

PROFESSIONAL TRAINING REPORT

At

Sathyabama Institute of Science and Technology

(Deemed to be University)

Submitted in partial fulfilment of the requirements for the award of

Bachelor of Engineering Degree in

Electrical and Electronics Engineering

By

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS

SCHOOL OF ELECTRICAL AND ELECTRONICS

SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY

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JULY 2020

INTERNSHIP CERTIFICATE:



CERTIFICATE OF COMPLETION

This is to Certify that

HARINI.C

From **EEE - SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY**

Has Successfully Completed Internship on

INTERNET OF THINGS

During **1-7-2021** to **14-7-2021** in Pantech E Learning, Chennai.

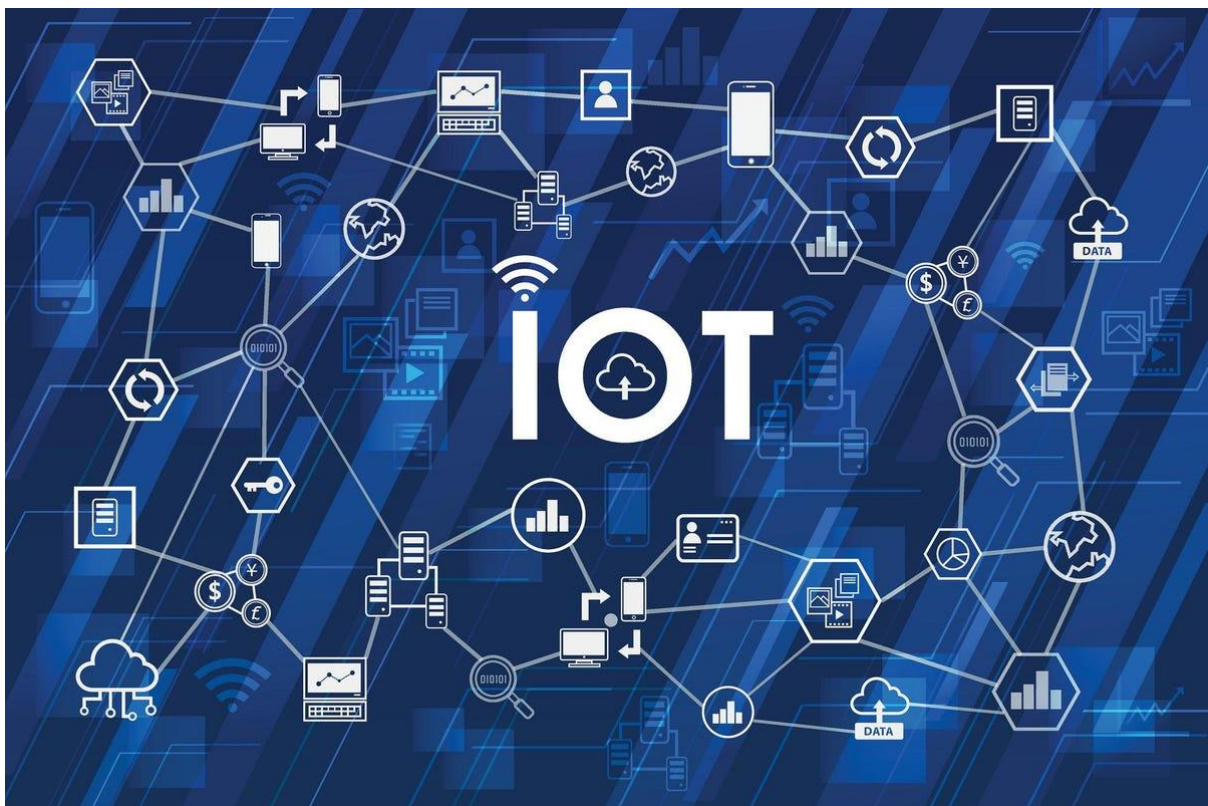
Certificate No: PA -INTERN- 2021 - 1093

Srinivasan.N
Director, Pantech

1. INTERNET OF THINGS

1. What is IOT?

The Internet of Things (IoT) describes the network of physical objects—“things”—that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet. These devices range from ordinary household objects to sophisticated industrial tools. With more than 7 billion connected IoT devices today, experts are expecting this number to grow to 10 billion by 2020 and 22 billion by 2025. Oracle has a network of [device partners](#).



