



Module 4- IoT

Module Overview

This module aims to explain IoT and the use of IoT application in our day to day activities.



Module Objective

At the end of the module, you will be able,

- Understand importance of IoT
- Learn Different IoT application



IoT

The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

An internet connection is a wonderful thing, it give us all sorts of benefits that just weren't possible before. If you're old enough, think of your cellphone before it was a smartphone. You could call and you could text sure, but now you can read any book, watch any movie, or listen to any song all in the palm of your hand. And that's just to name a few of the incredible things your smartphone can do.

Why IoT Matters

When something is connected to the internet, that means that it can send information or receive information, or both. This ability to send and/or receive information makes things smart, and smart is good.

Let's use smartphones (smartphones) again as an example. Right now you can listen to just about any song in the world, but it's not because your phone actually has every song in the world stored on it. It's because every song in the world is stored somewhere else, but your phone can send information (asking for that song) and then receive information (streaming that song on your phone).

To be smart, a thing doesn't need to have super storage or a super computer inside of it. All a thing has to do is connect to super storage or to a super computer. Being connected is awesome.

In the Internet of Things, all the things that are being connected to the internet can be put into three categories:

- Things that collect information and then send it.
- Things that receive information and then act on it.
- Things that do both.

And all three of these have enormous benefits that feed on each other.

1. Collecting and Sending Information

This means sensors. Sensors could be temperature sensors, motion sensors, moisture sensors, air quality sensors, light sensors, you name it. These sensors, along with a connection, allow us to automatically collect information from the environment which, in turn, allows us to make more intelligent decisions.



On the farm, automatically getting information about the soil moisture can tell farmers exactly when their crops need to be watered. Instead of watering too much (which can be an expensive over-use of irrigation systems and environmentally wasteful) or watering too little (which can be an expensive loss of crops), the farmer can ensure that crops get exactly the right amount of water. More money for farmers and more food for the world!

Just as our sight, hearing, smell, touch, and taste allow us, humans, to make sense of the world, sensors allow machines to make sense of the world.

2. Receiving and Acting on Information

We're all very familiar with machines getting information and then acting. Your printer receives a document and it prints it. Your car receives a signal from your car keys and the doors open. The examples are endless.

Whether it's a simple as sending the command "turn on" or as complex as sending a 3D model to a 3D printer, we know that we can tell machines what to do from far away. So what?

The real power of the Internet of Things arises when things can do both of the above. Things that collect information and send it, but also receive information and act on it.

3. Doing Both

Let's quickly go back to the farming example. The sensors can collect information about the soil moisture to tell the farmer how much to water the crops, but you don't actually need the farmer. Instead, the irrigation system can automatically turn on as needed, based on how much moisture is in the soil.

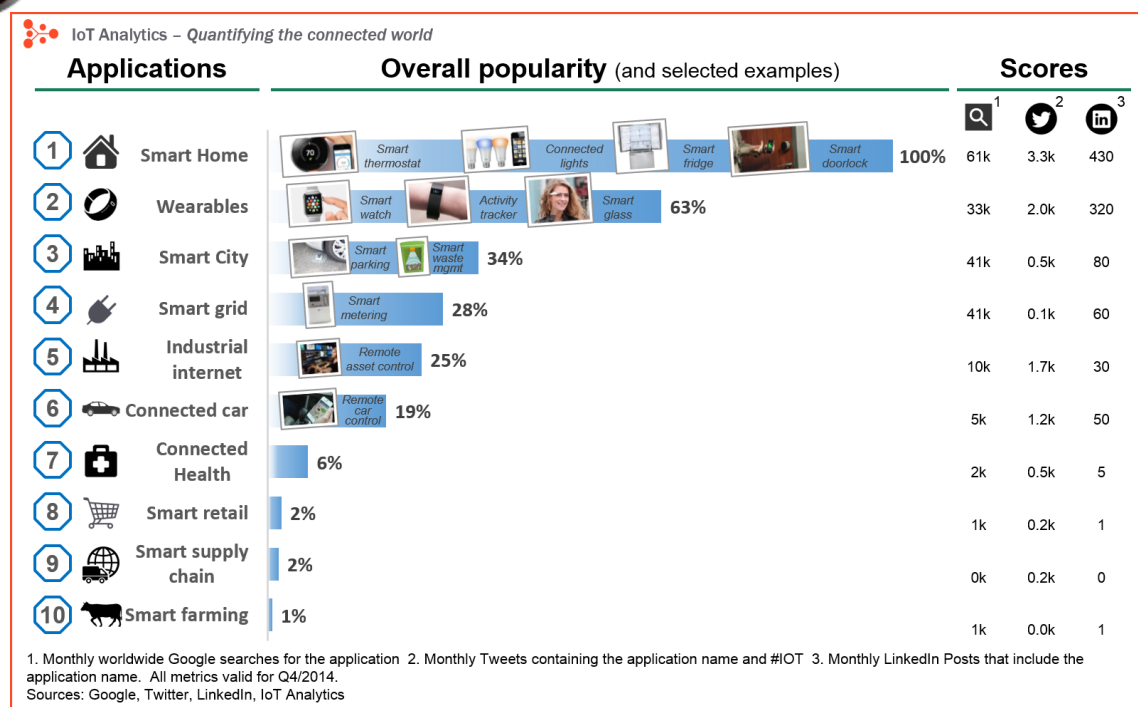
You can take it a step further too. If the irrigation system receives information about the weather from its internet connection, it can also know when it's going to rain and decide not to water the crops today because they'll be watered by the rain anyways.

