14 Top New IoT Technologies

The 14 top new IoT technologies for 2025 include 6G connectivity, edge AI and computing, digital twin 2.0, IoT security enhancement, energy harvesting IoT devices, AI-driven IoT platforms, interoperability standards, nanotechnology in IoT, smart materials, swarm IoT, space IoT, zero-trust architecture, quantum IoT (QIoT), IoT and augmented reality (AR) integration.

Space IoT Exploration

The following is a detailed introduction to the **14 top new IoT technologies for 2025**:

1. 6G connectivity

- **Definition**: 6G, the sixth generation of mobile communication technology, is the next generation of mobile communication technology after 5G.
- **Proposed time**: Although the specific time of proposal is difficult to trace, the research and development of 6G has been gradually carried out in recent years.
- **Basic concept**: 6G will achieve higher speed, larger capacity, lower latency communication, and support global seamless connection.
- **R&D progress**: The standardization of 6G is expected to start around 2025, and global seamless connectivity will be achieved through technologies such as terahertz communication and 3D network architecture.
- **Development history**: From 1G to 5G, each generation of mobile communication technology has brought significant improvements in communication performance. 6G will further expand the boundaries of communication on this basis.
- **Application areas**: 6G will be widely used in medical, industrial, transportation and other fields, supporting application scenarios such as remote surgery, intelligent manufacturing, and autonomous driving.
- **Technical difficulty**: The research and development of 6G faces many challenges, including the research and development of terahertz communication technology and the design of 3D network architecture.
- **Change and world influence**: 6G will completely change our digital life and work methods, and promote global digital transformation and intelligent development.

2. Edge AI and computing

- **Definition**: Edge AI and computing refers to the technology of data processing and AI reasoning at the edge of the device or network.

- **Proposed time**: With the rapid development of the Internet of Things and AI technology, the concept of edge AI and computing has gradually been proposed in recent years.
- **Basic concepts**: By deploying AI algorithms and computing power at the edge of the network, data can be processed and analyzed instantly, data transmission delays can be reduced, and privacy protection can be improved.
- **R&D progress**: Edge AI and computing have been widely used in smart cities, manufacturing and other fields.
- **Development history**: From the initial cloud computing to the proposal of edge computing, and then to the development of edge AI and computing, this technology has undergone a gradual evolution from theory to practice.
- **Application fields**: Edge AI and computing can be applied to autonomous driving, intelligent manufacturing, intelligent security and other fields to improve the real-time and accuracy of the system.
- **Technical difficulty**: Edge AI and computing need to solve problems such as limited computing power of devices and data transmission delays.
- **Changes and world influence**: Edge AI and computing will promote the intelligent and real-time development of IoT applications and improve the overall efficiency and accuracy of the system.

3. Digital Twin 2.0

- **Definition**: Digital Twin 2.0 refers to the creation of a virtual model in digital space that is highly consistent with the physical entity, and the realization of real-time interaction and feedback with the physical entity.
- **Time of Proposal**: The concept of digital twins has been gradually improved and developed in recent years, and digital twins 2.0 has been proposed as an upgraded version in recent years.
- **Basic Concept**: Digital Twins 2.0 integrates technologies such as the Internet of Things and AI to achieve real-time monitoring, prediction and optimization of physical entities.
- **R&D Progress**: Digital Twins 2.0 has been widely used in manufacturing, smart cities and other fields.
- **Development History**: From the initial digital model to the proposal of digital twins, and then to the development of digital twins 2.0, this technology has undergone a gradual evolution from simple to complex.
- **Application Field**: Digital Twins 2.0 can be applied to production line optimization, product design verification, supply chain collaboration and other fields to improve production efficiency and product quality.
- **Technical Difficulty**: Digital Twins 2.0 needs to solve problems such as model accuracy and real-time interaction.
- **Changes and World Influence**: Digital Twins 2.0 will promote the transformation of manufacturing to intelligence and digitalization and improve global industrial competitiveness.