2. Why is Internet of Things (IoT) so important?

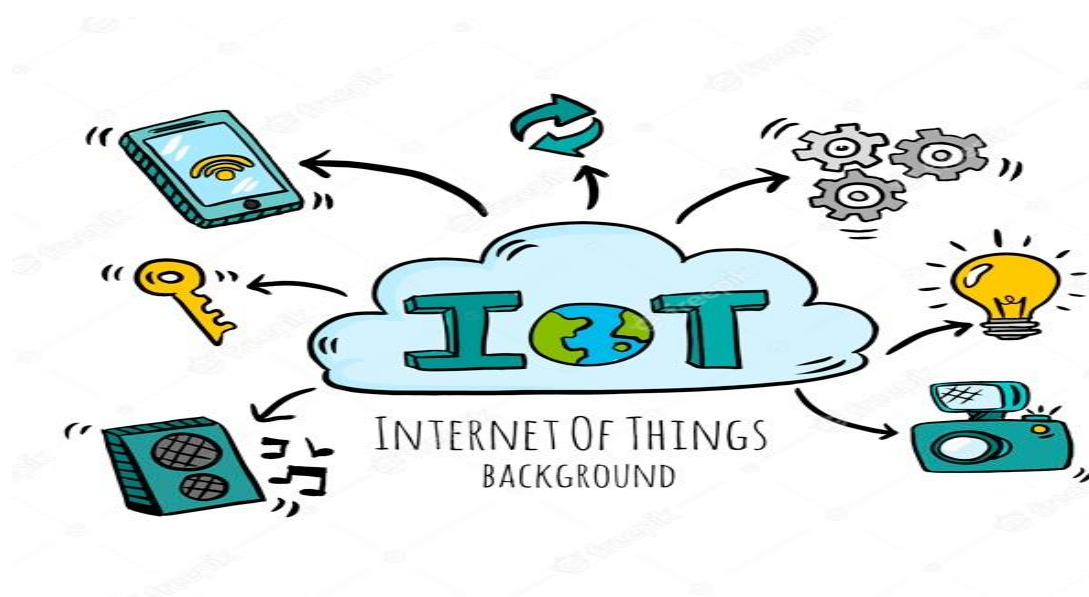
Access to low-cost, low-power sensor technology. Affordable and reliable sensors are making IoT technology possible for more manufacturers.

Connectivity. A host of network protocols for the internet has made it easy to connect sensors to the cloud and to other “things” for efficient data transfer.

Cloud computing platforms. The increase in the availability of cloud platforms enables both businesses and consumers to access the infrastructure they need to scale up without actually having to manage it all.

Machine learning and analytics. With advances in machine learning and analytics, along with access to varied and vast amounts of data stored in the cloud, businesses can gather insights faster and more easily. The emergence of these allied technologies continues to push the boundaries of IoT and the data produced by IoT also feeds these technologies.

Conversational artificial intelligence (AI). Advances in neural networks have brought natural-language processing (NLP) to IoT devices (such as digital personal assistants Alexa, Cortana, and Siri) and made them appealing, affordable, and viable for home use.



3. IoT applications?

IoT applications can be used in many ways to help businesses simplify, improve, automate, and control processes while providing relevant information, activity performance, and even environmental conditions that need to be monitored and controlled remotely. As a result, IoT applications can help drive new business models and revenue streams and provide the real-time data businesses need to develop products and services.

