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Scope of IOT in Unexplored Fields

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ABSTRACT

The Internet of Things (IoT) is a new paradigm that has transformed traditional lifestyles into high-tech ones. Smart cities, smart homes, pollution management, energy conservation, smart transportation, and smart industries are examples of IoT-driven developments. Many important research studies and investigations have been conducted in order to improve technology via IoT. However, in order to realize the full potential of IoT, a number of obstacles and issues must be addressed. These difficulties and challenges must be evaluated from a variety of perspectives, including applications, challenges, enabling technologies, social and environmental consequences, and so on.

introduction.

The Internet of Things (IoT) is a new paradigm that allows electrical gadgets and sensors to communicate with each other over the internet to make our lives easier. Smart devices and the internet are used by IoT to deliver new solutions to a variety of challenges and issues faced by businesses, governments, and public/private sectors around the world. IoT is becoming an increasingly significant part of our lives, and it can be felt all around us. IoT is a technology that brings together a wide range of smart systems, frameworks, intelligent devices, and sensors. Furthermore, it makes use of quantum and nanotechnology in ways that were previously unimaginable in terms of storage, sensing, and processing speed. To demonstrate the potential effectiveness and applicability of IoT changes, extensive research studies have been conducted and are available in the form of scholarly articles, press reports, both on the internet and in the form of printed materials. It could be used as a pre-work before developing unique inventive business concepts that take security, assurance, and interoperability into account.

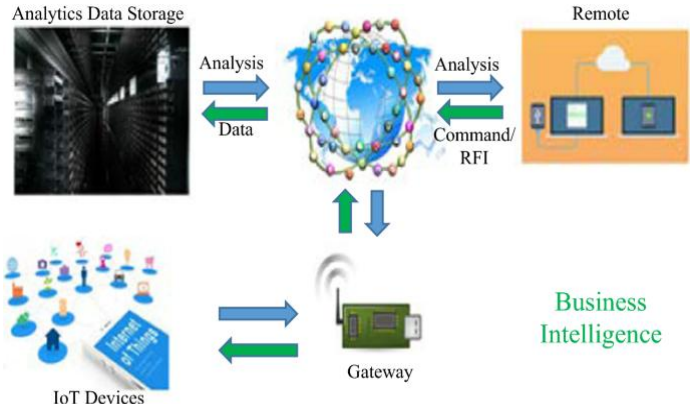


Fig General architecture of IoT

WHAT EXACTLY IS THE INTERNET OF THINGS?

I. The internet of things (IoT) refers to everyday objects that link to the internet, allowing us to control or receive data from them via our smartphone or computer.

II. The following are some examples of how we use the Internet of Things in our daily lives:

III. Smart home devices (stoves, refrigerators, washers and dryers, coffee machines, slow cookers)

IV. Intelligent security systems, locks, and doorbells

V. Hubs for smart homes, third (that control lighting, home heating and cooling, etc.)

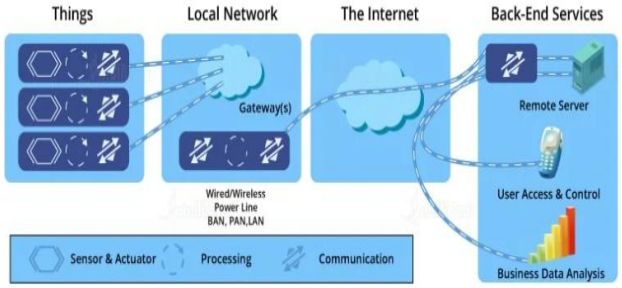
VI. Voice-activated assistants (such as Amazon Alexa or Apple's Siri)

VII. Smart scales, fitness monitors, and sleep trackers And more besides

Smart active wear, smart sports shoes, and connected vehicles are emerging consumer trends in IoT that inform us everything from how close we are to the vehicles around us to the best route to take to escape rush hour traffic.
Whatever type of smart IoT application you employ, the knowledge and convenience you gain as a result will save you time, money, and a lot of anxiety.

How Does the Internet of Things Work?