4. Internet of Things Security Enhancement

- **Definition**: Internet of Things security enhancement refers to improving the security and reliability of Internet of Things systems by adopting advanced security technologies and strategies.
- **Proposed time**: With the in-depth development of IoT applications, IoT security issues have gradually become prominent, and the concept of IoT security enhancement has been proposed in recent years.
- **Basic concept**: IoT security enhancement includes technical means such as data encryption, identity authentication, and access control to protect IoT systems from attacks and unauthorized access.
- **R&D progress**: IoT security enhancement technology has been widely used in smart homes, smart cities and other fields.
- **Development history**: From the initial simple security strategy to the complex security protection system, IoT security enhancement technology has undergone a gradual evolution from single to comprehensive.
- **Application field**: IoT security enhancement can be applied to smart homes, smart cities, industrial IoT and other fields to protect user privacy and data security.
- **Technical difficulty**: IoT security enhancement needs to solve problems such as device diversity and protocol complexity to ensure the security and reliability of the system.
- **Change and world influence**: IoT security enhancement will improve the security and reliability of IoT systems and promote the in-depth development of IoT applications.

5. Energy harvesting IoT devices

- **Definition**: Energy harvesting IoT devices refer to IoT devices that are powered by collecting energy from the environment (such as solar energy, vibration energy, etc.).
- **Proposed time**: With the popularization of IoT devices and the increase in energy consumption, the concept of energy harvesting IoT devices has been proposed in recent years.
- **Basic concept**: Energy harvesting IoT devices can collect energy from the environment and power the device by integrating energy harvesting modules, thereby extending the service life of the device.
- **R&D progress**: Energy harvesting IoT devices have been initially applied in smart homes, environmental monitoring and other fields.
- **Development history**: From the initial simple energy harvesting technology to the efficient energy harvesting module, energy harvesting IoT devices have undergone a gradual evolution from theory to practice.
- **Application field**: Energy harvesting IoT devices can be applied to smart homes, environmental monitoring, industrial IoT and other fields to reduce equipment energy consumption and operating costs.
- **Technical difficulty**: Energy harvesting IoT devices need to solve problems such as energy harvesting efficiency and device miniaturization.

- **Change and world influence**: Energy harvesting IoT devices will promote the greening and sustainable development of IoT devices.

Group Internet of Things

6. AI-driven IoT platform

- **Definition**: AI-driven IoT platform refers to the intelligent management and optimization of IoT devices by integrating AI technology and IoT technology.
- **Proposed time**: With the rapid development of AI and IoT technology, the concept of AI-driven IoT platform has been proposed in recent years.
- **Basic concept**: AI-driven IoT platform can realize real-time monitoring, prediction and optimization of IoT devices through intelligent algorithms and data analysis, and improve the overall efficiency and accuracy of the system.
- **R&D progress**: AI-driven IoT platform has been widely used in smart home, smart city and other fields.
- **Development history**: From the initial simple IoT platform to the intelligent platform integrating AI technology, AI-driven IoT platform has experienced a gradual evolution from single function to comprehensive service.
- **Application field**: AI-driven IoT platform can be applied to smart home, smart city, industrial IoT and other fields to improve the intelligence level of the system and user experience.
- **Technical difficulty**: AI-driven IoT platform needs to solve problems such as algorithm complexity and data processing capability.
- **Change and world influence**: AI-driven IoT platform will promote the intelligent and personalized development of IoT applications.

7. Interoperability standards

- **Definition**: Interoperability standards refer to standards that enable seamless connection and interaction between IoT devices from different manufacturers.
- **Proposed time**: With the popularization and diversification of IoT devices, the concept of interoperability standards has been proposed in recent years.
- **Basic concepts**: Interoperability standards achieve seamless connection and interaction between IoT devices from different manufacturers by formulating unified communication protocols and data formats.
- **R&D progress**: The International Organization for Standardization is accelerating the formulation of IoT standards, including communication protocols, data formats, security specifications, etc.