Some major applications of IOT:

- i) Smart Homes
- ii) Smart City
- iii) Self-driven Cars
- iv) IoT Retail Shops
- v) Farming
- vi) Wearables
- vii) Smart Grids
- viii) Industrial Internet
- ix) Telehealth
- x) Smart Supply-chain Management

i) Smart Homes:

One of the best and the most practical applications of IoT, smart homes really take both, convenience and home security, to the next level.

Though there are different levels at which IoT is applied for smart homes, the best is the one that blends intelligent utility systems and entertainment together. For instance, your electricity meter with an IoT device giving you insights into your everyday water usage, your set-top box that allows you to record shows from remote, Automatic Illumination Systems, Advanced Locking Systems, Connected Surveillance Systems all fit into this concept of smart homes. As IoT evolves, we can be sure that most of the devices will become smarter, enabling enhanced home security.



ii) Smart City:

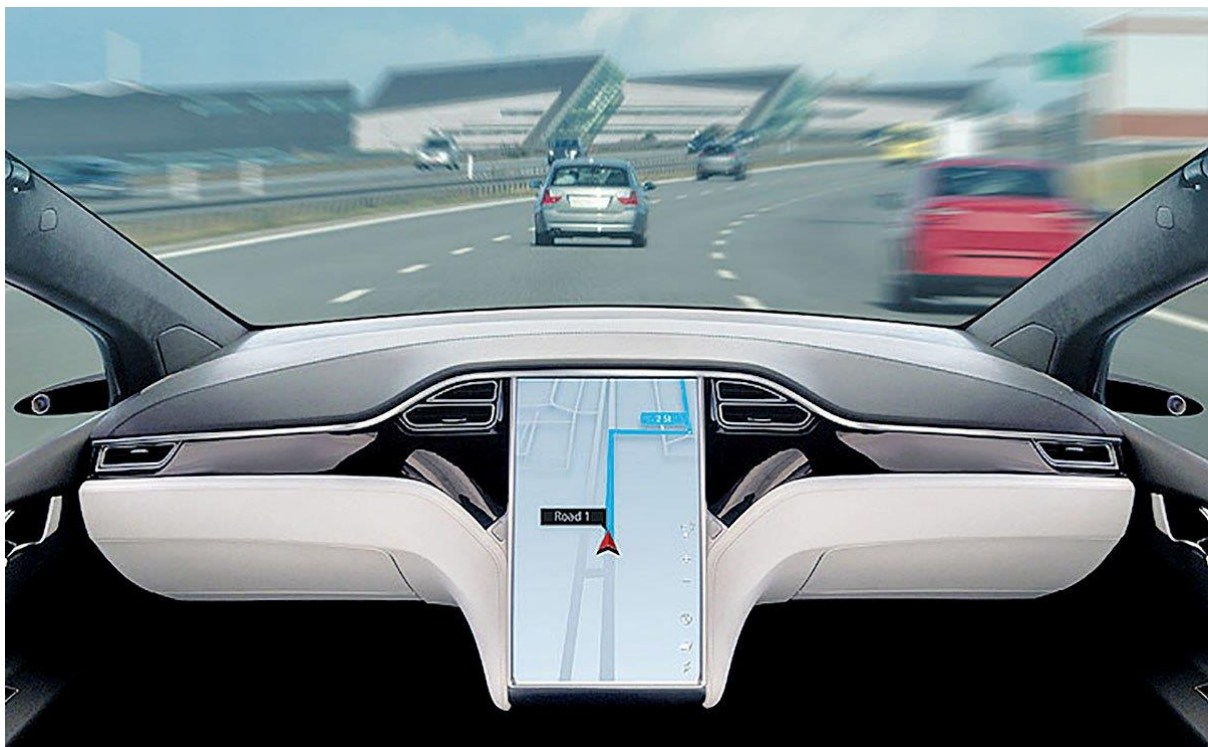
Not just internet access to people in a city but to the devices in it as well – that's what smart cities are supposed to be made of. And we can proudly say that we're going towards realizing this dream. Efforts are being made to incorporate connected technology into infrastructural requirements and some vital concerns like Traffic Management, Waste Management, Water Distribution, Electricity Management, and more. All these work towards eliminating some day-to-day challenges faced by people and bring in added convenience.



iii) Self-driven Cars:

We've seen a lot about self-driven cars. Google tried it out, Tesla tested it, and even Uber came up with a version of self-driven cars that it later shelved. Since it's human lives on the roads that we're dealing with, we need to ensure the technology has all that it takes to ensure better safety for the passenger and those on the roads.

