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Internet of Things : Recap

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ABSTRACT

Internet of Things (IOT) refers to the network of interconnected everyday objects. It is viewed as a self-configuring wireless network of sensors or objects whose purpose would be to interconnect all things. The IOT allows everyday objects embedded with electronic hardware and software to be controlled or sensed through a network remotely. Initially development towards the Internet of Things had been focused on the combination of Auto-ID and networked infrastructures in business to business logistics and product life-cycle applications. Thus, the future of Internet of Things can provide a broader vision, enable everyone to access locations, things and contribute rich information about the surroundings, things and locations. The social network's success of sharing experience and personalised insights shows great potential for integration with business-centric applications. This paper presents a recap on Internet of Things (IoT), its architecture, benefits, limitations and applications.

Keywords : Internet of Things, IOT, RFID

I. INTRODUCTION

IoT has become so vital in our daily life and it is going to create a big impact in the near future. For example, instant solutions for traffic flows, vehicle maintenance reminders, energy consumption track which will tend to help it reduced, use of monitoring sensors to helps diagnose pending maintenance issues and even help prioritise maintenance crew schedules for equipment repairing. This would tend to fruitful data analysis to help control over traffic, waste, pollution, law, security and other major functions in metropolitan and cosmopolitan cities efficiently.

Internet of Things is the network of physical devices or objects accessed through the internet using various connectivity techniques. These devices contain embedded technology to interact with internal states or the external environment. When these devices sense and communicate, it makes changes in the decision made and even who made them. It is a modern, smart, wireless communication technology having its application areas in various diversified domain areas. The basic idea of this concept is of the nature of epidemic presence around us of a variety of things or objects – such as sensors, actuators, Radio-Frequency Identification (RFID) tags, mobile phones and many more.

II. LITERATURE SURVEY

Several authors have presented work on Internet of Things. Following is related work in Internet of things.

Aarti Rao Jaladi et al presented designs a wireless sensor network system using Raspberry Pi as a base station, XBee as a networking protocol, sensor node as combination of sensors, controller and ZigBee. Hence, they could create location-tracking applications, sensor-logging application and a social network of things with status updates, so that we could have our location parameter control itself based on our current location [1].

Ashwin Agarwal et al focused specifically to its adoption to our Homes. Examines current leading companies in the market and technologies driving the same. Importantly, based on analysis of current consumer sentiment about the new smart devices, carves out the potential opportunities to bring down the barriers the Internet of Things is facing on its way to mainstream adoption and who has potential to win in the segment [2].

Antonio M et. al describes the main stages of the transformation from WSN to SIoT, reviewed the literature and the commercial approaches associated to Social IoT, they exposed the main research directions that will help to create this technology. First, they provide a general-purpose architecture for SIoT that integrates the main architectural components proposed in the literature [3].

Daiwat A et. al they tried to provide an overview of the key issues identified with the improvement of IoT advances and administrations. Various examination challenges have been distinguished, which are relied upon to end up significant exploration patterns in the following years. The most relevant application fields have been discussed, and various cases have been distinguished [4].

Indira Muhic et. al presented a review of Internet of Things (IoT) with standards and industrial state-of-art approach. The purpose here is to give insight into concept of “smart living”, a concept that meets requirements of today’s modern individuals and the society. She viewed that, implementation of the new technology i.e IOT requires new hardware and software installed and run on devices i.e things connected to the internet anytime and anywhere. Her paper was a review of basic aspects and concepts of new IoT paradigm and even an introduction about new IoT based low power wireless sensor network protocols at that time [5].

Jaehak Byun et. al presented a significant study in outlining general information about IoT, such as definable, market size, and status of IoT, which had become a hot IT topic these days, and in future applicable IoT business models which would help business entities and research institutes participating in related projects build a smart city as part of the future vision of local governments by reflecting the new information paradigm of IoT [6].

John A. et al presented a backdrop to identifying research questions, they briefly highlight a vision for a smart world then they discussed open research questions [7].

Li Da Xu et. al a presented literature review on IOT, by examining relevant articles from five major academic databases (IEEE Xplore, Web of Knowledge, ACM digital library, INSPEC, and Sci research opportunities regarding the use of IoT in industries. Their review focused on identifying the breadth and diversity of existing IoT research in the industrial areas and also the highlighting the challenges and opportunities for future researchers [8].

Marco Conoscenti et al performed a Systematic Literature Review (SLR) to verify whether documented use cases in the state of the art confirm the possibility, and, on the other side, to investigate which were the main factors that affect the levels of integrity, anonymity and adaptability of the blockchain [9].

