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Computer Science

A REVIEW ON INTERNET OF THINGS (IOT) AND ITS APPLICATIONS

Dr. Jasmin Pinank Bhootwala

Department of Bachelor Of Computer Application, Atmanad Saraswati Science College, Veer Narmad South Gujrat University,

ABSTRACT The internet is a groundbreaking creation that is always evolving into new hardware and software, making it impossible for anyone to stop. Human-to-human and human-to-device communication are the two main forms of communication that exist now, but machine-to-machine (M2M) communication is what the Internet of Things (IoT) promises to be a wonderful future for. The term "Internet of Things" (IoT) refers to a paradigm wherein items equipped with processors, actuators, and sensors interact with one another to do useful tasks. We covered the architecture of IoT in this paper. We also went over the various uses of IoT for users, as well as its benefits and drawbacks.

1. INTRODUCTION

PC connections marked the beginning of the internet's evolution. The World Wide Web was later formed when numerous computers were connected to one another. The development of mobile-Internet technology followed the capability of mobile devices to connect to the internet. Social networks were the first platform for people to use the internet. Ultimately, the notion of linking commonplace items to the internet was put out, resulting in the development of Internet of Things technology [1]. Kevin Ashton, the executive director of the Auto-ID Center, is credited with coining the term "Internet of Things." The Auto-ID Center in 2003, together with publications and related market statistics, helped popularize the idea of the Internet of Things [2]. As soon as the idea of this kind of communication emerged, several businesses concentrated on it, attempted to understand its importance, and started to pinpoint its [3].

1.1 Definition of IoT:

Vermesan et al. defined the Internet of Things as simply an interaction between the physical and digital worlds, but we are unable to define it properly and succinctly. Numerous sensors and actuators are used by the digital world to communicate with the physical environment [4]. An open and complete network of intelligent devices with the ability to self-organize, share information, data, and resources, and respond and act in response to external changes is another definition of the Internet of Things (IoT) [5]. The primary goal of current Internet of Things (IoT) research is to enable generic things to see, hear, and smell the physical environment for themselves. They can also be connected to share their discoveries with others. It is possible to shift monitoring and decision-making from the human to the machine side in this way. Thus, as seen in Fig. 1, we can claim that IoT generally enables people and things to be connected Anytime, Anywhere, with anything and everyone via Any network and Any service.
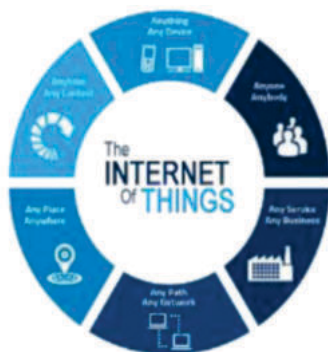

Fig -1 : Definition of IoT

2. The Iot Architecture

Fig-2 Shows main components of this architecture i.e. edge side and cloud side
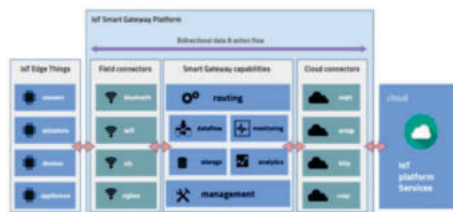

Fig-2 : The IoT Architecture

Cloud Protocols

The most of IoT solutions, even those ones live almost entirely on the edge need to integrate with cloud services or other IoT solution based on cloud. We need to communicate using a cloud protocol as MQTT,AMQP,CoAP,HTTP [7].

3. Use Of Iot In Various Applications

Most of the daily life applications are already smart but they are unable to communicate with each other and to enable them to communicate with each other and share useful information with each other will create a wide range of innovative applications

[10]. These emerging applications with some autonomous capabilities would certainly improve the quality of our lives, all due to the concept of IoT. In this section, we present few of IoT applications as shown in Fig-3.

3. Use Of Iot In Various Applications

The majority of everyday apps are already intelligent, but they are unable to interact with one another[9]. By allowing them to do so and exchange helpful information, a variety of novel applications will be developed [10].