The cars use several sensors and embedded systems connected to the Cloud and the internet to keep generating data and sending them to the Cloud for informed decision-making through Machine Learning. Though it will take a few more years for the technology to evolve completely and for countries to amend laws and policies, what we're witnessing right now is one of the best applications of IoT.



iv) IoT Retail Shops:

If you haven't already seen the video of Amazon Go – the concept store from the eCommerce giant, you should check it out right away. Perhaps this is the best use of the technology in bridging the gap between an online store and a retail store. The retail store allows you to go cashless

by deducting money from your Amazon wallet. It also adds items to your cart in real-time when you pick products from the shelves.

If you change your mind and pick up another article, the previous one gets deleted and replaces your cart with the new item. The best part of the concept store is that there is no cashier to bill your products. You don't have to stand in line but just step out after you pick up your products from shelves. If this technology is effective enough to fetch more patronage, this is sure to become a norm in the coming years.



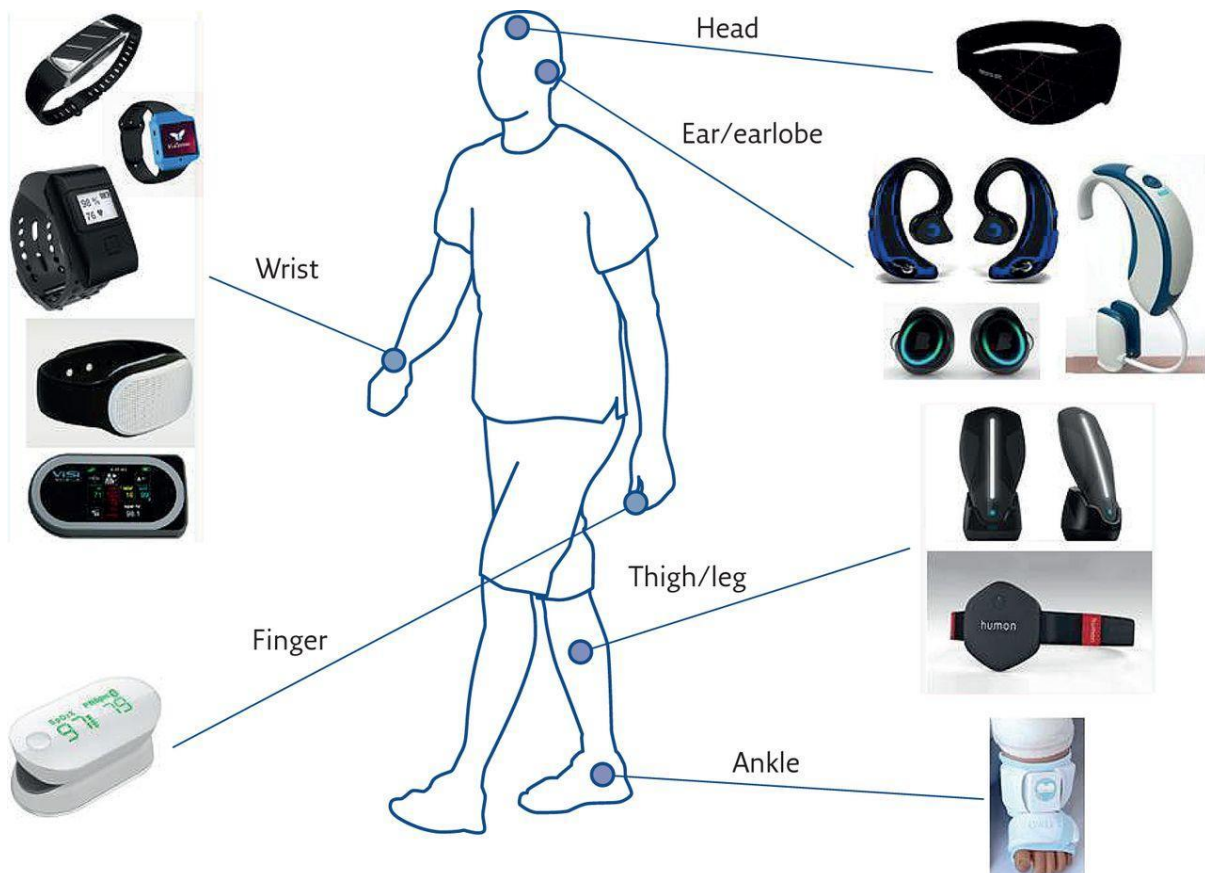
v) Farming:

