Internet of Things (IoT): An Overview and Its Applications

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Abstract

Internet has become a major part of our lives. Internet of Things speaks to a differing innovation and utilization with phenomenal business openings and dangers. It also has picked up great amount of attention from scientists, since it turns into a vital innovation that guarantees smart lifestyle of humans by permitting interchange of information and data between objects, machines and even peoples. The IoT expects to bind together everything in our reality under a typical foundation. The primary target of this paper is to give an outline of Internet of Things, designs, and essential advances and their uses in our everyday life observed from different research papers by various authors.

***Keywords*: Internet of things (IoT), RFID (Radio Frequency Identification), NFC**

Introduction

The term Internet of Things was coined by Kevin Ashton, who is the co-founder and director of Auto-ID Center at MIT. The Internet of Things (IoT), in some cases alluded to as the Internet of Objects, will change everything including ourselves. Obviously, the Internet is a standout amongst the most critical and ground-breaking manifestations in all of mankind's history and now with the idea of the web of things, web turns out to be greater to have a smarter life in each viewpoint. Using IoT anything can connect to the Internet from any places in the world and this can help in creating smart homes and smart vehicles and more such similar things. According to studies it says that by using IoT and using it with other devices parallelly it will be much close to introduction of smart environments by 2020.

Literature Survey

Somayya Madakam (2015) mentioned in his paper [2] that IoT is nothing but a global network which allows the interaction and exchange of data between things to things, humans to humans, things to humans and also provides a unique identity to each object.

He also stated that IoT has made possible to bring physical objects in connection or touch with the cyber world. This was made conceivable by various innovations like RFID, NFC, and 2d Barcode which enabled physical objects to be distinguished and identified over the web. Also, different individuals call IoT with various names however the goal of the IoT is same in the expansive sense. The aliases of IoT include Web of Things, Internet of Objects, Embedded Intelligence, Connected Devices and Technology Omnipotent, Omniscient and Omnipresent.

Elmustafa Sayed Ali Ahmed (2017) in his paper [1] said that IoT can be used alongside with many different combinations with other wired and wireless devices.

For example, IoT can be used with Cloud Computing where cloud can offer a compelling answer for benefits in IoT service management and composition. And once any data is in cloud it can be accessed remotely from any parts in the world. Also, according to the paper IoT can be used with other devices to make them smarter and improve the decision-making capabilities in devices so that they don't produce huge amount of data because the data in internet is growing at a huge rate every single day. So ultimately this will also help in reduction or controlling the transfer of data in the internet.

Also, it is possible to use IoT with various other devices to make a smart product. Arun Rajaa, R. Naveedhab, G. Niranjanadevic and V. Roobini proposed in their paper [3] that a security framework or system records the video when any movement is identified and uploads it to the server and alerts the client by instant text message to his/her phone. In their proposed theory they used Raspberry Pi camera module for detecting motion, Raspberry Pi (model B+) and a small credit card sized computer to process the video.

S. Nazeem Basha1, Dr. S.A.K. Jilani, Mr.S. Arun have proposed in their paper [4] about an intelligent door system using Internet of Things which advises interruption by conveying email notice to the proprietor. They used ADXL345 and raspberry pi, ADXL345accelerometer detects the change in movement or acceleration on the door and Raspberry Pi reads he data acquired from sensor. Apart from this they also used Amazon Web Services Internet of Things (AWS IoT) for storing data and sending out email notice to the concerned proprietor. In the meantime, all the intrusion logs are kept stored in Google Spreadsheet and can be accessed by the concerned owner whenever he needs. It very well may be utilized as a model in fortifying entryway security in numerous applications, for example, bank robbery, home attacks, lock picking etc.

Gipsa Alex, Benitta Varghese, Jezna G Jose, AlbyMol Abraham proposed a work on an Intelligent Medicine Box along with sensors for health monitoring and diagnosing the disease. According to their work a medicine box is developed with wireless connection to an Android application that will help the doctor and the patient to be more connected. They proposed that their project have this intelligent medicine box which gives alerts for patients to take their medication at the right time. The box is

remotely associated with web to make auspicious updates about medicines which will be advised in the android application with in patient's cell phone. [5]

Sachchidanand Singh, Nirmala Singh (2015) [6] has talked about the Challenges of IoT in their paper. The data transferred and dealt with in IoT can be of a single person, and enterprise, an industry or a consumer therefore information stored and processed in IoT should be anchored against burglary, theft and tampering. For example, an IoT application may store a person's records of his/her shopping, health, behavior and location.