And it doesn't stop there! All this information about the soil moisture, how much the irrigation system is watering the crops, and how well the crops actually grow can be collected and sent to supercomputers that run amazing algorithms that can make sense of all this information.

And that's just one kind of sensor. Add in other sensors like light, air quality, and temperature, and these algorithms can learn much more. With dozens, hundreds, thousands of farms all collecting this information, these algorithms can create incredible insights into how to make crops grow the best, helping to feed the world's growing population.



Applications of IoT



1. Smart home

Smart Home clearly stands out, ranking as highest Internet of Things application on all measured channels. More than 60,000 people currently search for the term “Smart Home” each month. This is not a surprise. The IoT Analytics company database for Smart Home includes 256 companies and startups. More companies are active in smart home than any other application in the field of IoT. The total amount of funding for Smart Home startups currently exceeds \$2.5bn. This list includes prominent startup names such as Nest or AlertMe as well as a number of multinational corporations like Philips, Haier, or Belkin.

2. Wearables

Wearables remains a hot topic too. As consumers await the release of Apple’s new smart watch in April 2015, there are plenty of other wearable innovations to be excited about: like the Sony Smart B Trainer, the Myo gesture control, or LookSee bracelet. Of all the IoT startups, wearables maker Jawbone is probably the one with the biggest funding to date. It stands at more than half a billion dollars!

3. Smart City

Smart city spans a wide variety of use cases, from traffic management to water distribution, to waste management, urban security and environmental monitoring. Its popularity is fueled by the fact that many Smart City solutions promise to alleviate real pains of people living in cities these days. IoT solutions in the area of Smart City solve traffic congestion problems, reduce noise and pollution and help make cities safer.

4. Smart grids

Smart grids is a special one. A future smart grid promises to use information about the behaviors of electricity suppliers and consumers in an automated fashion to improve the efficiency, reliability, and economics of electricity. 41,000 monthly Google searches highlights the concept’s popularity. However, the lack of tweets (Just 100 per month) shows that people don’t have much to say about it.

5. Industrial internet

The industrial internet is also one of the special Internet of Things applications. While many market researches such as Gartner or Cisco see the industrial internet as the IoT concept with the highest overall potential, its popularity currently doesn’t reach the masses like smart home or wearables do. The industrial internet however has a lot going for it. The industrial internet gets the biggest push of people on Twitter (~1,700 tweets per month) compared to other non-consumer-oriented IoT concepts.

6. Connected car

The connected car is coming up slowly. Owing to the fact that the development cycles in the automotive industry typically take 2-4 years, we haven’t seen much buzz around the connected car

yet. But it seems we are getting there. Most large auto makers as well as some brave startups are working on connected car solutions. And if the BMWs and Fords of this world don't present the next generation internet connected car soon, other well-known giants will: Google, Microsoft, and Apple have all announced connected car platforms.

7. Connected Health (Digital health/Telehealth/Telemedicine)

Connected health remains the sleeping giant of the Internet of Things applications. The concept of a connected health care system and smart medical devices bears enormous potential (see our analysis of market segments), not just for companies also for the well-being of people in general. Yet, Connected Health has not reached the masses yet. Prominent use cases and large-scale startup successes are still to be seen. Might 2015 bring the breakthrough?

8. Smart retail

Proximity-based advertising as a subset of smart retail is starting to take off. But the popularity ranking shows that it is still a niche segment. One LinkedIn post per month is nothing compared to 430 for smart home.

9. Smart supply chain

Supply chains have been getting smarter for some years already. Solutions for tracking goods while they are on the road, or getting suppliers to exchange inventory information have been on the market for years. So while it is perfectly logic that the topic will get a new push with the Internet of Things, it seems that so far its popularity remains limited.

10. Smart farming

Smart farming is an often overlooked business-case for the internet of Things because it does not really fit into the well-known categories such as health, mobility, or industrial. However, due to the remoteness of farming operations and the large number of livestock that could be monitored the Internet of Things could revolutionize the way farmers work. But this idea has not yet reached large-scale attention. Nevertheless, one of the Internet of Things applications that should not be underestimated. Smart farming will become the important application field in the predominantly agricultural-product exporting countries.



Trainer will take the participants to the computer lab and ask the participants to do internet research on IoT Application.