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A REVIEW OF INTERNET OF THINGS (IOT) AND ITS COMPONENTS

Shivani Nimgale[1]

[1]*Electronics and Telecommunication Engineer, Jalgaon- 425001, Maharashtra, India.*

Abstract - *We are entering into a new era of computing calling as "Internet of Things (IoT)". Over the past few years, IoT has become one of the most important technologies of the 21st century. The cloud has various things that are connected by "universal global neural network". The Internet of Things (IoT) is the internetworking of physical devices, smart vehicles, and another object which consists of an embedded system with sensors, actuators, and network connectivity that enables us to connect and exchange data. The IoT is a rapidly increasing and promising technology which becomes more and more present in our day to day lives. This paper focuses especially on components of IoT and its application. For improving our lives there is amazing potential in this new era which has limitless creativity.*

Key Words: Internet of things, IoT components, Sensor.

1.INTRODUCTION

Internet of Things (IoT) is nothing but "The network of a physical object or things embedded with electronic software, sensors, and networks connectivity which collaborates and enables this object to collect and exchange data". Most simply, IoT collects all the things from the environment and connect it to the internet. Let us take an example, In the past few years we were using cellular phones use for calling and sending text SMS but now technologies have been changes now we can watch online movies, read books, listen to the songs, etc. IoT allows direct integration between the physical world and the computer-based system and resulting in improved efficiency, accuracy, and economic benefit. Nowadays, every person is connected using lots of communication ways such as by using social media, emails, etc. where internet is most popular communication way so in another word, we can say internet which connects people. Due to its great estimated impact in improving our daily lives and society, IoT has attracted many researchers and industries [1].

Things in the IoT referred to be a wide variety of devices such as heart monitoring implants, Biochips transponders on animals, automobile in built-in sensors, DNA analysis devices for environmental food, pathogen monitoring that assists firefighters in search of secure operation, sensors which can transfer data over a network without a human to human or human to computer interaction. These devices collect useful data from the environment with the help of various new technologies and then flow the data between other devices. When something is connected to the network means it can send or receive information or both. This sending and receiving information can be done by the network i.e. internet that makes things smarter. Each thing uniquely identifiable through its embedded computing system but can interoperate within the existing internet infrastructure. Experts estimate that the IoT will consist of 50 billion objects by 2020 almost [2].

2. COMPONENTS OF IoT

The humans in today's world are surrounded by basic electronic devices, smart devices, automated vehicles, smart buildings, and so on. These physical devices are equipped with software, which is able to provide specific facilities and services based on their designs and purposes. These physical entities can communicate through powerful communication networks to overcome geographical boundaries [3]. The information gathered from physical devices having a unique identification number will be processed using storage servers on the web and further will be delivered at the right place at the right time to be utilized by different applications as shown in fig1.

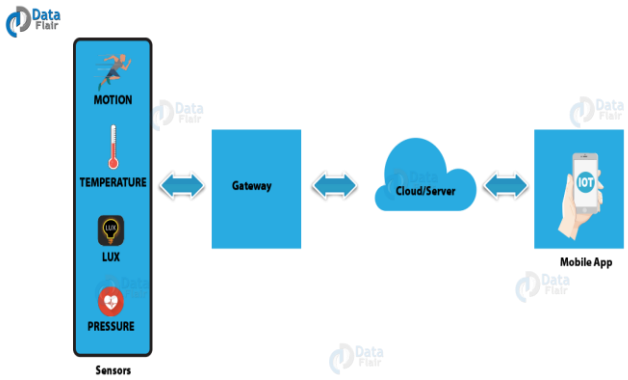

Fig -1: Components of IoT [5].

The complete IoT system integrates with the four distinct components as follows:

2.1 Sensors/Devices

Sensors or Devices help in collecting data from the environment. We use sensors or devices that can be bundled together to just sense things. for example, our phone is a device that has many sensors such as GPS, accelerometer, camera but our phone is not just a sensor but it can perform

many actions. For example, the temperature reading of the room.