- **Development history**: From the initial simple communication protocols to complex interoperability standards, the standardization work of the Internet of Things has undergone a gradual evolution from disorder to order.
- **Application areas**: Interoperability standards can be applied to smart homes, smart cities, industrial IoT and other fields to improve the flexibility and scalability of the system.
- **Technical difficulty**: Interoperability standards need to solve problems such as device diversity and protocol complexity to ensure seamless connection and interaction between different devices.
- **Change and world influence**: Interoperability standards will promote the prosperity and coordinated development of the IoT ecosystem and improve the competitiveness of the global IoT market.

8. Nanotechnology in the Internet of Things

- **Definition**: Nanotechnology in the Internet of Things refers to the application of nanotechnology in Internet of Things devices to improve the performance and function of the devices.
- **Proposed time**: With the rapid development of nanotechnology and the in-depth development of Internet of Things applications, the concept of nanotechnology in the Internet of Things has been proposed in recent years.
- **Basic concept**: Nanotechnology in the Internet of Things can achieve miniaturization, high performance and intelligence of Internet of Things devices by utilizing the unique properties of nanomaterials (such as size effect, surface effect, etc.).
- **R&D progress**: Nanotechnology in the Internet of Things has been initially applied in sensors, actuators and other fields.
- **Development history**: From the initial simple application of nanomaterials to the complex design of nanodevices, nanotechnology in the Internet of Things has undergone a gradual evolution from basic to application.
- **Application field**: Nanotechnology in the Internet of Things can be applied to sensors, actuators, smart tags and other fields to improve the miniaturization, high performance and intelligence of equipment.
- **Technical difficulty**: Nanotechnology in the Internet of Things needs to solve problems such as the preparation, processing and stability of nanomaterials.
- **Change and world influence**: Nanotechnology in the Internet of Things will promote the miniaturization and high performance of Internet of Things devices and improve the competitiveness of the global Internet of Things market.

9. Smart Materials

- **Definition**: Smart materials refer to materials that can sense, respond to and adapt to changes in the external environment.

- **Proposed time**: The concept of smart materials has existed in the field of materials science for many years, but its application in the field of the Internet of Things has gradually emerged in recent years.
- **Basic concepts**: Smart materials can sense, respond to and adapt to changes in the external environment by integrating components such as sensors and actuators, thereby improving the intelligence level of IoT devices.
- **R&D progress**: Smart materials have been initially applied in the fields of sensors, actuators, wearable devices, etc.
- **Development history**: From the initial simple smart materials to complex smart material systems, smart materials have undergone a gradual evolution from basic to application.
- **Application fields**: Smart materials can be applied to sensors, actuators, wearable devices, smart homes and other fields to improve the intelligence and adaptability of equipment.
- **Technical difficulty**: Smart materials need to solve problems such as material preparation, processing and performance optimization.
- **Changes and world influence**: Smart materials will promote the intelligent and adaptive development of IoT devices and improve the innovation ability and competitiveness of the global IoT market.

10. Group Internet of Things

- **Definition**: Massive IoT refers to connecting a large number of devices, sensors and machines through IoT technology to form a large, mutually collaborative IoT system.
- **Proposed time**: The concept of mass IoT was not proposed by a specific event or time point, but gradually formed with the continuous **development of IoT technology** and the expansion of application fields.
- **Basic concept**: Massive IoT emphasizes the interconnection and collaboration between devices, and realizes intelligent decision-making and optimization by collecting, analyzing and utilizing a large amount of data.
- **R&D progress**: At present, mass IoT technology is in a rapid development stage, and major technology companies and research institutions are actively investing in R&D resources to promote the innovation and application of related technologies.
- **Development history**: From the initial simple device connection to the current complex system collaboration, mass IoT has gone through a process from concept proposal to technical realization to widespread application.
- **Application field**: Mass IoT is widely used in smart cities, industrial manufacturing, agricultural management and other fields. By realizing the interconnection between devices, it improves production efficiency and reduces operating costs.
- **Technical difficulty**: The technical difficulty of mass **IoT** is mainly reflected in the interconnection between devices, data security and privacy protection.
- **Changes and World Influence**: Group IoT technology has promoted the further development and application of IoT technology, promoted digital transformation and industrial upgrading, and had a profound impact on global economic and social development.