Farming is one sector that will benefit the most from the Internet of Things. With so many developments happening on tools farmers can use for agriculture, the future is sure promising. Tools are being developed for Drip Irrigation, understanding crop patterns, Water Distribution, drones for Farm Surveillance, and more. These will allow farmers to come up with a more productive yield and take care of the concerns better.



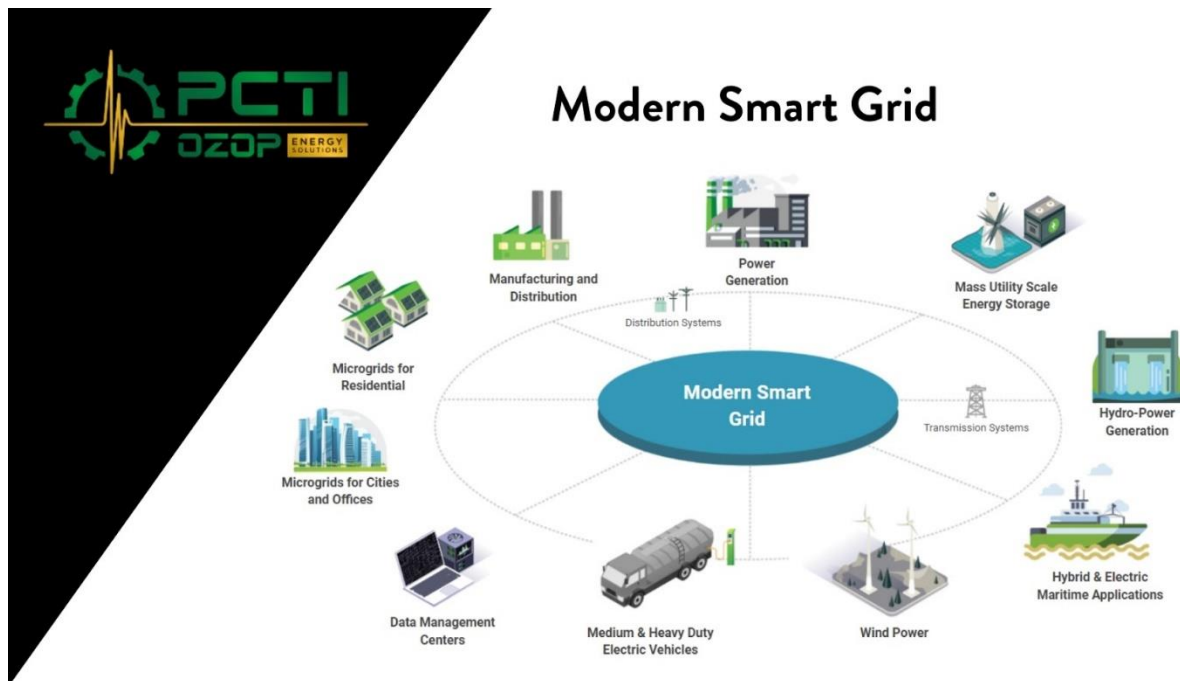
vi) Wearables:

