

# Usage of Internet of Things in Education

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**Abstract**—In the forthcoming years, technology will control the learning practice in many ways. Internet of Things (IoT) continues to approve its important location in the perspective of Information and Communication Technologies and the development of society. Now a day's one of the advance word in the information technology is Internet of Things (IoT). The main objective of IoT is to transform real world objects to the artificial intelligent virtual objects. IoT will provide everything in the real world object to provide shared infrastructure to control the things around the state of the things. In recent times this study represents IoT concepts by researcher's scholars, expert system, corporate white papers and online databases. Moreover this research paper will present definitions, issues of internet things, basic requirements and characteristics of IoT. The main goal of research paper is to provide a complete overview of advance technologies associated with their usage of ICT in higher education. However new research will provide goal comprehension and assist accumulation effectively.

## II. RELATED WORK

**Keywords**- Internet of Things, Information Communication Technology, Wireless Sensor Network, Artificial Intelligence, Learning.

### I. INTRODUCTION

This document is a The Internet of Things (IoT) is a distinctive concept shifted to the information technology. IoT include two words internet and things. The internet observe standard internet protocol suite (TCP/IP). In the system millions of administration networks, public, private and business networks are related by various networking technologies and broad array electronic data inputs. Today the data is communicated over the countries and it provides local and global data throughout the network. Network consists of various lists of exchange data, linked web application, news and various things on internet. While another word is "Thing" means that is distinguishable from real world objects. It defines as any object or person that is distinguished from real world entities. The entities are representing as things in the IoT (Internet of Things). Every unit has its attributes which represent the description of entity. Internet of Things currently not distinctively defined but as a substitute various researchers, technocrats, practitioners, developers and corporate people that Internet of Things is accepted or acceptable by the world based users. Another definition that defines internet means that the data is created by the people and the next edition is about data that is created by the objects.

The IoT is referred to as linking the smart devices and structuring which includes the sensors, software, and electronic software, actuators which trigger these objects to collect and switch data. notion of network of smart devices was discussed as early as 1982 with a tailored coke machine at Carnegie Mellon University becoming the first internet related applicer. The term Internet of things was invented by Peter T. Lewis in 1985 speech given at U.S FCC (Federal Communication Commission).

### III. CHARACTERISTICS OF IOT

Intelligence uses various algorithms and computing technologies that provide to make a product very skillful and smart. Connectivity that aids the people is connected through Wi-Fi and enables to admit the network compatibility. Accessibility means to offer ability to construct and consume data. Sensing on the other hand is to understand and sense the ability for the physical world and people around us. Energy that is used in power efficiency, harvesting and power intelligence must be designed with safety using various tools which is the aid for physical entities.

In 2013, the Global Standard initiative on IoT, defines it as the "Infrastructure of the information society". The IoT allows the objects to be sensed and controlled distantly across existing network communications.

In 2016, the scope of the internet of things has emerged due to a union of multiple technologies, concerning real time analytics, machine learning and commodity sensor etc. The

### IV. PROBLEM WITH IOT

**Problem with storage of data:** When the IOT will be deployed the data generated from number of sources will increase considerably. This data is desired to be stored at someplace for processing and analyzing in real time. Processing of such a vast amount of data in real time will require supplementary data centers which will cause new issues with security, capacity and analytics.

**Connecting Remote Assets:** The challenge lies in nature of IoT itself. IOT will unite remote devices and systems providing a data stream connecting devices and decentralized management systems. The data will include the information about the location, activity and functionality of those systems along with the data about the people who own and operate these systems. This amount and type of information differs in many ways from the big data that is collected from social media.

## V. CHALLENGES ASSOCIATED WITH IOT

**Security:** With the digitization and automation of millions of devices, providing security will become a challenge for enterprises to look after themselves from the threats. Till now various industries specific platforms have been urbanized like air and defense sector. These solutions are aimed at protection of specific devices for example smart meters. So, security with handling such a large amount of data is a most important challenge related to IOT.

**Enterprises:** With growing amount of data, the requirement for the devices to hold this data will also increase security complexities which in turn impact the availability necessities which are also likely to increase. This may put the real time business processes at risk.

**Consumer Privacy:** As the main purpose of internet of things is to improve the services and management of devices. So securing the consumer's personal information is also a challenging concern.