Smart electronic gadgets, local area networks, the Internet, cloud servers, and user applications make up the Internet of Things. A local network is used to link IoT devices. The information is then sent to the cloud servers over the Internet. The cloud servers also give the IoT device with data or information from the end-user application. This information transfer is a two-way communication that aids in the operation of the IoT system.
As indicated in the diagram below, an IoT system comprises of four major components:



IoT Devices: These are smart electronic devices with wireless sensors that allow data to be transferred over the Internet.

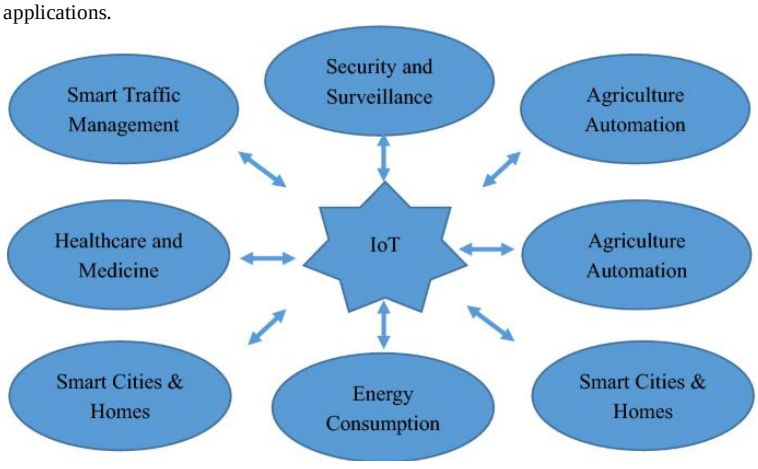
Local Network: It allows data to be accessed via Internet-connected devices.

The Internet : It allows devices to communicate with user apps and servers.

Back-end Services: A remote server, user access and control, and mobile applications make up back-end services. These services are always available to assist in the exchange of streaming data from various IoT devices and end-user apps.

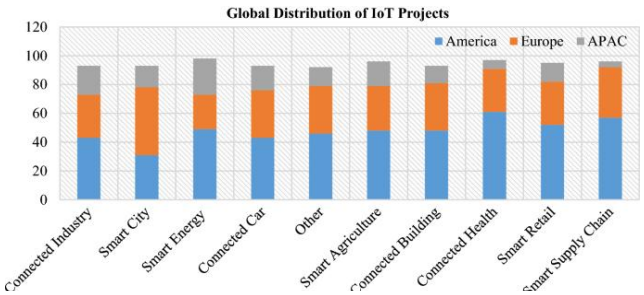
Review of the Literature

The Internet of Things (IoT) has a multidisciplinary vision to assist a variety of disciplines, including environmental, industrial, public/private, medical, and transportation. With respect to specific interests and issues, many scholars have interpreted the IoT in different ways. IoT's potential and power may be observed in a variety of applications.



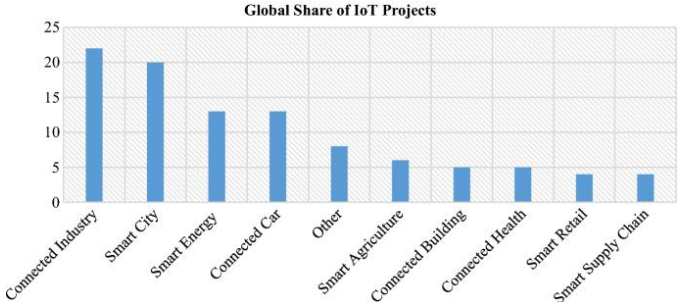
Some of the potential application domains of IoT

Several significant IoT initiatives have dominated the industry in recent years. Some of the most significant IoT initiatives that have dominated the market. The American, European, and Asia/Pacific regions are represented in a global distribution of these IoT projects. It is clear that the American continent contributes more to health care and smart supply chain initiatives, whereas the European continent contributes more to smart city projects.



