

CHALLENGES AND APPLICATIONS OF INTERNET OF THINGS

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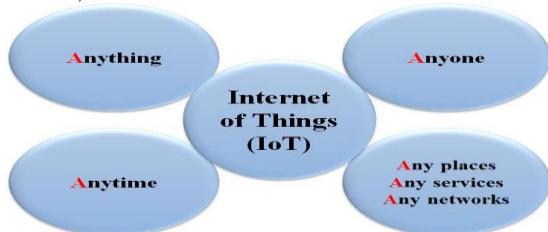
ABSTRACT: Nowadays Internet of Things (IoT) gained a great awareness from researchers, since it becomes allowing a communications between machines, objects and everything together with peoples and important technology that promises a smart human being life. In the real world connected to the Internet via wireless network and IOT can use different types of connections like RFID, Bluetooth, WIFI and ZigBee. Technology of IOT becomes smart in every aspect. Since the IOT will provide a means of smart cities, smart healthcare, smart homes and building using this having various important applications as smart energy, grid, transportation, waste management and monitoring.

Keywords: IoT Applications, Future Technologies, Smart Environment, Smart Cities, Smart Energy and Grid, Smart Manufacturing, Smart Healthcare

1. INTRODUCTION

The Internet is one of the most important and powerful creations in all of user account and now using the concept of internet of things, internet becomes more favorable having every aspect in a smart life. The Internet of Things is also called as Internet of Objects for everything including ourselves. Internet of Things is a new technology of the Internet accessing. Figure shows anything's will able to communicate to the internet at any time from any place to provide any services by any network to anyone.

This is create a new types of applications which is use for smart vehicle and smart home to provide various services like security, energy saving, automation, communications, entertainment and notifications.



Rising the IOT, it will provide testing and deploying products to implementing smart environments by 2020.

2. STANDARDIZATIONS AND PROTOCOLS OF INTERNET OF THINGS

The IOT will consists a technology to creating the means of action for communicate the machine from one to another with many types of information. IOT standards are required that the efficient of energy and network capacity and as well as other constraints which are radio frequency communications having a frequency bands and power levels.

3. APPLICATIONS OF INTERNET OF THINGS

In human life, IOT consists of many applications like life easier, smart cities, homes, transportation energy and environment.

Smart Cities: It is used for future and smart life for innovation rate of creating smart cites today, it requires careful planning for every stage and with the support of

agreement from governments, citizens to implement the internet of thing technology for an every aspect.



Figure: Smart City

A. Smart Home and Buildings:

In home automations Wi-Fi's technologies is used primarily due to networked nature of deployed electronics where electronic devices such as TVs, mobile devices, etc

The increasing rate of adoption of mobile computing devices like smart phones, tablets, etc with the help of Wi-Fi consisting of home IP network. Using the concept of IOT, homes and buildings may control various device and objects smartly of the most interesting application of IOT in smart homes and buildings are having smart lighting, smart environmental, media, air control, central heating, energy management and security as shown in Figure below.

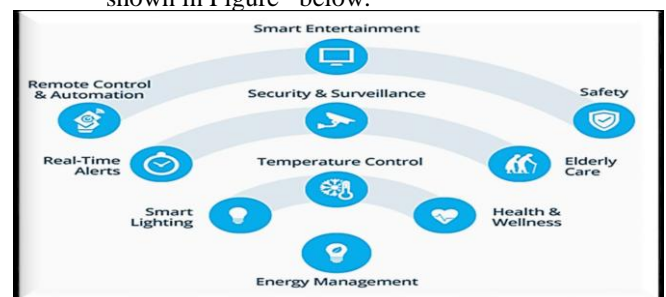


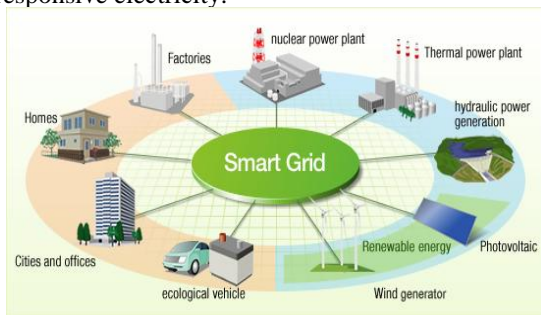
Figure. Smart Home & building applications