Ms. Monika and Rahul Sharma proposed work to decrease the power intake in Wireless video application of IoT. They used a PSOGSA optimized technique which is hybrid of PSO (Particle Swarm optimization) and GSA (Gravitational Search Algorithm) in their proposed algorithm [10].

Mirza Abdur Razzaq et al discussed security requirements such as confidentiality, integrity, and authentication, etc. In this paper, twelve different types of attacks are categorized as low-level attacks, medium-level attacks, high-level attacks, and extremely high-level attacks along with their nature/behavior as well as suggested solutions to encounter these attacks [11].

Shubhalika Dihulia et proposed the bird eye view on different type of IoT, also presented the different IoT techniques used in previous research. In this paper shows the main technical issue of IoT and describe the technical challenges in the IoT establishment. After the discussion of technical problem ,focused on the main technology of IoT used [12].

Saber Talari et al provided an inclusive review on the concept of the smart city besides their different applications, benefits, and advantages. Most of the possible IoT technologies were already introduced, their capabilities merge into and apply to the different parts of smart cities were discussed [13].

Somayya Madakam et al focused on definitions, geneses, basic requirements, characteristics and aliases on Internet of Things. The main objective of this paper was to provide an overview of Internet of Things, architectures, and vital technologies and their usages in our daily life [14].

Vandana Sharma et. al presented a literature review on IOT, the IoT refers as intelligent connected devices and systems gathering data from embedded sensors, actuators and other physical objects. Mobile networks deliver connectivity to the broad range of devices, which could enable the development of new services and applications. That new wave of connectivity was going beyond tablets and laptops; to connected cars and buildings; smart meters and traffic control; with the prospect of intelligently connecting anything and anyone. The author describes the concept of sensor networks, which has been made viable by the convergence of microelectron-mechanical systems technology, wireless communications. Firstly, the sensor network applications and sensing task are explored, and according to that, the review factors influencing the design of sensor network were provided. Then the algorithms and protocols developed for each layer and the communication architecture for sensor networks was outlined [15].

Weisong Shi et. al introduced the definition of edge computing, several case studies, ranging from cloud offloading to smart home and city, as well as collaborative edge to materialize the concept of edge computing. They presented several challenges and opportunities in the field of edge computing [16].

III. ARCHITECTURE OF INTERNET OF THINGS

IoT is so vast and a broad concept that there is no proposed, uniform architecture. In order for the idea of IoT to work, it must consist of an assortment of sensor, network, communications and computing technologies, amongst others. Following are the IoT architectures or models given by several researchers, authors and practitioners.

A. European FP7 Research Project

1) Blueprint for IoT concrete architecture design.

2) Model: Architectural Reference Model (ARM).

3) Developed By: Project partners of the European FP7 Research Project IoT-A.

4) Derived From: Business considerations, application-based requirements and current technologies.

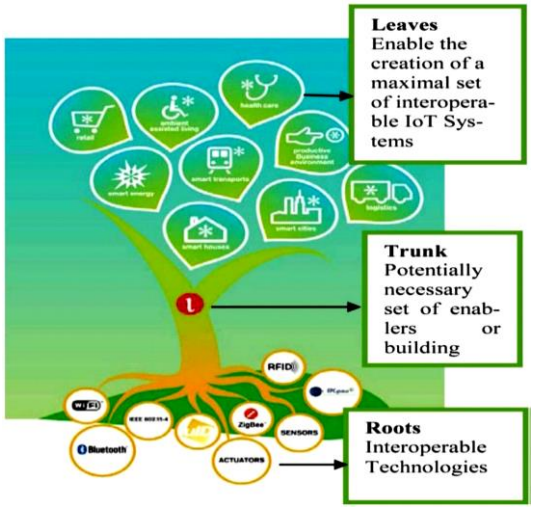

Figure 1: Model Architecture of IoT [14].

B. **ITU Architecture**

According to the recommendations of the International Telecommunication Union (ITU), the network architecture of Internet of Things consists of

1) The Sensing Layer
2) The Network Layer
3) The Middleware Layer
4) The Application Layers

These layers are similar to the Open Systems Interconnection (OSI) reference model in network and data communication.

A. The Sensing Layer

1. Provides a user interface for using IoT.
2. Different applications for various sectors like Supply chains, Government, Retail, Transportation, Healthcare, Agriculture and many more.
3. In the sensing layer, the wireless smart systems with tags or sensors are now able to automatically sense and exchange information between different devices.
4. These technology advances significantly improve the capability of IoT to sense and identify things or the environment.
5. In some industry sectors, intelligent service deployment schemes and a universal unique identifier (UUID) is assigned to each service or device that may be needed. These devices can be easily identified and retrieved. Thus, UUIDs are critical for successful services deployment in a huge network like IoT[14].