Wearables remain a hot topic in the market, even today. These devices serve a wide range of purposes ranging from medical, wellness to fitness. Of all the IoT start ups, Jawbone, a wearables maker, is second to none in terms of funding.



vii) Smart Grids:

One of the many useful IoT examples, a smart grid, is a holistic solution that applies an extensive range of Information Technology resources that enable existing and new gridlines to reduce electricity waste and cost. A future smart grid improves the efficiency, reliability, and economics of electricity.



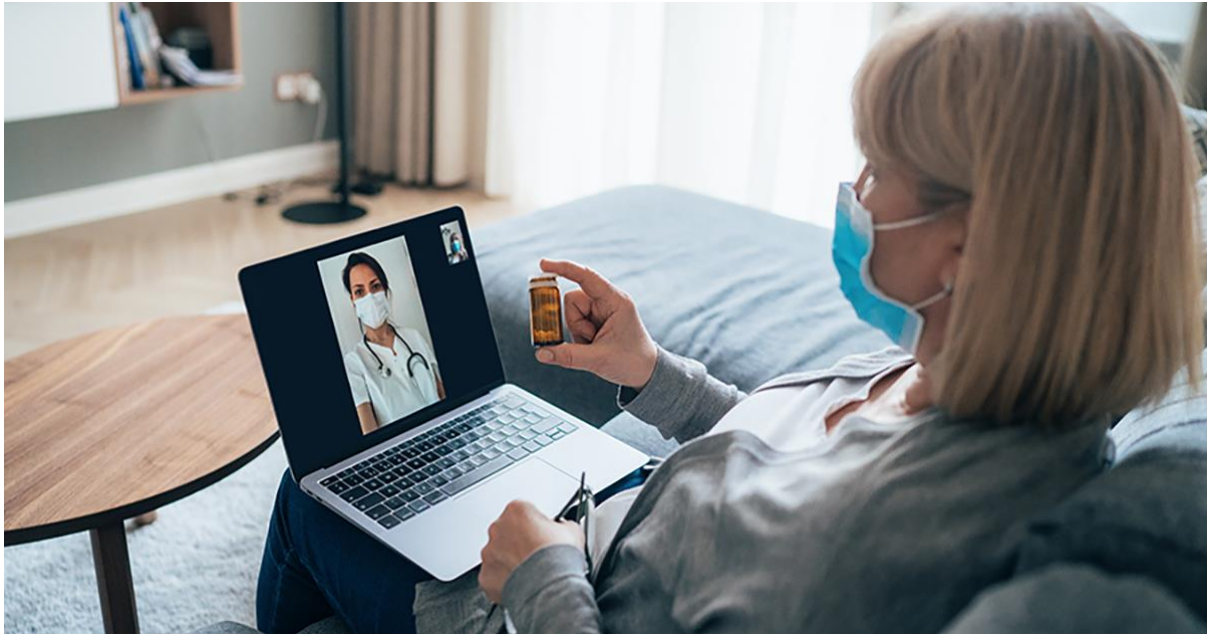
viii) Industrial Internet:

The Industrial Internet of Things consists of interconnected sensors, instruments, and other devices connected with computers' industrial applications like manufacturing, energy management, etc. While still being unpopular in comparison to IoT wearables and other uses, market researches like Gartner, Cisco, etc., believe the industrial internet to have the highest overall potential.



