

Analysis of IoT Growth and Applications in Real World

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Abstract:

The Internet of things (IOT) is the inter-networking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings, and other items embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. The IOT Mainly uses the connectivity of devices system and services that beyond the machine to machine communication. Internet of thing defined the IOT as the infrastructure of the information society. The main objective of this paper is to provide an overview of Internet of Things, growth, and their usages in our daily life.

Keywords: mobile computing, IOT, security etc.

I. INTRODUCTION

Internet of Things can be defined as the collection of two terms: one is Internet, which is defined as networks of networks which can connect billions of users with some standard internet protocols. Internet connect several different sectors and department while using different technologies. Several devices like mobile, personal systems and business organizations are connected to Internet. The second term is Thing, this term is basically mean to these devices or objects which turn into intelligent objects. Moreover this it is also a part of all objects of this real world. If we want to define IOT then we cannot define it precisely and concisely but Vermesan et al. defined the Internet of Things as simply an interaction between the physical and digital worlds. The digital world interacts with the physical world using a plethora of sensors and actuators. IoT can also be defined as “An open and comprehensive network of intelligent objects that have the capacity to auto-organize, share information, data and resources, reacting and acting in face of situations and changes in the environment”.

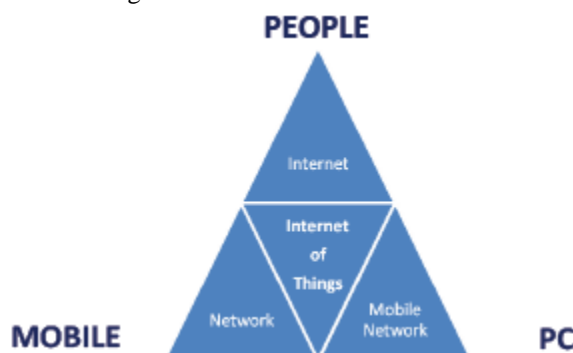


Fig 1: IOT

II. GROWTH OF IOT

Internet has been part and parcel of the social animal's life. It's a huge space of information and people. The internet first evolved as “internet of computers”. It is a global platform where many services like the World Wide Web could be implemented on top of it. It was an era of information exchange. As the days passed by, people started emerging into the internet- “Internet of people”. Many social websites came into picture which kept people connected all the time. This has led to internet being filled with people rather than information. On the other hand, technology has been advancing day by day and simultaneously an era of “MobiComp” (mobile computing) had begun. Mobile helped man to be always connected to the internet on the move. Nowadays 3G and 4G mobile internet connections have led to faster internet access and deliver better quality in video calls. Wireless technologies and

mobile computing have become cheap and have gained more popularity. Hence a new computing had emerged- Ubiquitous computing.

This computing focuses on smart, intelligent space and minimal user involvement. Advancement in technology led to mobile and other hand-held devices to diminish in size. Smart phones, Ipads, tablets and notebooks replaced ordinary mobiles and PCs. Hence there was a change in the device with which people access the internet. This in turn resulted in sophisticated features being configured in devices such as sensors, Global Positioning system (GPS) and actuators.

In such a scenario devices were not only connected to the internet but also sense, compute and perform intelligent tasks. Later physical objects were configured with identification tags such as bar code and RFID so that they could be scanned by devices like smart phones and upload their information into the internet. This way of connecting the physical world with cyberspace with the help of a smart device led to internet being called as “Internet of Things”.

Hence IOT has its roots from Mobile computing, ubiquitous computing and information technology. IOT connects the objects in an intelligent way. The “thing” here refers to the physical object’s information read through sensors and RFID reader and uploaded into the internet. The physical object can be anything from smart phones to objects at home. The International telecommunications Union (ITU) has pointed out four dimensions of IOT : object identification (“ tagging things”) , sensors and wireless sensor networks(“ feeling things”), embedded systems (“thinking things”) and nanotechnology (“shrinking things”). Hence from the above , IOT changes the connectivity view from “**any-time , anyplace**” for “**any-one**” into “**any-time , any-place**” for “**any-thing**”. These things once connected to the internet provide smart services beneficial to the environment and society. They play a major role in supply chain, energy, defence, health care and other useful applications.

