A Review- Communication Technologies enabling working of IoT

Someet Singh[1], Navjot Kaur[2]

AP, School of Electronics and Communication[1] , School of Computer Science and Engg.[2]

Lovely Professional University, Phagwara, Punjab[1,2]

Abstract- Communication technologies play a vital function in any wireless network. The wireless communication network consists of energy efficient devices which require low power for combination over the network. Internet of Things has emerged as a significant and succeeding concept to provide communication connectivity among the smart devices over the internet. Iot enables communication among various objects which allow local and global communication. This paper intends to present major communication technologies that can be utilized by IoT devices for communication.

Keywords- IoT, RFID, Bluetooth, Wireless Sensor Network, Smart Devices, Wireless Personal Area Network, Zigbee.

Introduction

Internet of Things (IoT) is a systematic system of interconnected intelligent smart devices including various sensors and people. All intelligent devices are provided and identified with the unique id's.[1] IoT has ability to transmit information over the network and allows human to human or machine to human interaction. This fast revolution of technology has put a significantly incredible impact of the technical, social, economic and educational aspect of living and non-living things. [2] In the recent years, the individuals had encountered educated specialized changes because of creations of new innovation. [3]

Working of IoT

Internet has influenced our lifestyle and mode of communication among human and machines. IoT has forwarded this legacy by interconnecting many devices over internet communicating to each other at the same time. It has facilitated the machine to machine and human to machine communication. [4][5]

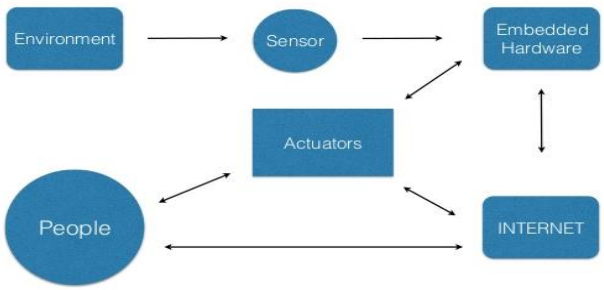

Figure 1: Working of IoT

IoT Architecture

The IoT architecture consists of four components: Sensors or Devices, connectivity, data processing, and a user interface. [6]

1. **Sensors or Devices:** Sensors or devices are used to gather data from the surrounding. A device can consist of multiple devices to sense other devices and data. [7]
2. **Connectivity:** Data that is collected is sent to cloud through a medium like WiFi, WAN.
3. **Data Processing:** The data collected at cloud is processed using a software or appropriate devices or technique. Processing of data can be for multiple reasons like examining the temperature sensed during the day to predict variation in temperature during the day or identifying any moving or still object. This processing might require human intervention to meet the purpose. [9][8]
4. **User Interface:** The collected and processed information is made available for users to use. Such information can be used for multiple reasons (but depends upon the reason for which it is collected and processed) like accessing information from a remote source, identifying objects to fine intruders, checking availability of items in a smart houses. [10][11]

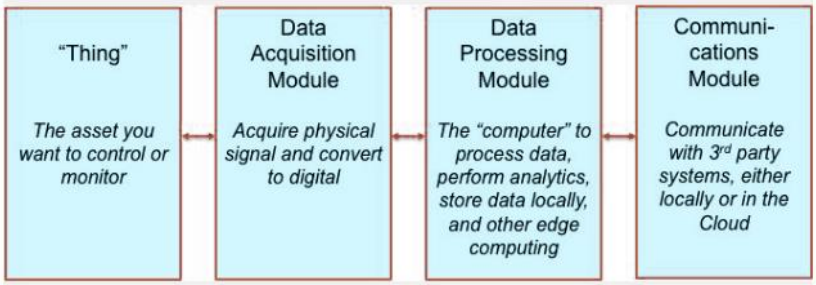

Figure 2: Components of IoT

Applications of IoT in Industries

With the evolution and advancement in technology, use of Iot in various industries has hit the highest point. [12] Industries are highly influenced by the application and deployment of IoT based solutions including ecological surveillance, healthcare sector, stock and manufacture management, food supply chain (FSC), transportation, work and home security, and supervision.[13] [14].

IoT in the Healthcare Service Industry

IoT offers major and continuous prospect to advance healthcare. Influenced and powered by IoT's omnipresence recognition, its ability to sense and communicate. All entities in the healthcare systems can be tracked and monitored constantly with the help of connected smart devices. Data is collected and is sent over cloud. By using that data all connected devices are operated.