In future Internet of Things will provide an intelligent building management system which can be considered as a part of a much larger information system used by facilities managers in buildings to manage energy use and energy procurement and to maintain buildings systems

B. Smart Energy and the Smart Grid:

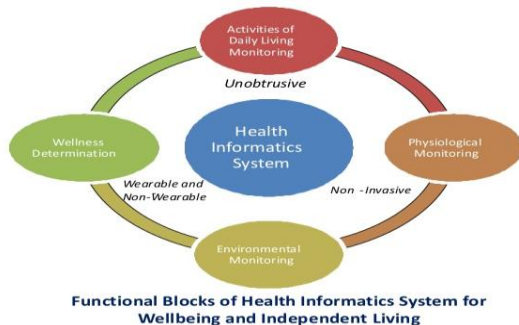
A smart grid is linked to the information, control and developed to have a smart energy management. A smart grid which is integrate that the information and communications technologies (ICTs) to the electricity network will enable in a real time, two way communication between suppliers and consumers, creating more dynamic interaction on energy flow, which will help deliver electricity more efficiently and sustainably.

The Key elements of information and communications technologies will contains sensing and monitoring technologies for power flows digital communications infrastructure to transmit data across the grid, smart meters with in home display to inform energy usage, coordination, control and automation systems to aggregate and process various data and to create a highly interactive responsive electricity.



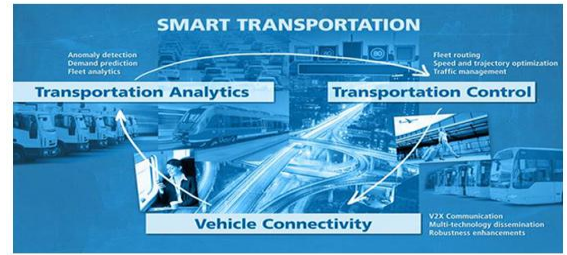
C. Smart Health:

It is an open standard based technology platform which enables innovators to create apps that seamlessly and securely run across the healthcare system. Using an electronic health record (EHR) system or data warehouse that supports the SMART standard, patients, doctors, and healthcare practitioners can draw on this library of apps to improve clinical care, research and public health.



D. Smart Transportation and Mobility:

It is used to apply the principles of crowd sourcing and participatory sensing. The process began with user identified the route wishes and marked some points as pothole in the smart phone's application



4. CHALLENGES OF INTERNET OF THINGS

The fact that Internet of things applications and scenarios outlined above are very interesting which provides technologies for smart everything. IOT are also faced with many other challenges.

Scalability: The IOT requires a new functions and methods in order to gain an efficient operation for scalability. Internet of Things has a large concept than the conventional Internet of computers, because of things are cooperated inside an open environment.

Self-Organizing: Smart things should not be managed as computers with the aim of require their users to configure and adapt them to particular situations. Mobile things, which are often only periodically used, need to establish connections spontaneously and able to be organize and configure themselves to suit their particular environment.

Data volumes: Some application scenario of the internet of things will involve to infrequent communication and gathering information's form sensor networks or form logistics and large scale networks will collect a huge volume of data on central network nodes or servers.

Data interpretation: To support the users of smart things that there is a need to interpret the local context determined by sensors as exactly as possible.

Interoperability: Every type of smart objects in Internet of Things having different information, processing and communication capabilities.

Automatic Discovery: In dynamic environments suitable services for things must be automatically identified, which requires proper semantic means of describing their functionality.

Software complexity: Extensive software infrastructure needed on the network and on the background servers which is to manage the smart objects and provides the services to support them. Because the software systems in smart objects will have function with minimal resource as in conventional embedded systems.

Security and privacy: Communications secrecy, the authenticity and trust worthiness of communication partner's message integrity, other requirements would be important in an Internet of things.

Fault tolerance: Structuring an Internet of Things in a robust and trustworthy manner would require redundancy on several levels and an ability to automatically adapt to changed conditions.