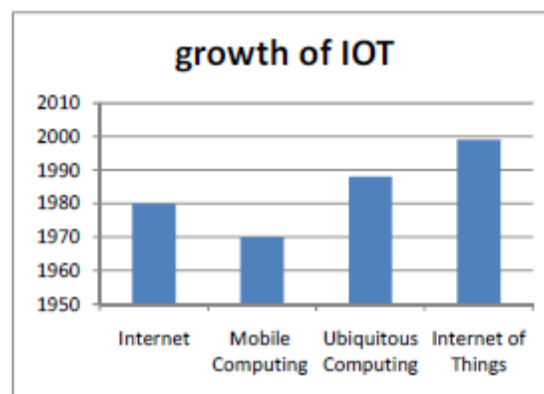


Fig 2. Growth of Internet Of Things

III. APPLICATIONS AREA OF IOT

This system is designed for a shopping complex mall but it can be also used in various organizations like educational Notice board system or at Railway station, Bus stand and Air-port to display the information and notification. In mall it is also used to control the humidity and temperature of mall via central AC by using temperature sensor. In Industrial organization it can be also used. E-display system may be used to display Emergency message in Hospitals. Some areas where IoT frequently used.

- i. Smart cities:-** To make the city as a smart city to engage with the data exhaust produced from your city and neighborhood.
- Monitoring of parking areas availability in the city.
 - Monitoring of vibrations and material conditions in buildings, bridges and historical monuments.
 - Detect Android devices, iPhone and in general any device which works with Bluetooth interfaces or WiFi .
 - Measurement of the energy radiated by cell stations and and Wi-Fi routers.
 - Monitoring of vehicles and pedestrian levels to optimize driving and walking routes.
 - Detection of rubbish levels in containers to optimize the trash collection routes.
 - Intelligent Highways with warning messages and diversions according to climate conditions and unexpected events like accidents or traffic jams.

ii. Security & Emergencies:-

- Perimeter Access Control: Detection and control of people in non authorized and restricted.
- Liquid Presence: Liquid detection in data centers, sensitive building grounds and warehouses to prevent breakdowns and corrosion.
- Radiation Levels: In nuclear power stations surroundings distributed measurement of radiation levels to generate leakage alerts.
- Explosive and Hazardous Gases: Detection of gas leakages and levels in industrial environments, surroundings of chemical factories and inside mines.

iii. Smart agriculture:-

- Wine Quality Enhancing: Monitoring soil moisture and trunk diameter in vineyards to control the amount of sugar in grapes and grapevine health.
- Green Houses: Control micro-climate conditions to maximize the production of fruits and vegetables and its quality.
- Golf Courses: Selective irrigation in dry zones to reduce the water resources required in the green.
- Meteorological Station Network: Study of weather conditions in fields to forecast ice formation, rain, drought, snow or wind changes.
- Compost: Control of humidity and temperature levels in alfalfa, hay, straw, etc. to prevent fungus and other microbial contaminants.

iv. Domestic & Home Automation:-

In home by using the iot system remotely monitor and manage our home appliances and cut down on your monthly bills and resource usage.

- Energy and Water Use: Energy and water supply consumption monitoring to obtain advice on how to save cost and resources.
- Remote Control Appliances: Switching on and off remotely appliances to avoid accidents and save energy.
- Intrusion Detection Systems: Detection of windows and doors openings and violations to prevent intruders.
- Art and Goods Preservation: Monitoring of conditions inside museums and art warehouses.

v. Medical field:-

- All Detection: Assistance for elderly or disabled people living independent.
- Medical Fridges: Monitoring and Control of conditions inside freezers storing medicines ,vaccines, and organic elements.
- Sportsmen Care: Vital signs monitoring in high performance centers and fields.
- Patients Surveillance: Monitoring of conditions of patients inside hospitals and in old people's home.
- Ultraviolet Radiation: Measurement of UV sun rays to warn people not to be exposed in certain hours.

vi. Industrial Control:-

- Machine to Machine Applications: Machine auto-diagnosis the problem and control.
- Indoor Air Quality: Monitoring of oxygen levels and toxic gas inside chemical plants to ensure workers and goods safety.
- Temperature Monitoring: Monitor the temperature inside the industry.
- Ozone Presence: In food factories monitoring of ozone levels during the drying meat process.
- Vehicle Auto-diagnosis: Information collection from Can Bus to send real time alarms to emergencies or provide advice to drivers.

IV. CONCLUSION

IOT avail connections to users on anywhere, anything and at any moment. IOT is a creative idea that alters the real world objects into virtual objects. IOT enables users to control over labeled items like door locks, lights, microwave, tv, coffeemaker, washing machine, window locks and so on and keeps up-to-date about the state. The description of a concept IOT represent various technologies that make the internet available to each real world tangible objects. In this paper we focus on the various applications

of IOT like interoperability, smart cities, smart medicine, offices, home, transportation, vegetable traceability system in agriculture, cyber security, e-commerce and so on.

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