**Data:** IOT will require storing the two types of data: Personal data (Consumer driven) and big data (Enterprise driven). IT administrators, whose job was to keep the data centers in operation, will now have to outline on how to store, protect and make all the incoming data accessible.

**Storage Management:** Although the capacity is available, further demands on storage will be made. The economics of storage have been weighted up against the IOT information by the businesses.

**Server Technologies:** The IOT has exaggerated the server market in a way that now it is paying more attention on increased investment in key vertical industries where IOT will be more gainful. There exist some companies which collect data from huge array of devices. This may necessitate additional compute capacity and may increase server budget.

**Data Center Network:** Current data center network uses WAN (Wide Area Network) and the bandwidth is enough for the current flow rate of data. Since after deployment of IOT, the amount of data will increase considerably so the bandwidth of the network need to be modified in such a way that it can handle huge amount of data flow rate. So it is no longer practical to store data at a single location.

## VI TECHNOLOGIES OF IOT USED IN HIGHER EDUCATION

The basic technologies which support the particular functionality essential in IOT system as compare to a standard uniform network are as follow.

**Radio Frequency Identification (RFID):** Internet of Things permits each person to be connected anytime and anywhere. Radio Frequency identification dispenses a exclusive identification to the substance. This technology is used as a most protected identification method for locate or we can say track objects, vehicles and things. Moreover RFID endow with an easy, versatile, low energy option for discovery and access token, connection bootstrapping payments and to

preserve research methodology in higher education. RFID technology use full duplex radio transmitter receiver to follow and identify tags associated with objects. To understand RFID in detail let us regard as an example of grocery store where we contain to stand in long checkout lines. But now this line will evaporate as Universal Product Code (UPC) is replaced by smart labels. These RFID smart tags are intelligent bar code that way every product and communicate product in sequence and price details of items in the cart to a central network scheme. After that your bank will be notified for bill payment and amount is deduct from your account.

RFID is used in a range of fields like automotive industry RFID is used to locate and control major assembly with in production, patient identification in hospitals and aerospace industry and defense RFID is used for verification of parts and to get better supply chain visibility.

**Near Field Communication (NFC):** Near Field Communication (NFC) is a rising wireless short-range communication technology that working with the Radio Frequency Identification (RFID) infrastructure. These technologies allow a simple, rapid, instinctive and simply securable communication between two electronic devices or we can say NFC contains a set of communication protocols specifically for mobile device and standard device.

**Wireless Sensor Network (WSN):** One of the well-known technologies of IoT is wireless a wireless sensor network consisting of distributed autonomous devices with sensors which monitor physical or environmental conditions, such as temperature, pressure, vibration, sound, motion or pollutants, at dissimilar locations. WSN allow us to monitor unobservable things over large temporal scale. WSN based on IoT has customary notable attention in various areas like education, military, forest fire, manufacturing, transportation, civil infrastructure, security, healthcare, agriculture monitor, habitat monitoring and flood detection etc. Sensors can be used to monitor patient's body response to the medication, so that doctors can establish the effects of the medicines [6].

**Artificial Intelligence:** Artificial Intelligence refers to electronic environment created by human beings which is susceptible and responsive to the behavior done by peoples.

Artificial Intelligence is explain by following characteristics such as embedded, adaptive, anticipatory, and personalized. Artificial Intelligence has its relevance in various areas like natural language processing, expert system, gaming, vision system, speech recognition, handwriting recognition, and intelligent robots etc which are helps to build up the education system.

**Wifi Direct:** Wifi direct is a wifi customary that allow distinct device to connect to the network without an access point. As in conventional wifi access points are use which are accountable for routing between different nodes and also maintain communication between wireless and wired system. But the number of devices is increasing day by day with that operating cost is also increasing. Wifi direct allow connection devoid of any access point and moreover assist communication between devices from different manufacturer. Wifi direct sustain all the functionalities like file transfer, communication among different devices and internet browsing which mostly supportive in to get digitalized data for the students and researchers who are pursuing their higher education.

## VII CONCLUSION

Internet of Things gradually brings a set of various technologies that brings change in our daily lives, which help to build our life more comfortable and simpler. Because the various technologies are used based on the application. The main area of Internet of Things application includes industrial, transportation, medical, education, manufacturing, mining, commerce and education etc. We concluded that in this research paper the key observations are meaning and definitions of Internet of Things, their technologies connected with IoT, various confronts related to the IoT and provide uniqueness of the internet on things.

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