IFERP
connecting engineers... developing research

ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
Vol 4, Issue 11, November 2017

Internet of Things (IoT)

[1] Reji Thomas, [2] Devanshu Priyam, [3] Jaswanth Vishal, [4] Avinash Verma, [5] Aman Kumar.
[1] Professor, C.S.E Department, Sri Sairam College of Engineering.
[2] [3] 3rd SEM, C.S.E Department, Sri Sairam College of Engineering.
[4] [5] 3rdSEM, E&C Department, Sri Sairam College of Engineering.

Abstract:- **This presentation mainly focuses on the Internet of Things (IoT).The Internet of things (IoT) is the network of physical devices, vehicles, and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable these objects to collect and exchange data. Internet of Things (IoT) is an ecosystem of connected physical objects that are accessible through the internet. The 'thing' in IoT could be a person with a heart monitor or an automobile with built-in-sensors, i.e. objects that have been assigned an IP address and have the ability to collect and transfer data over a network without manual assistance or intervention. The embedded technology in the objects helps them to interact with internal states or the external environment, which in turn affects the decisions taken.**

I. INTRODUCTION

As of 2017, the vision of the Internet of things has evolved due to a convergence of multiple technologies, including ubiquitous wireless communication, real-time analytics, machine learning, Commodity sensors and embedded systems. This means that the traditional fields of embedded systems, wireless sensor networks, control systems, automation (including home and building automation), and others all contribute to enabling the Internet of things (IoT). According to a technology research and advisory corporation, there will be nearly 20.8 billion devices on the Internet of things by 2020. It estimates that more than 30 billion devices will be wirelessly connected to the Internet of things by 2020.
Some other major applications are Media, Environmental monitoring, Infrastructure Management, manufacturing, agriculture, energy management, medical and health care, building, home automation, transportation, metropolitan scale development.

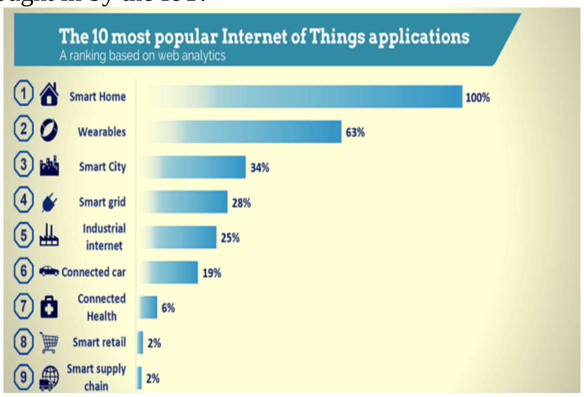
APPLICATIONS OF IoT
Environmental monitoring applications of the IoT typically use sensors to assist in environmental protection by monitoring air or water quality, atmospheric or soil conditions,and can even include areas like monitoring the movements of wildlife and their habitats. Development of resource-constrained devices connected to the Internet also means that other applications like earthquake or tsunami early-warning systems can also be used by emergency services to provide more effective aid. IoT devices in this application typically span a large geographic area and can also be mobile. It has been argued that the standardization IoT brings to wireless sensing will revolutionize this area.
MEDIA - In order to hone the manner in which things, media and big data are interconnected, it is first necessary to provide some context into the mechanism used for media process. It has been suggested by Nick Couldry and Joseph Turow that practitioners in media approach big data as many actionable points of information about millions of individuals. The industry appears to be moving away from the traditional approach of using specific media environments such as newspapers, magazines, or television shows and instead tap into consumers with technologies that reach targeted people at optimal times in optimal locations.
Infrastructure management
Monitoring and controlling operations of urban and rural infrastructures like bridges, railway tracks, on- and offshore-wind-farms is a key application of the IoT. The IoT infrastructure can be used for monitoring any events or changes in structural conditions that can compromise safety and increase risk. It can also be used for scheduling repair and maintenance activities in an efficient manner, by coordinating tasks between different service providers and users of these facilities.IoT devices can also be used to control critical infrastructure like bridges to provide access to ships. Usage of IoT devices for monitoring and operating infrastructure is likely to improve incident management and emergency response coordination, and quality of service, up-times and reduce costs of operation in all infrastructure related areas. Even areas such as waste management can

ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)

Vol 4, Issue 11, November 2017

benefit from automation and optimization that could be brought in by the IoT.