IoT in FSC

The IoT system offers ability in networking; all the connected elements can be distributed throughout the entire Food Supply Chain system for smooth and efficient implementation and transfer. Enabling FSC industry IoT equipped, additionally offers powerful monitoring and identifying functionalities and techniques to track and screen the procedure of nourishment generation. IoT based solution to FSC encompass three parts:

1.) Wireless Sensor Network Hosts, RFID tags, client interaction units.

2.) The backend systems and other types of units attached by distributed networks.

3.) The communication infrastructures.

Role of IoT for Mining Industry

Mine safety is a major worry for some majority of the nations because of the working conditions beneath the surface of the ground mines. To avoid tragedy in the mining, there is a need to setup and utilize IoT enabled smart devices and technologies to be aware of mine calamity. By using IoT enabled devices underground mining

can be monitored and controlled. Mining units can follow the area of mining beneath the surface and examine, analyze all safety information gathered from electronics sensors to upgrade security standards.

Role of IoT in Transportation and Logistics Industry

IoT based smart devices play undeniably significant role in transportation and logistics industries. As numbers of interconnected physical devices are operational with scanner tags, unique IDs, transportation and logistics industries can directly monitor of the movement of IoT enabled physical devices from a source to destination across the entire supply chain.

Role of IoT in Firefighting and Safety Field

Internet of Things has influenced the firefighting safety field. Smart devices are integrated and are used to find potential fire and give early cautionary indications to conceivable fire calamities. Using IoT based devices the industries and business units could perform automatic identification and analysis to recognize real-time environmental monitoring, early fire cautioning and crisis salvage where ever and when ever required.

Conclusion

Regardless of risk and other issues, industries are gaining faith in IoT enabled solutions because of its popularity, reliability, accuracy. With advancement in technology, sensing devices are becoming less expensive, small in size and technically more powerful. These factors influence industries to deploy IoT enabled devices to build up applications.

References

1. Ashton, K.: That 'Internet of Things' Thing. RFiD Journal 22, 97–114 (2009)
2. Atzori, L., Iera, A., Morabito, G.: The internet of things: A survey. Computer Networks 54(15), 2787–2805 (2010).
3. ITU Internet Reports 2005: The Internet of Things, http://www.itu.int/osg/spu/publications/internetofthings (accessed on September 19, 2011).
4. International Telecommunication Union UIT. ITU Internet Reports 2005: The Internet of Things[R] (2005).
5. Gustavo, R.G., Mario, M.O., Carlos, D.K.: Early infrastructure of an Internet of Things in Spaces for Learning. In: Eighth IEEE International Conference on Advanced Learning Technologies, vol. 2, pp. 381–383 (July 2008).
6. Sarma, A.C., Girão, J.: Identities in the future internet of things. Wireless Personal Communications 49(3), 353–363 (2009).
7. CERP-IoT: Cluster of European Research Projects on the Internet of Things, Vision and Challenges of Realizing the Internet of Things (March 2010), http://www.internet-ofthings-research.eu/pdf/IoT_Clusterbook_March_2010.pdf (accessed on May 2012).
8. Internet of Things Strategic Research Roadmap, http://www.grifs-project.eu/data/File/CERP-IoT%20SRA_IoT_v11.pdf (accessed on April 2012).
9. Agrawal, S., Das, M.L.: Internet of Things—A paradigm shift of future Internet applications. In: 2011 Nirma University International Conference on Engineering (NUiCONE), pp. 1–7 (December 2011).
10. Newmarch, J., Tam, P.: Issues in Ownership of Internet Objects. In: The Fifth International Conference on Electronic Commerce Reaserch, Montral, Canada (2002).
11. Petrie, C.: The Future of the Internet is Coordination. In:Proceedings of FES-2010: Future Enterprise Systems Workshop (2010).
12. Weber, R.H., Weber, R.: Internet of things: legal perspectives. Springer Publishing Company, Incorporated (2010).

13. ZigBee – The Internet of Things, http://www.vesternet.com/zigbee (accessed on November 2012).
14. Doukas, C.: Building Internet of Things with the Arduino. CreateSpace Publishers (2012).
15. Lee, J.S., Su, Y.W., Shen, C.C.: A comparative study of wireless protocols: Bluetooth, UWB, ZigBee, and Wi-Fi. In: 33rd Annual Conference of the IEEE Industrial Electronics Society (IECON 2007), pp. 46–51 (November 2007).
16. Decuir, J.: Bluetooth 4.0: Low Energy, IEEE Annual Report (2010), http:// chapters.comsoc.org/vancouver/BTLER3.pdf (accessed on October 2012).