communication between sensor node and Microcontroller in Arduino IDE.
5. Log the sensor data onto Thing Speak (Open source data platform and API for the Internet of Things)
6. Continuous monitoring of real-time data.

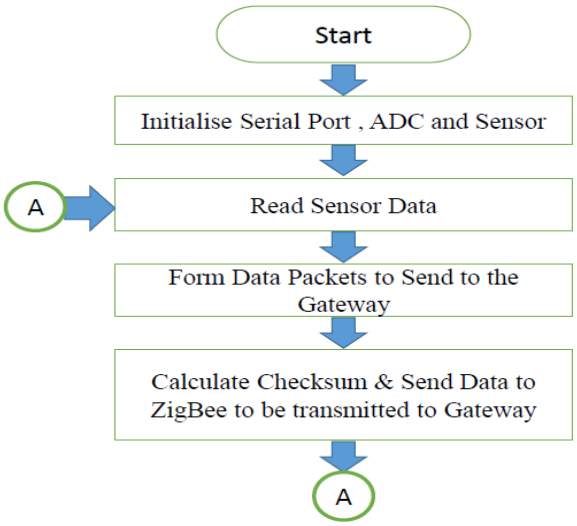

Fig.2- Flowchart of WSN

C. WSN interface

Interfacing Zigbee based WSN, a ZigBee coordinator is required. It will provide the serial interface so that it would be able to communicate with the module.The software which is running on an IOT gateway must have to be interfaced with ZigBee unit by using ZigBee API format.

D. XBee Trans-receiver

Within the Zigbee protocol and abutment, the exclusive want of low-cost, low-power wireless sensor networks the Zigbee RF module performs. Minimal powers require the modules and also support the trustworthy transfer of data between remote devices. Within the ISM 2.4GHz frequency band, the module performs.

E. Key Feature

High attainment, flat Cost:

- Indoor/Urban: up to 133' (40 m)
- Outdoor line-of-sight: up to 400' (120 m)
- Transmit Power: 2 mW (+3 dBm)
- Receiver Sensitivity: -95 dBm
- RF Data Rate: 250 kbps

Flat Power:

- TX Current: 40 mA (@3.3 V
- RX Current: 40 mA (@3.3 V)
- Power-down Current: < 1 µA @ 25℃

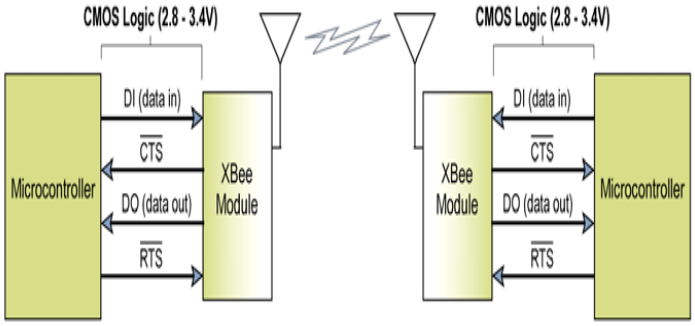

Fig.3 System Data Flow Diagram in a UART- interfaced environment

F. Proposed Methodology

The sensor node consists of a sensor which interacts with the environment. Every sensor node was integrated with transce-receiver XBee called End Devices. These End Devices form a Mesh network and transmit the information accumulated by the sensors to the base station.The data sensed by the sensor is sent to the micro-controller ATMEGA328P. The micro-controller then transmits the data to the XBee through its UART interface. The XBee then transmits the data to the base station. After transmitting the data

to the base station the XBee will go into the sleep mode and after the wake, up again receives data from the micro-controller and transmits to the coordinator.

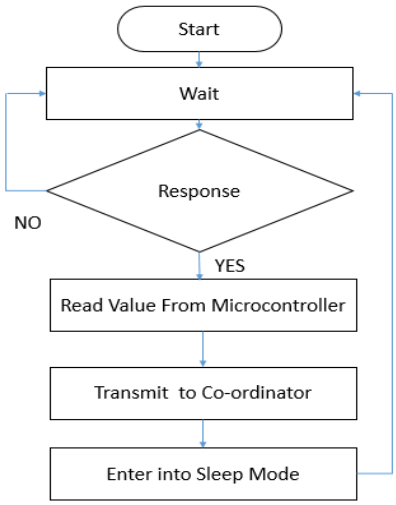

Fig.4 Flow-chart of communication in the sensor node.

CONCLUSION

Wireless data transmission between all the three End Device sensor nodes ADXL345 accelerometer, DHT11 Temperature and Humidity sensor and DS18B20 Temperature sensor has been done. By using the sleep mode mechanism for low power XBee transceiver modules provided an energy efficient approach to increase the lifetime of sensor nodes.The sensor nodes are transmitting the data at a cyclic time interval of 4 sec and in between it goes into sleep mode which is very useful in reducing power consumption of the whole network.

REFERENCES

[1].Y.S.Chen and Y. R. Chen, "Context-Oriented Data Acquisition and Integration Platform for Internet of Things," *2012 Conference on Technologies and Applications of Artificial Intelligence*, Tainan, 2012, pp. 103-108.
[2].IEEE Standard for Local and metropolitan area networks--Part 15.4: Low-Rate Wireless Personal Area Networks (LR-WPANs) Amendment 1: MAC sublayer," in *IEEE Std 802.15.4e-2012 (Amendment to IEEE Std 802.15.4-2011), vol., no., pp.1-225, April 16 201*
[3].IEEE Draft Supplement to Standard [For] Information Technology- Telecommunications and Information Exchange Between Systems-Local and Metropolitan Area Networks-Specific Requirements -Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications: Supplement to IEEE Std 802.11-1999," *in IEEE Std P802.11a/D7 , vol., no., pp., 1999.*
[4].Chee-Yee Chong and S. P. Kumar, "Sensor networks: evolution, opportunities, and challenges," in *Proceedings of the IEEE, vol. 91, no. 8, pp. 1247-1256, Aug.2003.doi:10.1109/JPROC.2003.814918*.
[5].Rajeev Piyare and Seong Ro Lee, "TOWARDS INTERNET OF THINGS (IOTS): INTEGRATION OF WIRELESS SENSOR NETWORK TO CLOUD SERVICES FOR DATA COLLECTION AND SHARING", *International Journal of Computer Networks & Communications (IJCNC) Vol.5, No.5, September 2013.*
[6].M. Swan, "Sensor Mania! The Internet of Things, Wearable Computing, Objective Metrics, and the Quantified Self 2.0," *Journal of Sensor and Actuator Networks, vol. 1, pp. 217-253, 2012.*
[7].J. Tooker, X. Dong, M. C. Vuran, and S. Irmak, "Connecting soil to the cloud: A wireless underground sensor network test bed," *in Sensor, Mesh and Ad Hoc Communications and Networks (SECON), 2012 9th Annual IEEE Communications Society Conference on, 2012, pp. 79-81.*
[8].Datasheet "XBee®/XBee-PRO® RF Modules", Available [online]. https://www.digikey.com
[9].Datasheet"ATMEGA328P",[online]. Available http://www.atmel.com
[10]. Datasheet"DHT11",[online]. Available http://www.micropik.com
[11]. Datasheet"DS18B20",[online]. Available http://www.sparkfun.com
[12]. Datasheet "ADXL345", [online]. Available http:// www.analog.com