Manufacturing

Network control and management of manufacturing equipment, asset and situation management, or manufacturing process control bring the IoT within the realm of industrial applications and smart manufacturing as well.TheIoT intelligent systems enable rapid manufacturing of new products, dynamic response to product demands, and real-time optimization of manufacturing production and supply chain networks, by networking machinery, sensors and control systems together.

Digital control systems to automate process controls, operator tools and service information systems to optimize plant safety and security are within the purview of the IoT.But it also extends itself to asset management via predictive maintenance, statistical evaluation, and measurements to maximize reliability. Smart industrial management systems can also be integrated with the Smart Grid, thereby enabling real-time energy optimization. Measurements, automated controls, plant optimization, health and safety management, and other functions are provided by a large number of networked sensors.

Agriculture

The IoT contributes significantly towards innovating farming methods. Farming challenges caused by population growth and climate change have made it one of the first industries to utilize the IoT. The integration of wireless sensors with agricultural mobile apps and cloud platforms helps in collecting vital information pertaining to the environmental conditions temperature, rainfall, humidity, wind speed, pest infestation, soil humus content or nutrients, besides others – linked with a farmland, can be used to improve and automate farming techniques, take informed decisions to improve quality and quantity, and minimize risks and wastes. The app-based field or crop monitoring also lowers the hassles of managing crops at multiple locations. For example, farmers can now detect which areas have been fertilized (or mistakenly missed), if the land is too dry and predict future yields.

Energy management

Integration of sensing and actuation systems, connected to the Internet, is likely to optimize energy consumption as a whole.It is expected that IoT devices will be integrated into all forms of energy consuming devices (switches, power outlets, bulbs, televisions, etc.) and be able to communicate with the utility supply company in order to effectively balance power generation and energy usage. Such devices would also offer the opportunity for users to remotely control their devices, or centrally manage them via a cloud-based interface, and enable advanced functions like scheduling (e.g., remotely powering on or off heating systems, controlling ovens, changing lighting conditions etc.).

Medical and healthcare

IoT devices can be used to enable remote health monitoring and emergency notification systems. These health monitoring devices can range from blood pressure and heart rate monitors to advanced devices capable of monitoring specialized implants, such as pacemakers, Fitbit electronic wristbands, or advanced hearing aid. Some hospitals have begun implementing "smart beds" that can detect when they are occupied and when a patient is attempting to get up. It can also adjust itself to ensure appropriate pressure and support is applied to the patient without the manual interaction of nurses.

Building and home automation

IoT devices can be used to monitor and control the mechanical, electrical and electronic systems used in various types of buildings (e.g., public and private, industrial, institutions, or residential)[49] in home automation and building automation systems. In this context, three main areas are being covered in literature.

Transportation

The IoT can assist in the integration of communications, control, and information processing across various transportation systems. Application of the IoT extends to all aspects of transportation systems (i.e. the vehicle, the infrastructure, and the driver or user). Dynamic interaction between these components of a transport system enables inter and intra vehicular communication, smart traffic control, smart parking, electronic toll collection systems, logistic and fleet management, vehicle control, and safety and road assistance.[49] In Logistics and Fleet Management for example, The IoT platform can continuously monitor the location and conditions of cargo and assets via wireless

IFERP
connecting engineers... developing research

ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
Vol 4, Issue 11, November 2017

sensors and send specific alerts when management exceptions occur (delays, damages, thefts, etc.).