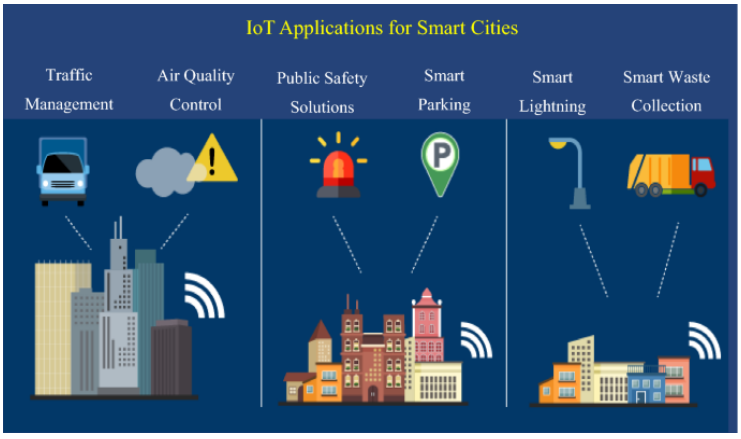
IoT projects are distributed globally among America (the United States, South America, and Canada), Europe, and Asia-Pacific (Asia and Pacific region)

The global market share of Internet of Things initiatives [3]. In comparison to other IoT projects, it is clear that industry, smart city, smart energy, and smart vehicle-based IoT projects have a large market share.



Global share of IoT projects across the world

Alavi et al. looked at the topic of urbanization in cities. The migration of individuals from rural to urban areas has resulted in an increase in the population of cities. As a result, smart solutions for mobility, energy, healthcare, and infrastructure are required. One of the most important application areas for IoT developers is smart cities. It looks at traffic management, air quality management, public safety solutions, smart parking, smart lighting, and smart garbage collection, among other topics. IoT is working hard to address these difficult concerns. With increasing urbanization, the requirement for improved smart city infrastructure has provided openings for smart city technology entrepreneurs. The authors came to the conclusion that IoT-enabled technology is critical for the development of long-term smart cities.



Potential IoT application areas for smart cities

Future Scope of IoT

The Internet of Things (IoT) has risen to prominence as a global technology. It has grown in popularity in a short period of time. In addition, advances in Artificial Intelligence and Machine Learning have made IoT device automation simple. In general, AI and machine learning applications are integrated with IoT devices to provide adequate automation. As a result, the Internet of Things (IoT) has broadened its scope of applicability across a variety of industries. We will cover the uses and future reach of IoT in the healthcare, automotive, and agriculture industries in this part.

I. Medical Care:

The Internet of Things has proven to be one of the most useful tools in the healthcare industry. It aids in the provision of advanced healthcare to patients, clinicians, and researchers. Smart diagnosis, wearable gadgets for tracking health, patient management, and many other services are available. In addition, IoT gadgets have alleviated undue burden on the healthcare system.

Over a secure network, healthcare gadgets can deliver patients' health data directly to doctors. This enables clinicians to diagnose patients in far-flung areas.

The following are some of the reasons why IoT is advantageous in the healthcare industry:

1. Error reduction in treatments

There is a reduction in manual errors in diagnosing patients because to IoT devices. As a result, patients can receive timely treatment. In addition, when compared to manual diagnosis, 24/7 diagnosis through gadgets provides a clearer picture of patients' health.

2. Decrease in the cost of treatments

Manual diagnosis takes time and needs the use of a variety of expensive equipment, in addition to additional hospital costs. As a result, the entire cost of treatment rises. We can cut these expenditures by utilizing IoT devices. Furthermore, because patients can be diagnosed from their individual places, hospital charges and congestion can be reduced.

3. Availability of specialists in remote locations

The availability of doctors, particularly specialists, in remote places is one of the fundamental difficulties in the healthcare industry that the Internet of Things addresses. The care of patients in the absence of doctors is now possible thanks to Internet of Things devices. All that is required of the patients is that they wear the device. The device will then communicate all of the real-time data on the patients' health to the appropriate doctors for analysis. In this way, the Internet of Things is assisting the healthcare sector in providing correct treatment to those who are in need.

ii Agriculture

Food is one of the three basic human necessities. We farm in order to meet the demand for food. However, as the world's population grows, the agricultural business is confronted with numerous obstacles. Changes in weather and climate can have a significant impact on the agriculture industry. To address increased food demand, the sector has turned to technology to boost productivity. Precision farming, agricultural drones, and smart farming applications are all part of it.

All of this is developed on top of the Internet of Things application. Now, let's look at how precision farming, smart farming apps, and agricultural drones might assist increase land production.