3.1 IoT For Smart Home/Building

Now a days, smart home is becoming a need of fast life. Smart home allows many household devices to be connec ted with internet for the communication. In smart home, the various home equipment's like air conditioning, doors, windows, lighting, washing machine, and refrigerator can be controlled manually as shown in Fig-4. IoT in integration with wireless sensor network can give intelligent solution for energy management of buildings. With the help of laptop or smartphones, we can access energy information and control system of buildings[11].

3.1 IoT For Smart Home/Building

A smart house is increasingly necessary in today's fast-paced

world. A smart home enables the internet connection of numerous household gadgets for communication purposes. As seen in Fig. 3, a smart home's numerous appliances, including the refrigerator, washing machine, air conditioning, doors, and windows, may all be manually operated. When IoT is integrated with wireless sensor networks, intelligent building energy management solutions can be obtained. We can access building control systems and energy information with the use of laptops or smartphones [11].
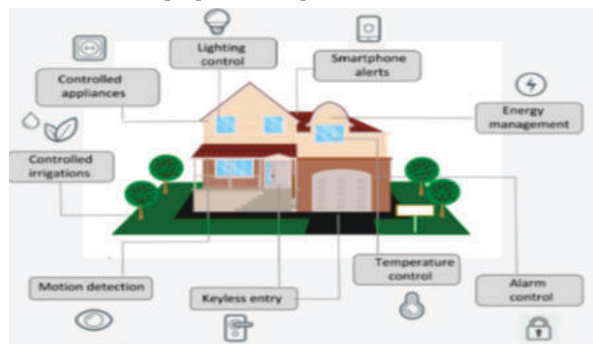

Fig-3: Smart Home

3.2 IoT for Smart Farming
IoT-based smart farming systems can help monitor, for instance, light, temperature, humidity, rain prediction and soil moisture of crop fields using connected sensors as shown in Fig-5. IoT is also instrumental in automating irrigation systems. The benefits of smart farming are it increases the business efficiency through process automation, Enhances product quality and volumes, increases control over the production, Monitoring of climate conditions, Crop management. It also provides better control over the internal processes and lower production risks.

3.2 IoT for Smart Farming
As seen in Fig. 4, IoT-based smart farming systems can assist in monitoring many aspects of crop fields, such as light, temperature, humidity, rain prediction, and soil moisture, through the use of networked sensors. Irrigation system automation is another benefit of IoT. The advantages of smart farming include improved product quality and volume, more control over production, improved business efficiency through process automation, climate condition monitoring, and crop management. It also offers reduced manufacturing risks and improved internal process control.
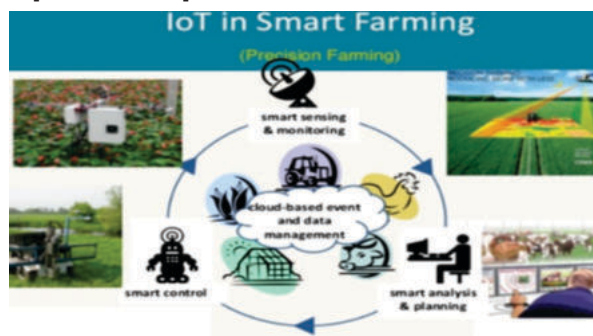