Consumer application

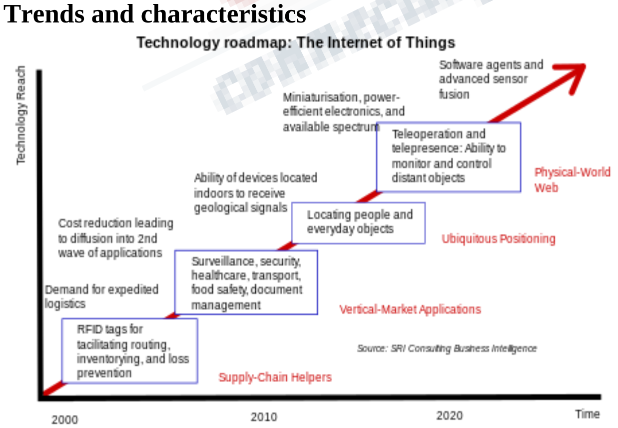
A growing portion of IoT devices are created for consumer use. Examples of consumer applications include connected car, entertainment, residences and smarthomes, wearable technology, quantified self, connected health, and smart retail.Consumer IoT provides new opportunities for user experience and interfaces.

Some consumer applications have been criticized for their lack of redundancy and their inconsistency, leading to a popular parody known as the “Internet of things”.Companies have been criticized for their rush into IoT, creating devices of questionable value,and not setting up stringent security standards.

UNIQUE ADDRESSABILITY OF THINGS;-

Integration with the Internet implies that devices will use an IP address as a unique identifier. Due to the limited address space of IPv4 (which allows for 4.3 billion unique addresses), objects in the IoT will have to use the next generation of the Internet protocol (IPv6) to scale to the extremely large address space required.Internet-of-things devices additionally will benefit from the stateless address auto-configuration present in IPv6, as it reduces the configuration overhead on the hosts,and the IETF 6LoWPAN header compression. To a large extent, the future of the Internet of things will not be possible without the support of IPv6; and consequently, the global adoption of IPv6 in the coming years will be critical for the successful development of the IoT in the future. A combination of these ideas can be found in the current GS1/EPCglobal EPC Information Services specifications. This system is being used to identify objects in industries ranging from aerospace to fast moving consumer products and transportation logistics.

Trends and characteristics



Technology roadmap: Internet of things.

The interconnection via the Internet of computing devices embedded in everyday objects, enabling them to send and receive data.

Intelligence

Complexity

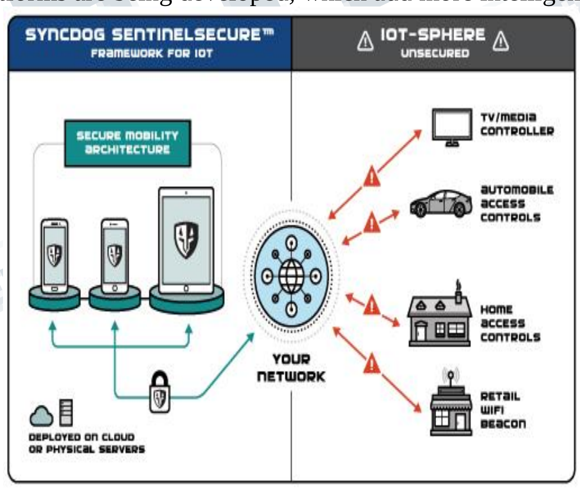
Size considerations

Sectors

ASolutionto "basketofremotes"

Frameworks

IoT frameworks might help support the interaction between "things" and allow for more complex structures like distributed computing and the development of distributedapplications. Currently, some IoT frameworks seem to focus on real-time data logging solutions, offering some basis to work with many "things" and have them interact. Future developments might lead to specific software-development environments to create the software to work with the hardware used in the Internet of things. Companies are developing technology platforms to provide this type of functionality for the Internet of things. Newer platforms are being developed, which add more intelligence.