11. Space IoT

- **Definition**: Space IoT refers to the use of space facilities such as satellites combined with ground IoT devices to achieve global IoT connection and data transmission.
- **Proposed Time**: The concept of space IoT has gradually formed with the continuous development of satellite communications and IoT technology, and has received widespread attention and research in recent years.
- **Basic Concept**: Space IoT achieves global coverage through satellite networks, providing IoT connection services for remote areas, oceans and other areas that cannot access traditional networks.
- **R&D Progress**: At present, space IoT technology is in the early stages of R&D and application, and some satellite IoT projects have been successfully launched and put into operation.
- **Development History**: The development of space IoT has gone through a process from concept proposal, technical verification to preliminary application, and is expected to be more widely used worldwide in the future.
- **Application Field**: Space IoT is widely used in environmental monitoring, disaster warning, agricultural management and other fields, providing strong support for global IoT applications.
- **Technical Difficulty**: The technical difficulty of space IoT is mainly reflected in the reliability of satellite communication technology, data security and privacy protection.
- **Changes and World Influence**: Space IoT technology has promoted the globalization and popularization of IoT technology, providing new impetus for global economic and social development.

Application Examples of Space IoT

12. Zero Trust Architecture

- **Definition**: Zero Trust Architecture is a network security framework that no longer fully trusts internal or external networks, but dynamically controls access to resources based on identity authentication and authorization.
- **Proposal Time**: The concept of zero trust was proposed by Forrester in 2010.
- **Basic Concept**: The core idea of zero trust architecture is "never trust, continuous verification", that is, no matter where the user or device is, strict identity authentication and authorization are required to access resources.
- **R&D Progress**: At present, zero trust architecture has become an important strategy for global network security, and major companies and organizations are actively adopting and implementing this architecture.

- **Development History**: Zero trust architecture has gone through a process from concept proposal, technical verification to widespread application, and has become an important development direction in the field of network security.
- **Application fields**: Zero trust architecture is widely used in finance, government, medical and other fields, providing more secure and reliable network security solutions for these fields.
- **Technical difficulty**: The technical difficulty of zero trust architecture is mainly reflected in the complexity of identity authentication and authorization, data security and privacy protection.
- **Change and world influence**: Zero trust architecture has promoted the innovation and development of network security technology, improved the level and ability of network security protection, and had an important impact on global economic and social development.

13. Quantum Internet of Things (QIoT)

- **Definition**: Quantum IoT (QIoT) refers to the combination of quantum technologies such as quantum computing and quantum communication with Internet of Things technology to achieve more efficient and secure Internet of Things connections and data transmission.
- **Proposed time**: The concept of quantum Internet of Things has gradually formed with the continuous development of quantum technology and the widespread application of Internet of Things technology.
- **Basic concept**: Quantum Internet of Things uses the advantages of quantum technology, such as quantum superposition and quantum entanglement, to achieve more efficient and secure communication and data transmission between Internet of Things devices.
- **R&D progress**: At present, quantum Internet of Things technology is still in the R&D stage, but there are some preliminary research results and application cases.
- **Development history**: The development of quantum Internet of Things has gone through a process from concept proposal, technical verification to preliminary application, and is expected to be more widely used worldwide in the future.
- **Application fields**: Quantum Internet of Things is widely used in finance, medical care, military and other fields, providing these fields with safer and more efficient Internet of Things solutions.
- **Technical difficulty**: The technical difficulty of quantum Internet of Things is mainly reflected in the complexity and instability of quantum technology, data security and privacy protection.
- **Change and world influence**: Quantum Internet of Things technology has promoted the innovation and upgrading of Internet of Things technology, and provided new opportunities and challenges for global economic and social development.