Fig-4: Smart Farming

3.3 IoT For Smart Health
Hospitalized patients need ongoing attention, and IoT monitoring technology can help with this. The physiological status of these patients should be regularly checked. In the context of smart health, sensors are utilized to gather comprehensive physiological data, which is then analyzed and stored via gateways and the cloud. The analyzed data is then wirelessly sent to caregivers for additional review and analysis . Instead of requiring a medical expert to visit the patient on a regular basis to check their vital signs, it offers an automatic flow of data that is continuous. In this approach, in addition to data gathering and analysis as illustrated in Fig. 5, it simultaneously lowers the cost of care and enhances the quality of care through continuous attention.
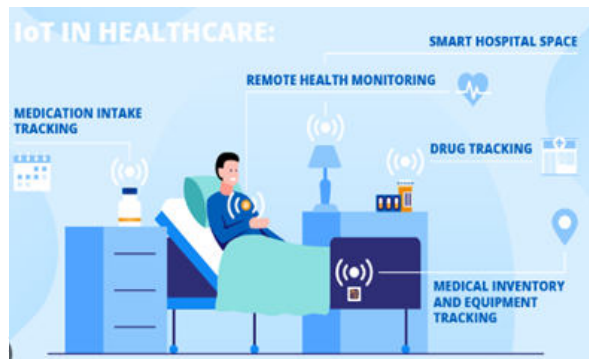
3.4 IoT for Smart City
Smart cities need careful planning in every step, with support of agreement from governments, citizens toimplement the internet of things technology in every aspects. Using IoT, cities can be improved in many ways, by improving infrastructure, enhancing public transportation by reducing traffic congestion, and keeping citizens safe and healthy[13].Smart city layout is shown in Fig-7

3.4 IoT for Smart City
Encouraging governments and communities to embrace the use of internet of things technology in all areas requires meticulous planning at every stage. Cities can benefit from IoT in a number of ways, including bettering public transportation, maintaining public safety and health, and upgrading infrastructure . Fig. 6 shows the layout of a smart city.

Fig-6: Smart City

5. CONCLUSION
Through a variety of technologies and applications, IoT has been progressively bringing about a sea of technological changes in our daily lives, which in turn helps to make our lives easier and more pleasant. IoT has limitless applications in every field, including education, governance, manufacturing, healthcare, transportation, mining, and habitat. This paper describes applications of Internet of Things. IoT is headed toward making human life more "smart" and "connected" both now and in the future.

REFERENCES
[1] Charith Perera, Chi Harold Liu, Srimal Jayawardena The Emerging Internet of Things market place From an Industrial Perspective: A Survey", IEEE transactions on emerging topics in computing, 31 Jan 2015.
[2] A. Al-Fuqaha, M. Guizani, M. Mohammadi, M. Aledhari, and M. Ayyash, "Internet of things: A survey on enabling technologies, protocols, and applications," IEEE Communications Surveys & Tutorials, vol. 17, pp. 2347-2376, 2015.
[3] Luigi A., Antonio I., Giacomo M. 2010.The Internet of Things: A survey. Science Direct journal of Computer Networks, Volume 54, Pages: 2787–2805.

[4]   Miao W., Ting L., Fei L., ling S., Hui D., 2010. Research on the architecture of Internet of things. IEEE International Conference on Advanced Computer Theory and Engineering (ICACTE), Sichuan province, China, Pages: 484-487.

[5]   Ms.Neha Kamdar, Vinita Sharma, Sudhanshu Nayak, "A Survey paper on RFID Technology, its Applications and Classification of Security/Privacy Attacks and Solutions,"IRACST - International Journal of Computer Science and Information Technology & Security (IJCSITS), ISSN: 2249-9555 Vol.6, No4, July-August 2016.

[6]   Edge computing - http://searchdatacenter.techtarget.com/definition/edge-computing

[7]   IoT Protocols - https://www.rs-online.com/designspark/eleven-internet-of-things-iot-protocols-you-need-to-know-about

[8]   The Architecture of IoT Gateways - https://dzone.com/articles/iot-gateways-and-architecture .

[9]   Internet of Things Protocols and Standards -http://www.cse. wustl. edu/~jain/cse570-15/ftp/iot_prot/

[10]   R. Abdmeziem, D.Tandjaoui, "Internet of Things: Concept,Building blocks, Applications and Challenges,Computersand Society, Cornell University

[11]   Mohammed ZKA, Elmustafa SAA. Internet of Things Applications, Challenges and Related Future Technologies. World Scientific News. 2017; 67(2):126–48.