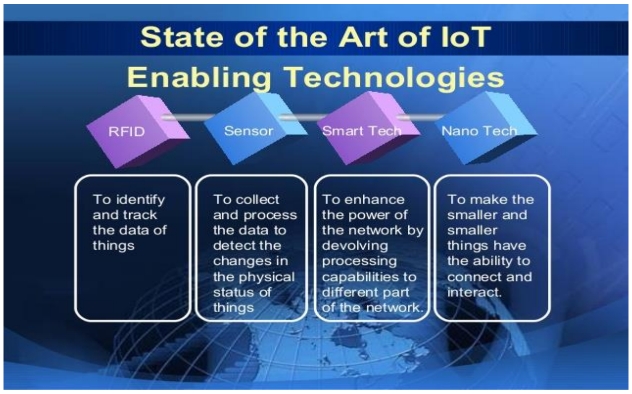
REST is a scalable architecture that allows things to communicate over Hypertext Transfer Protocol and is easily adopted for IoT applications to provide communication from a thing to a central web server.

Enabling technologies for IoT;-

There are many technologies that enable IoT. Crucial to the field is the network used to communicate between devices of an IoT installation, a role that several wireless or wired technologies

ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
Vol 4, Issue 11, November 2017



Short-range wireless
Bluetooth mesh networking, Light-Fidelity, Near-field communication, QR codes and barcodes, Radio-frequency identification, Wi-Fi Direct.

Medium-range wireless
HaLow, LTE-Advanced.

Long-range wireless
Low-power wide-area networking ,Verysmall aperture terminal.

Wired
Ethernet, Multimedia over Coax Alliance, Power-line communication .

IoT adoption barriers;-

Lack of interoperability and unclear value propositions.Despite a shared belief in the potential of IoT, industry leaders and consumers are facing barriers to adopt IoT technology more widely.

Privacy and security concern
According to a recent study by NouraAleisa and Karen Renaud at the University of Glasgow, "the Internet of things' potential for major privacy invasion is a concern"[192] with much of research "disproportionally focused on the security concerns of IoT.

Traditional governance structures
A study issued by Ericsson regarding the adoption of Internet of things among Danish companies identified a "clash between IoT and companies' traditional governance structures, as IoT still presents both uncertainties and a lack of historical precedence. Among the respondents interviewed, 60 percent stated that they "do not believe they have the organizational capabilities, and three of four do not believe they have the processes needed, to capture the IoTopportunity This has led to a need to understand organizational culture in order to facilitate organizational design processes and to test new innovation management practices. A lack of digital leadership in the age of digital transformation has also stifled innovation and IoT adoption to a degree that many companies, in the face of uncertainty, "were waiting for the market dynamics to play out" or further action in regards to IoT "was pending competitor moves, customer pull, or regulatory requirements. Some of these companies risk being 'kodaked' – "Kodak was a market leader until digital disruption eclipsed film photography with digital photos– failing to "see the disruptive forces affecting their industry and "to truly embrace the new business models the disruptive change opens upScott Anthony has written in Harvard Business Review that Kodak "created a digital camera, invested in the technology, and even understood that photos would be shared online but ultimately failed to realize that "online photo sharing was the new business, not just a way to expand the printing business.

II. CONCLUSION

Internet of Things can connect devices embedded in various systems to the internet. When devices/objects can represent themselves digitally, they can be controlled from anywhere. The connectivity then helps us capture more data from more places, ensuring more ways of increasing efficiency and improving safety and IoT security. IoT is transformational forces that can help companies improve performance through IoT analytics and IoT Security to deliver better results. Businesses in the utilities, oil & gas, insurance, manufacturing, transportation, infrastructure and retail sectors can reap the benefits of IoT by making more informed decisions, aided by the torrent of interactional and transactional data at their disposal.

REFERENCES

i) www.happiestminds.com/insights/internet-f-things.
ii) www.en.wikipedia.org/wiki/internet-of-things.
iii) https://www.sap.com/india/trends/internetofthings.