**Learn About IOT**

**(Introduction)**

**Internet of Things (IoT)** is the networking of physical objects that contain electronics embedded within their architecture in order to communicate and sense interactions amongst each other or with respect to the external environment. In the upcoming years, IoT-based technology will offer advanced levels of services and practically change the way people lead their daily lives. Advancements in medicine, power, gene therapies, agriculture, smart cities, and smart homes are just a very few of the categorical examples where IoT is strongly established.

Over 9 billion ‘Things’ (physical objects) are currently connected to the Internet, as of now. In the near future, this number is expected to rise to a whopping 20 billion.

**There are four main components used in IoT:**

1. **Low-power embedded systems:**Less battery consumption, high performance are the inverse factors that play a significant role during the design of electronic systems.
2. **Cloud computing:**Data collected through IoT devices is massive and this data has to be stored on a reliable storage server. This is where cloud computing comes into play. The data is processed and learned, giving more room for us to discover where things like electrical faults/errors are within the system.
3. **Availability of big data:**We know that IoT relies heavily on sensors, especially in real-time. As these electronic devices spread throughout every field, their usage is going to trigger a massive flux of big data.
4. **Networking connection:**In order to communicate, internet connectivity is a must where each physical object is represented by an IP address. However, there are only a limited number of addresses available according to the IP naming. Due to the growing number of devices, this naming system will not be feasible anymore. Therefore, researchers are looking for another alternative naming system to represent each physical object.

**There are two ways of building IoT:**

1. Form a separate internetwork including only physical objects.
2. Make the Internet ever more expansive, but this requires hard-core technologies such as rigorous cloud computing and rapid big data storage (expensive).

**IoT Enablers:**

* **RFIDs:** uses radio waves in order to electronically track the tags attached to each physical object.
* **Sensors:** devices that are able to detect changes in an environment (ex: motion detectors).
* **Nanotechnology:** as the name suggests, these are extremely small devices with dimensions usually less than a hundred nanometers.
* **Smart networks:** (ex: mesh topology).

**Characteristics of IoT:**

* Massively scalable and efficient
* IP-based addressing will no longer be suitable in the upcoming future.
* An abundance of physical objects is present that do not use IP, so IoT is made possible.
* Devices typically consume less power. When not in use, they should be automatically programmed to sleep.
* A device that is connected to another device right now may not be connected in another instant of time.
* Intermittent connectivity – IoT devices aren’t always connected. In order to save bandwidth and battery consumption, devices will be powered off periodically when not in use. Otherwise, connections might turn unreliable and thus prove to be inefficient.

As a quick note, IoT incorporates trillions of sensors, billions of smart systems, and millions of applications.

**Application Domains:** IoT is currently found in four different popular domains:

1) Manufacturing/Industrial business - 40.2%

2) Healthcare - 30.3%

3) Security - 7.7%

4) Retail - 8.3%

**Modern Applications:**

1. Smart Grids and energy saving
2. Smart cities
3. Smart homes
4. Healthcare
5. Earthquake detection
6. Radiation detection/hazardous gas detection
7. Smartphone detection
8. Water flow monitoring
9. Traffic monitoring
10. Wearables