B. The Network Layer

1. Allows multiple organisations to share and use the same network independently
2. Robust and High-performance network infrastructure
3. Supports the communication requirements for latency, bandwidth or security

C. The Middleware Layer

1. Capturing of periodic sensory data.
2. Data Analytics (Extract relevant information the from massive amount of raw data)
3. Streaming Analytics (Process real time data)
4. Ensures security and privacy of data.

D. The Application Layers

1. Lowest Abstraction Layer.
2. With sensors we are creating a digital nervous system.
3. Incorporated to measure physical quantities.
4. Interconnects the physical and digital world.
5. Collects and process the real time information.

E. IoT Forum Architecture

The IoT Forum declares that the Internet of Things Architecture is basically categorized into 3 types including

1) Applications
2) Processors
3) Transpiration

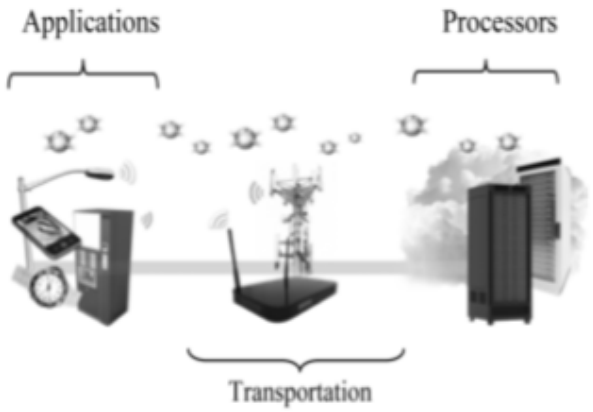

Figure 2. IoT Forum Architecture [14]

IV. BENEFITS OF INTERNET OF THINGS

Following are the benefits of IoT (Internet of Things)

1) Improved citizen's quality of life
2) Healthcare from anywhere
3) Better safety, security and productivity
4) New business opportunities
5) IoT can be used in every vertical for improving the efficiency
6) Creates new businesses, and new and better jobs
7) Economic growth
8) Billions of dollars in savings and new services
9) Better environment
10) Saves natural resources and trees
11) Helps in creating a smart, greener and sustainable planet
12) Improved competitiveness
13) Competitive in providing cutting edge products/services

V. CHALLENGES OF IOT

- **Compatibility**

For sensors tagging and monitoring, standards are not available. Some simple uniform concepts are required to do that.

- **Complexity**

There are a number of chances for let-down with complex systems. Many researchers are working to overcome it.

- **Privacy**

Privacy is a big concern with IoT. All the data need be encrypted to protect the data.

- **Safety**

The software may be hacked; personal information, account information can be stolen and used for the wrong purpose. There can be n number of possibilities of such things. So there can be risk of safety and be the consumer's responsibility.

VI. APPLICATIONS

Areas where IoT frequently used:

- **Smart Cities**

1) Monitoring of vehicles, help to optimize driving.
3) Monitoring pedestrian, help to optimize walking routes.
4) Monitoring the availability of parking areas in the city.
5) Intelligent Highways with warning messages and diversions according to climate conditions and unexpected events like accidents or traffic jams.
6) Measurement of the energy radiated by cell stations and Wi-Fi routers.

- **Security & Emergencies**

1) Explosive and Hazardous Gases: Detection of gas leakages and levels in industrial environments, surroundings of chemical factories and inside mines.
2) Liquid Presence: Liquid detection in data canters, sensitive building, grounds and warehouses to prevent breakdowns and corrosion.

- **Medical field**

1) Medical Fridges: Monitoring and Control of conditions inside freezers storing medicines, vaccines, and organic elements.
2) Ultraviolet Radiation: Measurement of UV sun rays to warn people not to be exposed in certain hours.
3) Sportsmen Care: Vital signs monitoring in high performance centres and fields.

4) Patients Surveillance: Monitoring of conditions of patients in hospitals and in old people's home.
5) Liquid Presence: Liquid detection in data canters, sensitive building, grounds and warehouses to prevent breakdowns and corrosion.

- **Industrial Control**

1) Temperature Monitoring: Monitor the temperature inside the industry.
2) Indoor Air Quality: Monitoring of oxygen levels and toxic gas inside chemical plants to ensure workers and good safety.
3) Vehicle Auto-diagnosis: Information collection from Can Bus to send real time alarms to emergencies or provide advice to drivers.
4) Machine to Machine Applications: Machine auto-diagnosis the problem and control.