14. Augmented Reality (AR) and Internet of Things Integration

- **Definition**: The integration of augmented reality (AR) and Internet of Things (IoT) refers to the combination of augmented reality technology and Internet of Things technology, collecting data through Internet of Things devices, and presenting the data in an intuitive and interactive way through augmented reality technology.
- **Proposed time**: The concept of integration of augmented reality and Internet of Things has gradually formed with the continuous development and integration of these two technologies.
- **Basic concept**: Augmented reality technology combines virtual information such as computer-generated images and sounds with the real world to provide users with a richer interactive experience. The Internet of Things technology collects data through sensors and other devices to provide a data source for augmented reality technology.
- **R&D progress**: At present, augmented reality and Internet of Things integration technology has been applied to many fields and is in a rapid development stage.
- **Development history**: The integration of augmented reality and Internet of Things has gone through a process from concept proposal, technical verification to preliminary application, and is expected to be more widely used worldwide in the future.
- **Application field**: The integration of augmented reality and Internet of Things is widely used in education, medical care, entertainment and other fields, providing users with a more intuitive and interactive experience. For example, in the field of education, students can intuitively understand historical events and scientific knowledge through augmented reality technology; in the medical field, doctors can view patients' medical images and surgical instructions through augmented reality technology.
- **Technical difficulty**: The technical difficulty of the integration of augmented reality and Internet of Things is mainly reflected in the real-time, accuracy, security and privacy protection of data.
- **Change and world influence**: The integration of augmented reality and Internet of Things has promoted the innovation and development of science and technology, provided users with richer interactive experience and application scenarios, and had an important impact on global economic and social development.

In summary, these new technology studies have their own characteristics in terms of definition, time of proposal, basic concepts, R&D progress, development history, application fields, technical difficulty, changes and world influence.

The development and application of these technologies will promote further innovation and upgrading of IoT technology, bringing new opportunities and challenges to global economic and social development.

About IoT Cloud Platform

IOT Cloud Platform (blog.iotcloudplatform.com) focuses on IoT design, IoT programming, security IoT, industrial IoT, military IoT, best IoT projects, IoT modules, embedded development, IoT circuit boards, IoT solutions, Raspberry Pi development and design, Arduino programming, programming languages, RFID, lora devices, IoT systems, sensors, smart homes, smart cities, new energy, semiconductors, smart hardware, photovoltaic solar energy, lithium batteries, chips and other scientific and technological knowledge.

FAQs

The following are frequently asked questions and answers about concepts such as 6G connectivity, edge AI and computing, and digital twin 2.0:

What are the main improvements of 6G connectivity compared to 5G?

6G connectivity is expected to achieve data speeds 100 times faster than 5G, reaching 1 terabit per second, while focusing more on eliminating the digital divide and ensuring that remote and rural areas can also get high-speed Internet access.

How will 6G connectivity change our lives?

6G connectivity will open up new use cases and applications beyond traditional communications, such as augmented reality, holographic communications, and advanced IoT applications, completely changing the way we communicate, entertain, and work.

What are the advantages of edge AI and computing over cloud computing?

Edge AI and computing bring data processing closer to the source of generation, reduce latency, and improve real-time processing capabilities, which is particularly valuable for applications that require low latency.

What role do edge AI and computing play in 6G?

In 6G, edge AI and computing will be seamlessly integrated with cloud computing to jointly optimize data processing and user connections and improve network performance.

What improvements does Digital Twin 2.0 have compared to the first generation?

Digital Twin 2.0 has been expanded and improved in model dimensions, data dimensions, connection dimensions, service/function dimensions, and physical dimensions, achieving a more dynamic and realistic mapping of the physical world.

In which fields does Digital Twin 2.0 have application prospects?

Digital Twin 2.0 has broad application prospects in smart manufacturing, smart cities, smart medical care and other fields, and can help these fields with digital transformation and intelligent upgrades.

