



Shree Rahul Education Society's (Regd.)
SHREE L.R. TIWARI
College of Engineering
(Approved by AICTE, Govt. of Maharashtra & Affiliated to University of Mumbai)

NEW WAVE

THE NEWSLETTER OF INFORMATION
TECHNOLOGY DEPARTMENT

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Enhanced Interconnectivity via Internet of Things (IoT)

Introduction:



The Internet of Things (often IoT) describes an elaborate network of objects and people, all interacting with one another through wireless communication, sensors and embedded circuits. It allows communication to occur from people to objects, or from object to object.

How IoT Works:

An IoT ecosystem consists of web-enabled smart devices that use embedded processors, sensors and communication hardware to collect, send and act on data they acquire from their

Department Of Information Technology environments. IoT devices share the sensor data they collect by connecting to an IoT gateway or

other edge device where data is either sent to the cloud to be analyzed or analyzed locally. Sometimes, these devices communicate with other related devices and act on the information they get from one another. The devices do most of the work without human intervention, although people can interact with the devices -- for instance, to set them up, give them instructions or access the data.

The connectivity, networking and communication protocols used with these web-enabled devices largely depend on the specific IoT applications deployed.

What is Interconnectivity?

Interconnectivity changes things. You can control the temperature in your house while sitting in an airport. Your car can update the maps for its navigation system while sitting in your garage. You can monitor the water levels of rivers in Oxfordshire or reservoirs in California from your couch. You can see pollution levels in the biggest cities in China or Europe on your smartphone.



Interconnected devices in the world of IoT

One of the most interesting things about IoT is that it has nothing to do about things. It can be simply referred to as a developing technological marvel. As per the estimations, globally 50 to 100 billion devices will be interconnected through the internet by the year 2020. At the core of the innovation behind the concept of IoT unfolding

Even Semester, Jan 2019

across all the geographies, connectivity between people is most visible as compared to industrial and technological boundaries. Human beings are lying

at the centre, using the applications and services being enabled by the technologically advanced devices and their integration provided the objects in the Internet of things. The technologists round the globe are working since years in order to build huge networking infrastructure to serve the purpose of expansion of pervasive connectivity worldwide. As a result, more and more people are getting connected through connectivity between devices and henceforth the lives of people are improving globally.

IoT can interconnect multiple devices embedded in different systems to the internet. When they can be represented by devices digitally, their access can be gained by anyone located anywhere. The connectivity between the devices then allows capturing substantially more amount of data from different devices at different locations, which in turn provided more options for increasing the efficiency and improving the security of IoT. Being a transformational force, IoT allows the organisations to enhance their performance in order to deliver best results through IoT analysis and IoT security.

Today, it is being envisioned worldwide that the devices owned by people belonging to the smallest towns, smart cities, and different nations or categorized on many other bases are connected ubiquitously and IoT is one common platform on which the notion of interconnected devices is predicated. Businesses like oil and gas, marketing, manufacturing, insurance, transportation, retail and infrastructure alongside utility businesses can reap exponential benefits of Internet of things through the facility of being more informed, and taking right decisions, which is aided by the torrent of transactional and interactional data available at their disposal.

➤ INTERNET OF THINGS REAL WORLD EXAMPLES

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The smart inter-connectivity of all technological devices is advancing rapidly with the improvement of internet access and speeds. This 'Internet of Things' or IoT brings with it some

incredible benefits which will assist our day-to-day living and working environments, although there are some drawbacks to consider. Here are some examples of how IoT will affect our lives in the very near future.

1. SMART HOMES



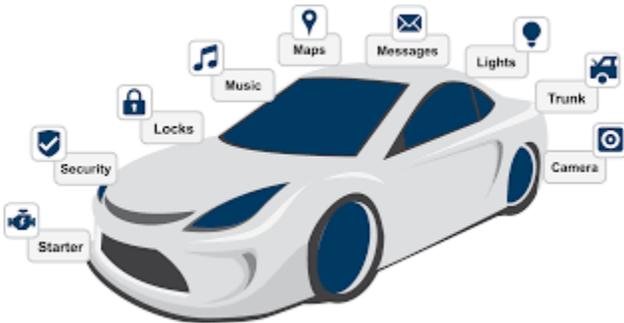
What was once a futuristic ideal brought to life in sci-fi films, suddenly became a reality for the ultra-wealthy and is now becoming a viable option for the average individual; the smart home. Any device that uses electricity can be connected to a central home network operated remotely on a tablet or smartphone. The lighting, temperature, home security as well music and entertainment systems can all be controlled using one device and, if you're away, checking in on your home is made possible through CCTV footage. These items can also learn your behavior and adapt elements such as temperature and music to suit the individual.