2.2 Connectivity

Next, the data is then sent to the cloud but it needs a gateway to get there! These sensors or devices can be connected to the cloud through various methods of communication like as cellular/satellite, Wi-Fi, Bluetooth, wide area network (WAN), Local area network (LAN), and many more, and then connected via internet.

2.3 Data Processing

Once the data is collected and it gets to the cloud, the software performs processing on it. This could be very simple, as checking the temperature reading is within its acceptable range. But what happens when the temperature is beyond a certain range?

2.4 User Interface

Next, Information provided to the end-user in some way. It can achieve it's by triggering an alarm on your phone or notifying via texts or emails. For example, notifying via alarm the temperature is too high.

3. TECHNOLOGIES

Different technologies are useful to implement the concept of IoT. The technologies of IoT are as follows:

Table -1: Technologies of IoT [4] [6].

Sr. No.	Technologies	Description	Example
1.	RFID	(RFID) Radiofrequency Identification transmits the information wirelessly using radio wave to read and store data on the tags attached to an object.	RFID is a barcode or a magnetic strip on the backside of the ATM card or credit card or just as a magnetic strip or a barcode that must be scanned to get the information.
2.	Wi-Fi	Wi-Fi allows computers, smartphones or other devices to connects wirelessly to the internet and exchange data.	Use in smartphones, laptops, etc.
3.	Satellite	An artificial body placed in the orbit around the earth or moon to communicate or to collect information.	Use for critical services in remote regions such as safety and security.
4.	M2M	Machine to machine(M2M) communication refers to the communication between the computers, sensors, actuators, and mobile devices.	Use in medical healthcare, smart robots, industry, home automation, transportation, etc.

4. APPLICATIONS

1) Smart Cars: Nowadays, for improving the accident prevention smart cars are used. These driverless cars will provide functioning more than just safety such as they can save valuable time, reduce the stress of driving, etc. [4].

2) Medical and Healthcare: IoT plays an important role in the medical field. The uses of IoT are as follows:

2.1) Wireless sensors: The wireless sensors are being used in labs and hospital refrigerators to ensure Blood samples, Chilled medications, and other biomedical material are always kept at a proper temperature.

2.2) Remote Monitoring: With the help of IoT devices, healthcare professionals can monitor their patients who underwent surgery, or who go home for outpatient care. They will be alerted if a patient reaches a critical case or needs immediate attention.

3) Environmental Monitoring: These applications are based on IoT, normally it uses sensors to observe the water or air quality, and soil or atmospheric situations. For monitoring the movements of wildlife and their habits it can also be used.

4) Home Automation: A smart home becomes the most important IoT application on all measured channels. Nowadays, we are using various electronic gadgets like microwave ovens, refrigerators, heaters, air conditioners, fans, and lights. Sensors and actuators will be installed in these devices to utilize the energy sufficiently and also to add more comfort in life.

5. MERITS OF IoT

1) IoT Saves time and human efforts and makes the life joyable.
2) As it is less costly so that poor people can also afford it as it is not expensive.
3) The way of communication becomes easy, as we can interact with people via emails, social media, etc.

6. DEMERITS OF IoT

1) The need for human labour reduces drastically as the technologies increase with automation.
2) The Internet of things is more complex or might be tough to handle if any error is caused.
3) There is a huge risk of leakage of the personal data when sending over a network, as it is less secure.

7. CONCLUSION

As it is concluded that the Internet of things has many disadvantages but it can be overcome by new growing technology. IoT has changed the living of the people as we can communicate with each other through the internet. IoT has made our life comfortable as new technologies increases as we can communicate with the object as all the things are connected to the network. This paper presents the review of IoT and its technologies that can help to work more effectively and can give a quality of life to humans. So, IoT is helpful for the betterment of our life in the future.

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BIOGRAPHIES

Shivani A. Nimgale
BE (Electronics and Telecommunication)
Jalgaon- 425001.