What are the main security threats facing the Internet of Things?

The main security threats facing the Internet of Things include weak passwords, lack of firmware updates, unencrypted communications, malware attacks, etc.

How to enhance the security of the Internet of Things?

The security of the Internet of Things can be enhanced by strengthening password management, regularly updating firmware, adopting encrypted communications, and deploying security protection software.

How do energy harvesting IoT devices work?

Energy harvesting IoT devices collect energy from the environment (such as solar energy, vibration energy, etc.) to power themselves and achieve self-sufficient operation.

What are the application scenarios of energy harvesting IoT devices?

Energy harvesting IoT devices can be used in scenarios such as monitoring in remote areas and energy management of smart buildings to reduce dependence on traditional power sources.

How does artificial intelligence drive the IoT platform?

Artificial intelligence can optimize the operating efficiency of the IoT platform and improve its intelligence level through data analysis, predictive models, etc.

What are the advantages of an AI-driven IoT platform?

AI-driven IoT platforms can achieve more efficient data processing, more accurate device management, and smarter decision support.

How important are interoperability standards in the Internet of Things?

Interoperability standards are the key to achieving seamless communication and collaborative work between devices in the Internet of Things, and are of great significance to promoting the large-scale application of the Internet of Things.

How to formulate and implement interoperability standards?

Interoperability standards can be developed and implemented through industry collaboration and participation in standardization organizations to ensure that devices from different manufacturers can communicate and work together based on unified standards.

What are the applications of nanotechnology in the Internet of Things?

Nanotechnology can be used to manufacture smaller and more efficient sensors and actuators, improving the performance and power consumption of IoT devices.

What challenges does nanotechnology face in the Internet of Things?

The main challenges faced by nanotechnology in the Internet of Things include the stability of nanomaterials, production costs, and regulatory restrictions.

What are smart materials?

Smart materials refer to materials that can sense external stimuli (such as temperature, pressure, electromagnetic fields, etc.) and respond accordingly.

What are the application prospects of smart materials in the Internet of Things?

Smart materials can be used to manufacture IoT devices with adaptive functions, such as smart clothing that self-regulates temperature, self-repairing smart sensors, etc.

What is the group Internet of Things?

The group Internet of Things refers to a network composed of a large number of IoT devices that can collaborate and share information with each other to achieve more efficient monitoring and management.

What are the application scenarios of the group Internet of Things?

The group Internet of Things can be applied to smart cities, smart transportation, smart agriculture and other fields to achieve collaborative monitoring and management of large-scale equipment.

What is the space Internet of Things?

The space Internet of Things refers to the use of space facilities such as satellites to build an Internet of Things network to achieve comprehensive monitoring and management of the earth's surface.

What are the advantages of the space Internet of Things?

The space Internet of Things has the advantages of wide coverage, high monitoring accuracy, and no geographical restrictions. It can be applied to disaster warning, environmental monitoring and other fields.

What is zero trust architecture?

Zero trust architecture is a network security architecture that does not trust any device and user in the network by default. Only after strict authentication and authorization can network resources be accessed.

How is zero trust architecture applied in the Internet of Things?

Zero trust architecture can be used for device authentication, access control and other aspects in the Internet of Things to ensure that only legitimate devices can access the network and access resources.

What is the quantum Internet of Things?

Quantum Internet of Things refers to an Internet of Things network built using quantum communication technology, which has higher security and transmission efficiency.

What are the technical challenges of quantum Internet of Things?

The main technical challenges faced by quantum Internet of Things include the maturity of quantum communication technology, the stability of quantum devices, and the efficiency of quantum key distribution.

What are the application scenarios of the integration of Internet of Things and augmented reality?

The integration of IoT and augmented reality can be applied to smart manufacturing, smart medical care, smart education and other fields to achieve the interaction and integration of virtual and real.

What technical challenges does the integration of IoT and augmented reality face?

The main technical challenges faced by the integration of IoT and augmented reality include data synchronization, device compatibility and user experience.