- **Smart agriculture**

1) Green Houses: Control micro-climate conditions to maximize the production of fruits and vegetables and its quality.
2) Compost: Control of humidity and temperature levels in alfalfa, hay, straw, etc. To prevent fungus and other microbial contaminants.

VII. CONCLUSION

The IoT has the potential to create a revolution by connecting everything to the internet. It will dramatically increace the availability of information. Thus it will transform organisations, companies and virtually every industry around the world.We can create numerous applications of IOT like sensor-logging application, location-tracking applications, social network of things with status updates, home threat sensors, connected appliances and a lot more. So that you could have your own things connected with you all the time.

VIII. REFERENCES

[1]. Aarti Rao Aladi, Karishma Khithan, Pankaj Pawer, Kiran Malvid, Gauri Sahoo, Environmental Monitoring Using Wireless Sensor Networks(WSN) based on IOT, International Research Journal of Engineering and Technology (IRJET), Vols: 04 ,01, Jan - 2017.

[2]. Ashwin Agarwal, Bale Thummim, Koushik Rajang, Murali Rupicola, Serves Bhardwaj, Internet of Things at Home, Number: 2014.10.22, October 22, 2014

[3]. Antonio M. Ortiz, Dina Hussein, Smooching Park, Son N. Han, and Noel Crispi, The Cluster Between Internet of Things and Social Networks: Review and Research Challenges, IEEE INTERNET OF THINGS JOURNAL, VOL. 1, NO. 3, JUNE 2014.

[4]. Daiwat A. Vyas, Dvijesh Bhatt, Dhaval Jha3, IoT: Trends, Challenges and Future Scope, IJCSC Vol. 7 No. 1 September 2015-March 2016 pp 186-197, Available online at: csjournalss.com

[5]. Indira Muhic, Migdat I. and Hodzic, Internet of Things: Current Technological Review, PERIODICALS OF ENGINEERING AND NATURAL SCIENCES Vol. 2 No. 2 (2014), Available online at: pen.ius.edu.ba

[6]. Jaehak Byun, Sooyeop Kim, Jaehun Sa, Sangphil Kim, Yong-Tae Shin and Jong-Bae Kim, Smart City Implementation Models Based on IoT Technology, Advanced Science and Technology Letters Vol.129(2016) pp.209-212

[7]. John A. Stankovic, Life Fellow, Research Directions for the Internet of Things, Available at dx.doi.org/10.1109/JIOT.2014.2312291.

[8]. Li Da Xu, Wu He, Shancang Li, Internet of Things in Industries: A Survey, IEEE Transactions on Industrial Informatics ,Volume: 10, Issue: 4, Nov. 2014 Pgs: 2233 – 2243

[9]. Marco Conoscenti, Juan Carlos De Martin, Blockchain for the Internet of Things: A

Systematic Literature Review, Computer Systems and Applications (AICCSA), 2016 IEEE/ACS 13th International Conference of Computer Systems and Applications (AICCSA) 29 Nov.-2 Dec. 2016, Electronic ISSN: 2161-5330

[10]. Ms. Monika, Mr. Rahul Sharma, Research paper on Internet of things, International Journal in Multidisciplinary and Academic Research (SSIJMAR) Vol. 6, No. 3, June 2017 (ISSN 2278 – 5973)

[11]. Muhammad Ali Qureshi, Sajid Habib Gill, Mirza Abdu Razzaq, Saleem Ullah, Security Issues in the Internet of Things (IoT): A Comprehensive Study, (IJACSA) International Journal of Advanced Compute

[12]. Shabalala Dhulia, Tanveer Farooqui, A Literature Survey on IoT Security Challenges, International Journal of Computer Applications (0975 – 8887) Volume 169 – No.4, July 2017

[13]. Sober Talari, Madrasa Shameka, Perugia Sian, Vincenzo Loie, Aurelio Tomasetti and João P. S. Catalo, A Review of Smart Cities Based on the Internet of Things Concept, 23 March 2017

[14]. Somaiya Mahakam, R. Ramaswamy, Siddharth Tripathi, Internet of Things (IoT): A Literature Review, Journal of Computer and Communications, May 2015, 3, 164-173 Available online at: www.scirp.org/journal/jcc

[15]. Vandana Sharma, Ravi Tiwari, A review paper on “IOT” & It’s Smart Applications, International Journal of Science, Engineering and Technology Research (IJSETR), Volume 5, Issue 2, February 2016

[16]. Weisong Shi, Fellow, Jie Cao, Quan Zhang, Youhuizi Li, and Lanyu Xu, Edge Computing: Vision and Challenges, IEEE INTERNET OF THINGS JOURNAL, VOL. 3, NO. 5, OCTOBER 2016

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