

Figure 1. Some objects that can be used by IoT technology

To date, IoT technology can be effectively used in every field, so the demand for it is expanding in every aspect. Therefore, IoT is divided into several types depending on the field of use, which are:

Industrial Internet Of Things

The IIoT represents industry-oriented applications where:

- Devices are gadgets functioning in industrial, transportation, energy, or medical environment.

- Data quantity and rates tend to vary from sustained to relatively high.

- Applications are safety-critical, for example, the misbehaving of a smart traffic system can threaten drivers.

- IIoT applications tend to be system-centric.

For IIoT, the scope can be within an organization (smart factory) or between organizations (retailer supply chain). This is definitely the most established and mature part of IoT. The IIoT will help a business to achieve:

1. Efficiency

2. Harness intelligence from a wide range of equipment

3. Improve operations (productivity)

4. Increase customer satisfaction

Industrial IoT (IIoT), is perhaps the most dynamic wing of the IoT industry. Its focus is on augmenting existing industrial systems, making them both more productive and more efficient. IIoT deployments are typically found in large-scale factories and manufacturing plants and are often associated with industries like healthcare, agriculture, automotive, and logistics. The Industrial Internet is perhaps the most well-known example of IIoT [1, 2].

Consumer Internet Of Things (CIoT)

The CIoT is a category of consumer-oriented applications where:

- Gadgets are consumer devices, for example, mobile, refrigerator, glasses, etc.

- Data quantity and rates are comparatively low.

- Applications are not very critical, for example, failure of fitness gadgets will not harm you.

- CIoT applications are consumer-centric.

Consumer IoT (CIoT) refers to the use of IoT for consumer applications and devices. Common CIoT products include smartphones, wearables, smart assistants, home appliances, etc. Typically, CIoT solutions leverage Wi-Fi, Bluetooth, and ZigBee to facilitate connectivity. These technologies offer short-range communication suitable for deployments in smaller venues, such as homes and offices.

For CIoT, the scope can be a single individual, family, small group, or community. The CIoT will help make life easier for consumers by improving:

1. Quality

2. Comfort

3. Security

4. Convenience

5. Efficiency

Commercial Internet of Things

While Consumer IoT tends to focus on augmenting personal and home environments, Commercial IoT goes a bit further, delivering the benefits of IoT to larger venues. For instance: commercial office buildings, supermarkets, stores, hotels, healthcare facilities, and entertainment venues.

There are plenty of use facts for commercial IoT, including monitoring environmental conditions, managing access to corporate facilities, and economizing utilities and consumption in hotels and other large venues. Many Commercial IoT solutions are geared towards improving customer experiences and business conditions.

Internet of Military Things (IoMT)

The last type of IoT is the Internet of Military Things (IoMT), often referred to as Battlefield IoT, the Internet of Battlefield Things, or simply IoBT. IoMT is precisely what it sounds like - the use of IoT in military settings and battlefield situations. It is chiefly aimed at increasing situational awareness, bolstering risk assessment, and improving response times. Common IoMT applications include connecting ships, planes, tanks, soldiers, drones, and even Forward Operating Bases via an interconnected system. In addition, IoMT produces data that can be leveraged to improve military practices, systems, equipment, and strategy[7].

Internet of Nano Things (IoNT)

While today's digital world is developing rapidly every hour, devices and technologies in every field are making people's burdens easier, but it is also causing them to become lazy. People, who have always sought convenience in communicating with technology, decided to reduce the size of devices in order to make them more convenient. This, in turn, led to a thousand-fold reduction in the size of devices. This perspective has led to the emergence of nanotechnology and the concept of nano-IoT [3].

Incorporating all or some of these nanodevices into the existing IoT concept is considered to give rise to the Internet of Nano-Things. Although commonly described as just a nanoscale version of the IoT, the implications of the IoNT go far beyond what is suggested by the simple differentiation. The advantages of nanodevices, whether it is the enhanced sensitivity of nanosensors or the increased energy density of nanobatteries, allow a new level of sophistication to the IoT paradigm and facilitate its applicability in ever-increasing applications. With billions of sensors collecting unprecedented amounts of confidential data, privacy and security concerns are critical barriers to widespread uptake [5]. Suitable levels of encryption, cyber security protocols, and authentication are all required before the necessary confidence in the IoT and IoNT can be achieved. Such a huge number of sensors also raises power supply concerns, especially considering the reliance of current battery technology on lithium [8, 9].

The internet of things helps people live and work smarter, as well as gain complete control over their lives by modern technologies. In addition to offering smart devices to automate homes, IoT is essential to business. IoT provides businesses with a real-time look into how their systems really work, delivering insights into everything from the performance of machines to supply chain and logistics operations. IoT enables companies to automate processes and reduce labor costs. It also cuts down on waste and improves service delivery, making it less expensive to manufacture and deliver goods, as well as offering transparency into customer transactions. Like this, IoT is

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one of the most important technologies of everyday life, and it will continue to pick up steam as more businesses realize the potential of connected devices to keep them competitive.

Table 1.

Analysis of IoT types by characteristics

Naming	Advantage	Scope of work	Purposes of use
Industrial Internet Of Things	Efficiency; Harness intelligence from a wide range of equipment; Improve operations (productivity); Increase customer satisfaction	Within an organization (smart factory) or between organizations (retailer supply chain)	Augmenting existing industrial systems, making them both more productive and more efficient.
Consumer Internet Of Things	Quality; Comfort; Security; Convenience; Efficiency	Single individual, family, small group, or community	Convenience for individual customers
Commercial Internet of Things	Delivering the benefits of IoT to larger venues	Including monitoring environmental conditions, managing access to corporate facilities, and economizing utilities and consumption in hotels and other large venues	Geared towards improving customer experiences and business conditions
Internet of Military Things	Providing privacy in battlefield situations	Connecting ships, planes, tanks, soldiers, drones, and even Forward Operating Bases via an interconnected system	Increasing situational awareness, bolstering risk assessment, and improving response times
Internet of Nano Things	Allow a new level of sophistication to the IoT paradigm and facilitate its applicability in ever-increasing applications.	In all fields where convenience and economy are required	Getting more compactness and efficiency while reducing energy consumption

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