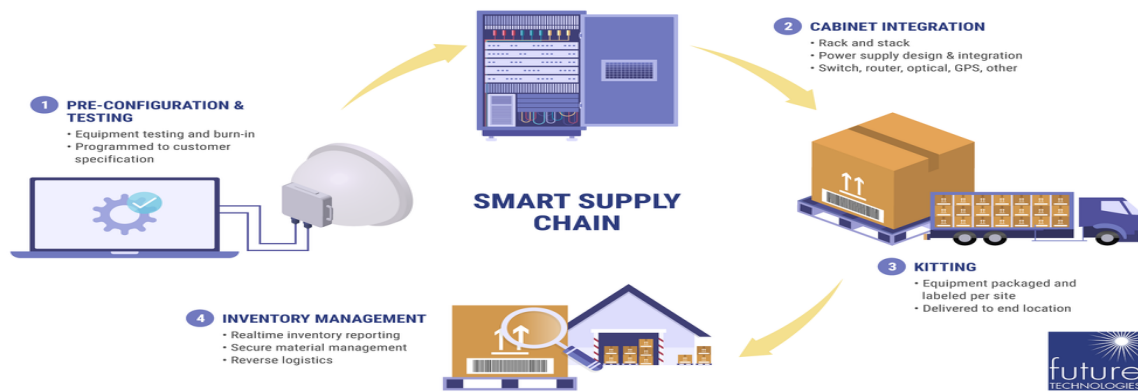
ix) Telehealth:

Telehealth, or Telemedicine, hasn't completely flourished yet. Nonetheless, it has great future potential. IoT Examples of Telemedicine include the digital communication of Medical Imaging, Remote Medical Diagnosis & Evaluations, Video Consultations with Specialists, etc.



x) Smart Supply-chain Management:

Supply-chains have stuck around in the market for a while now. A common example can be Solutions for tracking goods while they are on the road. Backed with IoT technology, they are sure to stay in the market for the long run.

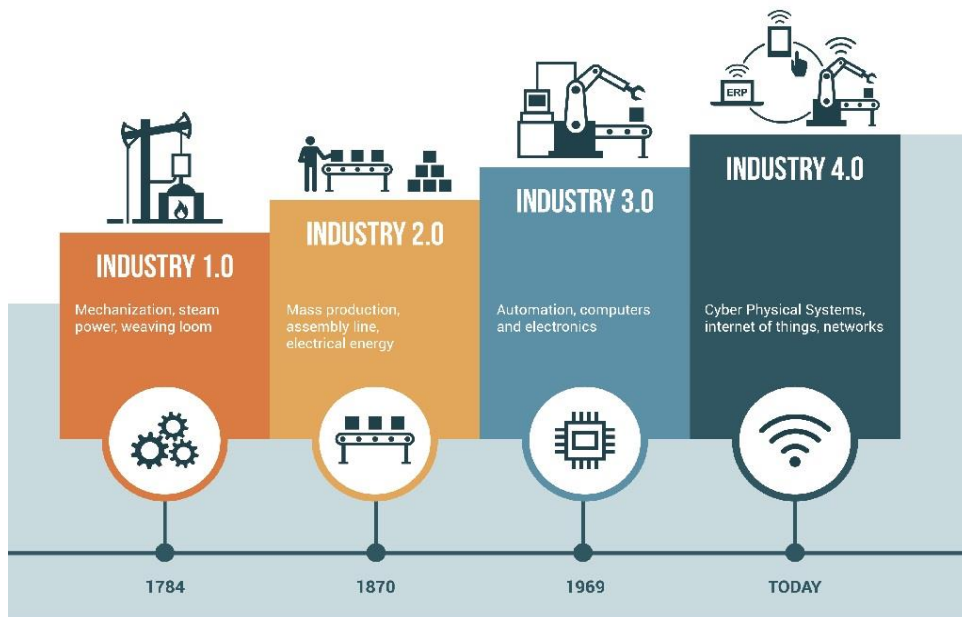


4.What is the industrial internet of things (IIoT)?