Precision farming

Information and Communication Technology (ICT) is a tool for smart farming in agriculture. Crop fields are monitored with the help of IoT-based devices. Sensors are used in the technique to calculate soil moisture, humidity, and temperature. It also makes efficient use of water by employing an automatic irrigation system. Precision farming allows farmers to keep track of their crops and increase productivity.

Drones for agriculture

Drones for agriculture and farming are one of the top Internet of Things applications. They're utilized to make agricultural procedures more efficient. Drones are used in agriculture to plant crops, irrigate fields, apply pesticides, and monitor the farms. It's easier to assess the health of crops with the use of drones. All of this is made feasible by sophisticated IoT-based technologies utilized to create agricultural drones.

Smart greenhouses

Greenhouse farming is used by farmers to increase crop output. Manual intervention is used to regulate the environmental conditions that affect crop growth in greenhouse farming. Manually regulating the mechanism for crop growth, on the other hand, is less productive. The Internet of Things (IoT) and technical improvements have led to the development of IoT-based greenhouses that include sensors, climate controllers, and other equipment. These IoT devices aid in the measurement of various environmental variables in accordance with plant specifications. Because all sensors and gadgets communicate with each other over the Internet, they provide reliable information on the current state of the environment. The gadgets then engage actuators that control greenhouse heaters, fans, glass, and lighting to match the climate. This is how the Internet of Things is helping to boost agricultural productivity.

III. Automobile Manufacturing:

The Internet of Things is transforming the automotive sector in the twenty-first century. One of the most significant uses is the development of self-driving automobiles, which has altered the automotive industry's tendencies. Self-driving automobiles were developed by engineers to reduce manual errors and ensure a safe ride. Self-driving vehicles are being developed by a number of firms throughout the world, including Google, Tesla, Mercedes-Benz, Volvo, Audi, and others. Data Science, Artificial Intelligence, Deep Learning, and the Internet of Things are all used in these self-driving cars

. IoT devices are programmed to assist in the development of an automated self-driving car system. HD cameras, temperature sensors, smart navigators, speed controllers, rain sensors, wireless connectivity, and proximity sensors are among the IoT gadgets. You must specify your location and destination when using these autos. The navigator then assists in locating the destination and attempts to identify the shortest route. Following that, IoT-based HD cameras assist in gathering pictures of the environment and sending the info to AI-based systems. These systems evaluate and visualize data from the environment and adjust the self-driving cars' responses accordingly. There are also IoT-based speed controllers that assist in regulating the speed of these automobiles in response to traffic and congestion. This is how the Internet of Things is affecting the automotive industry's tendencies.

IV People Will Become Addicted to Technological Connections:

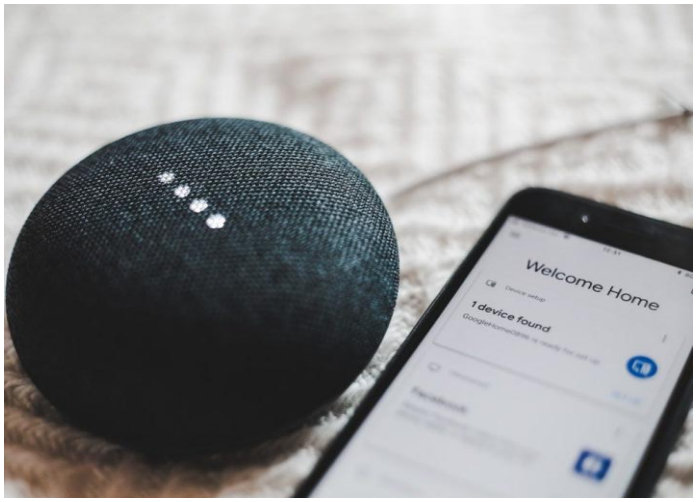
According to the studies, the use of IoT-based devices will skyrocket. It will have an impact on people in this and the next decade. There will be some magical things that will make people addicted to their devices, and they will be unable to leave them. People will be drawn to the devices because of their ease and benefits. We can even expect individuals to prioritize connectivity over security in the future. Connecting with society, friends, and new technology that provides convenience will grow more important as time goes on. People will begin to save all of their personal and family information on these gadgets, and they will begin to trade safety and security for convenience. Users will begin to make all sensible decisions in order to protect their security and safety. Everyone, including children and adults, will become addicted, and the house will become a large IoT device. Humans, on the other hand, will be unable to function without all of these.