They talked in their paper that to avoid such misuse and to protect the privacy the IoT security task should ensure that legitimate application level assurance and protections are made like Distributed Denial of Service (DDoS) attack migration are in proper place. The main challenges faced by IoT are mainly the Data privacy, Data security, Insurance concerns, lack of common standards, technical concerns and social concerns.

Timothy Malche, Priti Maheshwary (2017) [7] has proposed an idea of building a Smart Home System using the help of IoT. According to their proposed plan a Smart Home can have functions like Monitoring, where the house can monitor its environment using various sensors and camera feed. Monitoring is a vital capacity as it holds the track to each action in a Smart Home. Apart from this a Smart Home will have functions like Controlling of each and every appliance with just a touch of button and also the user can automate the working of appliances as because when using IoT in a Home the appliances will have Intelligence with which they can make their own decisions according to specified conditions.

And some of the major applications in a Smart Home will be Smart Lighting, Smart Appliances, Intrusion Detection, Smoke Gas detection. This are few but not the least application of a smart home which are helpful to enhance wellbeing and nature of living.

Mahmoud A. M. Albreem, Ayman A. El-Saleh, Muzamir Isa, Wael Salah, M. Jusoh, M.M Azizan (2017) has stated in their paper [8] about Green IoT. Towards green IoT, a few green advancements ought to be incorporated, for example, green RFID labels, green detecting system and green distributed computing system. Radio Frequency Identification (RFID) is a small device which consists of many tags and a small tag reader. They generally can store information about the objects that are linked to it. There are two kind of RFID: active RFID which uses own batteries to transmit their signal and passive RFID which needs to harvest energy from user's signal to work. For achieving the goal of Green RFID many steps have been taken such as reducing the size of the tags which in turn will reduce the amount of nondegradable material.

Same goes with Wireless Sensor Network (WSN) it contains countless hubs with constrained power and capacity limit. For Green Internet many things should be taken into consideration like devices should be made that consumes less energy but with no losses in efficiency and performance. Also, Virtual Machine technology should be used for reduction in memory utilization.

Conclusion

IoT has been bit by bit getting an ocean of innovative changes our everyday lives, which thus serves to making our life more straightforward and more agreeable. There is countless usefulness of IoT in all the places like medical, manufacturing, industrial, transportation, education, governance, mining, habitat etc. Internet of Things guarantees new innovations when related to cloud, fog and distributed computing, big data, and security issues. By coordinating every one of these issues with the Internet of things, more brilliant applications will be produced as soon. Also, the number of devices connected to the Internet is growing at a large ratio every day. So along with huge advantages also comes some limitations and challenges which needs to sorted out slowly. One of the biggest challenges right now for IoT is its Security and Privacy.

Reference

[1] Biswas, A. R., & Giaffreda, R. (2014). IoT and cloud convergence: Opportunities and challenges. 2014 IEEE World Forum on Internet of Things (WF-IoT). doi:10.1109/wf-iot.2014.6803194

[2] Somayya Madakam, R. Ramaswamy, Siddharth Tripathi, Journal of Computer and Communications, 2015, 3, 164-173

[3].A.Arun Rajaa,R.Naveedhab,G.Niranjanadevic and V.Roobini" AN internet of things (iot) based security alert system using raspberry pi" asia pacific international journal.

[4] S. Nazeem Basha1, Dr. S.A.K. Jilani2, Mr.S. Arun "An Intelligent Door System using Raspberry Pi and Amazon Web Services IoT" International Journal of Engineering Trends and Technology (IJETT) – Volume 33 Number 2-March 2016

[5] Gipsa Alex1, Benitta Varghese2, Jezna G Jose3, AlbyMol Abraham Student, Information Technology Department,Amal Jyothi College of Engineering,Kanjirapally" A Modern Health Care System Using IoT and Android" Gipsa Alex et al. / International Journal on Computer Science and Engineering (IJCSE) ISSN : 0975-3397 Vol. 8 No.4 Apr 2016

[6] Singh, S., & Singh, N. (2015). Internet of Things (IoT): Security challenges, business opportunities & reference architecture for E-commerce. 2015 International Conference on Green Computing and Internet of Things (ICGCIoT). doi:10.1109/icgciot.2015.7380718

[7] Malche, T., & Maheshwary, P. (2017). Internet of Things (IoT) for building smart home system. 2017 International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud) (I-SMAC). doi:10.1109/i-smac.2017.8058258

[8] Albreem, M. A. M., El-Saleh, A. A., Isa, M., Salah, W., Jusoh, M., Azizan, M. & Ali, A. (2017). Green internet of things (IoT): An overview. 2017 IEEE 4th International Conference on Smart Instrumentation, Measurement and Application (ICSIMA). doi:10.1109/icsima.2017.8312021