Industrial IoT (IIoT) refers to the application of IoT technology in industrial settings, especially with respect to instrumentation and control of sensors and devices that engage cloud technologies. Refer to this Titan use case PDF for a good example of IIoT . Recently, industries have used machine-to-machine communication (M2M) to achieve wireless automation and control. But with the emergence of cloud and allied technologies (such as analytics and machine learning), industries can achieve a new automation layer and with it create new revenue and business models. IIoT is sometimes called the fourth wave of the industrial revolution, or Industry 4.0.

The following are some common uses for IIoT:

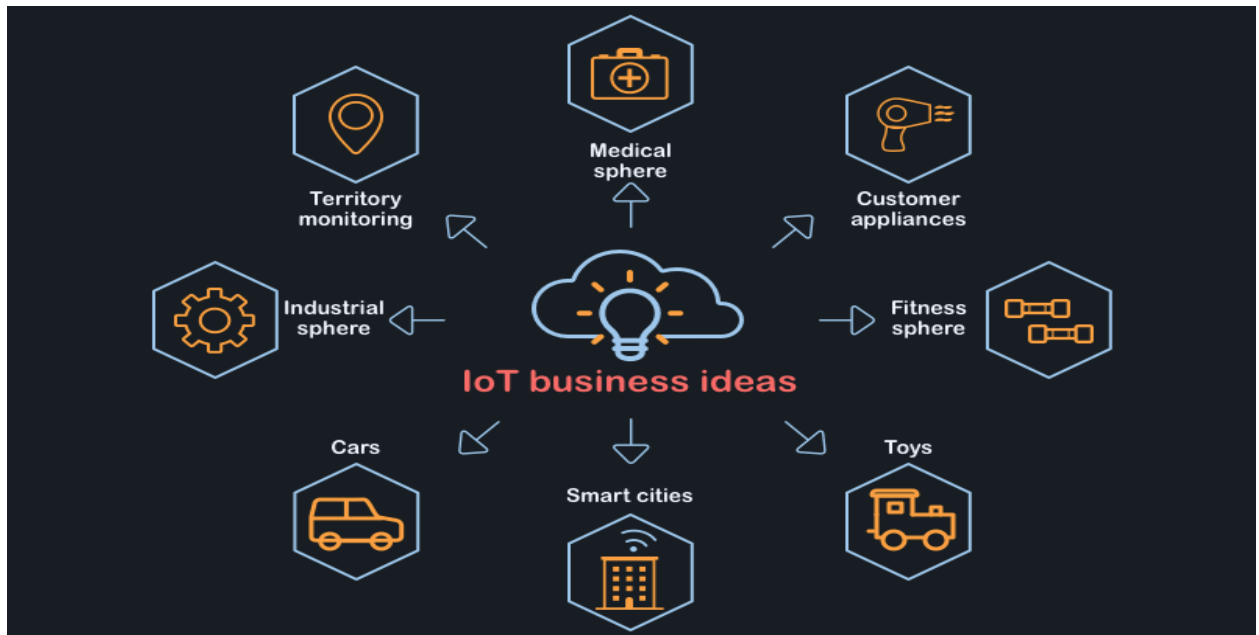
- *Smart manufacturing.
- *Connected assets and preventive and predictive maintenance.
- *Smart power grids.
- *Smart cities.
- *Connected logistics.
- *Smart digital supply chains.



5. Business opportunities with iot:

Here, we've collected the major trends of the niche to help you to develop your IoT business ideas:

- *Patient monitoring.
- *Transparency within healthcare organizations.
- *Remote operations.
- *IoT healthcare soft protection.
- *Smart sensors in manufacturing.
- *3D printing for better quality.
- *Flexible production chains.



6. Arduino:

6.a. Definition:

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.

6.b. Different Types Of Arduino Boards:

The list of Arduino boards includes the following such as,

- *Arduino Uno (R3).
- *Lily Pad Arduino Board.
- *Red Board Arduino Board.
- *Arduino Leonardo Board.
- *Arduino Mega.
- *Arduino Nano.
- *Arduino Mini.