Power supply: Things typically move around and are not connected to a power supply, so their smartness needs to be powered from a self-sufficient energy source. Energy saving is a factor not only in hardware and system architecture, but also in software, for example the implementation of protocol stacks, where every single transmission byte will have to justify its existence.

Wireless Communications: From an energy point of view, established wireless technologies such as GSM, UMTS, Wi-Fi and Bluetooth are far less suitable, more recent WPAN standards such as ZigBee and others still under development may have a narrower bandwidth, but they do use extensively less power.

5. INTERNET OF THINGS AND RELATED FUTURE TECHNOLOGIES

Many new technologies are related to IOT to prove the integration of wired as well as wireless control, communication and IT technologies together which are responsible for connecting several subsystems and things which operate under a unified platform controlled and managed smartly.

A. Cloud Computing

The two words of Cloud and IOT have seen a rapid and independent evolution.

Cloud can offer an effective solution for IOT service management and composition as well as implementing applications and services that exploit the things or the data produced by them. On the other hand, cloud can benefit from IOT by extending its scope to deal with real world things in a more distributed and dynamic manner and for delivering new services in a large number of real life scenarios.

B. Big Data

Nowadays, the number of devices and sensor networks are increased more and more in the physical environs which will change the information communications networks, services and applications in various domains due to the rapid expansion.

The expectations in the next year's it will generate large volumes of data from many applications and services in a variety of areas such as smart grids, smart homes, healthcare, automotive, transport, logistics and environmental monitoring.

C. Security and Privacy

Due the fact that IOT applications able to access the multiple administrative domains and involve to multiple ownership regimes, there is a need for a trust framework to enable the users of the system to have confidence that the information and services being exchanged can indeed be relied upon. The trust framework needs to be able to deal with humans and machines as users for it needs to convey trust to humans and needs to be robust enough to be used by machines without denial of service.

D. Distributed Computing

It is used as group of networked computers for the same computational goal. It has several common issues with concurrent and parallel computing as all these three fall in the scientific computing field.

6. CONCLUSIONS

Internet of things is a new technology which provides many applications to connect the things to things and human to things through the internet. All networks and technologies of communication are used in building the concept of the internet of things such technologies are mobile computing, RFID, wireless sensors networks and embedded systems in addition to many algorithms and methodologies to get management processes, storing data, and security issues. By the internet of things many smart applications becomes real in our life, which allows us to reach and contact with every things in addition to facilities many important aspects for human life such as smart healthcare, smart homes, smart energy, smart cities and smart environments.

Internet of things having two major challenges in order to guarantee seamless network access, the first issue relates the fact that today different networks coexist and the other issue is related to the big data size of the IOT. Other current issues such as address control, automatic address setup, security functions such as authentication, encryption and functions to deliver voice and video signals efficiently will probably be affected in implementing the concept of the internet of things but by ongoing in technological developments these challenges will be overcome. The internet of things promises new technologies when related to cloud, fog and distributed computing, big data and security issues. By integrating all of these issues with the internet of things, smarter applications will be developed as soon. This paper survey some of the most important applications of IOT with particular focus that actually done the challenges facing the implementation of internet of things concept and the future technology make the feasible on concept of IOT.

References

1. Jayavardhana Gubbia, Rajkumar Buyab, Slaven Marusic, Marimuthu Palaniswami. Internet of Things (IoT): A vision, architectural elements, and future directions. *Future Generation Computer Systems* 29 (2013) 1645-1660.
2. M. A. Ezechina, K. K. Okwara, C. A. U. Ugboaja. The Internet of Things (IoT): A Scalable Approach to Connecting Everything. *The International Journal of Engineering and Science* 4(1) (2015) 09-12.
3. S. Misra et al., Security Challenges and Approaches in Internet of Things. Springer Briefs in Electrical and Computer Engineering, 2016.
4. Suwimon Vongsingthong and Sucha Smanchat. A Review of Data Management in Internet of Things. *KKU Res. J.* 2015
5. Odulaja, G.O., Security issues in internet of the things. *Computing, Information Systems, Development Informatics & Allied Research Journal*, Vol. 6, No. 1, March 2015.
6. http://senseable.mit.edu/papers/pdf/20150228_Kumar_et_al_RiseLowcost_EnvironmentInternational.pdf