But this is extending even further now with the introduction of more home appliances on the market which can connect to WiFi. Your coffee maker can communicate with your alarm clock to ensure the coffee is ready for you when you get out of bed. Your pets can be fed at specific times throughout the day and the television programmed so children are only allowed to watch during a certain time. If there's a fire, your smoke detector will immediately notify you and can even unlock your home to allow emergency services in.

2. CONNECTED CARS

The connected or 'smart' car is another feature that will become commonplace with vehicle-to-tablet connection already a possibility.

Cars will eventually allow for vehicle-to-vehicle and vehicle-to-infrastructure communication, offering immense value to the driver and passengers. A chip will ensure emergency services are alerted in the case of an accident while cars will be able to enhance their own operation, maintenance and the comfort of passengers. We are ultimately moving towards the driver-less car with connections between cars and traffic systems factoring out the human element altogether.



3. SMART CITIES



The efficient management of resources, provision of services and overall city maintenance will be automated with the implementation of sensors and web applications. Rubbish bins will alert municipal services when they need to be emptied; distribution of resources such as water and electricity will be controlled using accurate data to

Department Of Information Technology prevent waste and urban security systems will alert the necessary policing body when laws are being infringed.

4. SMART FARMS

Food security is an increasing concern with the rapidly growing global population. According to the UN Food and Agriculture Organisation, the world will need to produce 70% more food in 2050 than it did in 2006 in order to feed everyone. Technological advancements in the agricultural sector are already looking to address this. Farmers are now using sensors in fields to obtain detailed maps of the area's topography and resources as well as variables such as soil acidity and temperature while predicting upcoming weather patterns.



As with smart cities and homes, smart farms mean the farmer can remotely monitor all equipment, crops and livestock while gathering statistical information needed for more efficient farm management. Self-driving tractors free up farm workers to focus on other tasks, essentially doubling the manpower. The use of drones in farming is also becoming commonplace as they provide farmers will real-time views of the land as well as useful data.

5. SMART HEALTHCARE



The benefits to human – and even animal – health are enormous with the implementation of IoT. By wearing connected devices, doctors are able to monitor their patients and emergency services can be alerted when an accident occurs. For individuals with chronic ailments such as epilepsy, heart conditions or any form of disability, this is a potentially life-saving revolution. The devices can also monitor an individual's health and daily activity with the collected data then used for a personalized analysis allowing for healthcare which is tailored to the individual as a preventative measure, as well as treatment.

For the elderly, IoT in healthcare will become a game-changer with reminders about when to take medication as well as vital healthcare monitoring. Family and friends will also be able to assist the elderly from afar through the use of connected devices.

➤ **Challenges we have to deal :**

Despite huge opportunities and possibilities in IOT. There are some challenges involved like complexity, Privacy and Security issues, Data storage Issues and some more. But there are also ways with which we can overcome them. Block chain also plays a major part in the Internet of Things it enhances the security, makes transactions more seamless and creates efficiencies in the supply chain.

Security & Privacy concerns:

With IOT huge numbers of devices are connected to each other. Even, one poorly designed

Department Of Information Technology device can cause the security issues like data theft and possibilities of hacking the other devices will increase. This also raises the data privacy issues, since huge amount of personal data is collected by IOT devices. Sometimes the end user may not even be aware of what data the devices are collecting from them.

Stability:

Issues on how devices perform without internet or connectivity should also be considered when developing the devices. Making the device to

perform in the similar way without the connectivity is also a challenge.

Compatibility:

Since IOT requires lot of devices to be interconnected the devices should be made compatible with each other. This needs the special hardware and software design.

Standards:

There are no proper standards followed or available for developing IOT devices. This may lead to the poorly designed and developed IOT devices which will in turn cause security and other major issues. At least in the future strong standards and best practices should be followed to develop IOT devices.