V. Say No to Unplugging:

Unplugging from the internet is becoming increasingly harder, and by 2025, there will be no such thing as unplugging. There would be a sense of threat, distrust, and people will be unable to withdraw from an online or digital platform. The internet will become increasingly important to people. According to the surveys, businesses will begin penalizing employees who are connected to the internet or who disconnect from it. Maintaining an active presence in the digital and social media will reap benefits. However, a complete withdrawal will be difficult, if not impossible. We can also hear stories of people who attempted to disconnect but were unsuccessful. With all of these technologies, you will not be able to detach yourself. Because you'll be surrounded by all of these things and won't be able to get away from them. People will believe they are separated, yet this will not be the case.

VI. Increase in Internet users:

Some people may attempt to withdraw from digital media and social media. When they strive to split by two, more people will eventually join the Internet platform. It simply increases in size but never decreases. Smart TVs, smartphones, and voice searches will all become necessary.



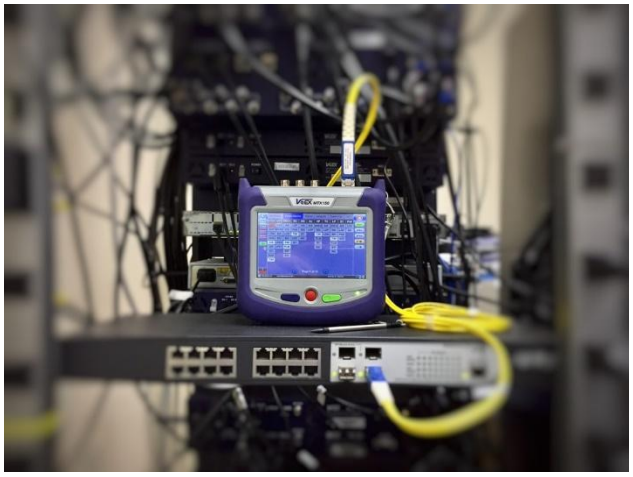
Even the disconnection indicates that those users are looking for a better way to reconnect. In the end, this means that the number of consumers always doubles rather than decreases.

VII. Risk mitigation and human ability will make IoT safer:

Human cleverness will turn them into true users, while risk mitigation will be reduced. For users, the Internet of Things will grow more dependable. However, the competition for authentic and secure information will be fierce, but it is certain that security levels will rise dramatically and offer the greatest outcomes. All networked devices will become as dependable as the power grid, protecting the platform from malicious operations. However, it will go out on occasion, which will be a calamity because people will, of course, survive. There will be numerous legislative and technological advances that will act as remedies and reduce all hazards. Citizens in countries and people all over the world will become much more aware of the internet platform's security and safety. If something goes wrong, this will put further pressure on the government. It will automatically put pressure on businesses and ensure that everything is safe for users.

VIII A rapid increase in IoT: Increase in risk :

With the tremendous expansion in the use of IoT devices, whether people are connected or not, the chance will remain. As a result, IoT devices may exacerbate security and liberty concerns.



Threats can escalate into brutal attacks and other activities that are extremely violent. People can see the physical assaults because they are taking place in public. Cyber attacks, on the other hand, will be carried out in secret, and you will not know who is the perpetrator, but the consequences will be disastrous. As the Internet of Things (IoT) and security become more prevalent, users' concerns will grow, as will their freedoms. You may suggest that this will assist you in knowing where you are walking and lighting your way, or that it will be able to access your sensitive and personal information. It will be the most difficult task for the cops, the government, and the entire planet.

Conclusion

Recent advances in IoT have piqued the interest of researchers and developers all over the world. IoT developers and researchers are collaborating to bring the technology to a wider audience and to help society as much as feasible. However, improvements are only achievable if we take into account the many challenges and flaws in current technical approaches. We discussed numerous concerns and challenges that IoT developers must consider when developing a better model in this survey post. Also highlighted are significant IoT application areas in which IoT developers and researchers are involved. Because the Internet of Things (IoT) not only provides services but also generates a large amount of data. As a result, the significance of big data analytics is explored, which can provide precise conclusions that can be used to design a better IoT system.

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