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Internet of Things

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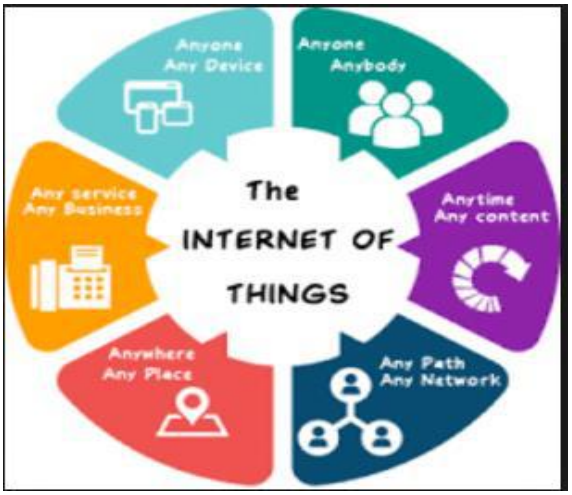
I. ABSTRACT :

The Internet of Things is emerging as a third wave in the development of Internet. The emerging IoT will have massive impact on all the business, industries , manufacturing , consumer products . IoT is overall a very broad idea. The following paper focuses on specifically to its adoption to our Homes.
Examines current leading companies in the market and technologies driving the same. Importantly based on analysis of current
consumer sentiment about the new smart devices, carves out the potential opportunities to bring down the barriers the Internet of Things is facing on its way to mainstream adoption and who has
potential to win in this segment



II. KEYWORDS:

- CONNECTED DEVICES
- MACHINE TO MACHINE COMMUNICATION
- NETWORK DEVICES
- SMART CITIES
- SMART DEVICES
- WEARABLES

III. INTRODUCTION :

The term Internet of things (often abbreviated IoT) was coined by industry researchers but has emerged into mainstream public view only more recently. Some claim the Internet of Things will completely transform how computer networks are used for the next 10 or 100 years, while others believe IoT is simply hype that won't much impact the daily lives of most people.

WHAT IS IOT

Internet of Things represents a general concept for the ability of network devices to sense and collect data from the world around us, and then share that data across the Internet where it can be processed and utilized for various interesting purposes.

Some also use the term industrial Internet interchangeably with IoT. This refers primarily to commercial applications of IoT technology in the world of manufacturing. The Internet of Things is not limited to industrial applications, however.

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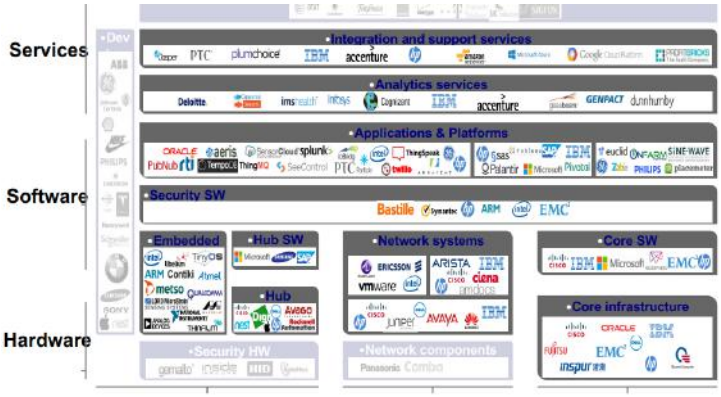
LETS HAVE A VIRTUAL GLANCE ON IOT

MORE THAN 800 COMPANIES PLAYING ACROSS SEGMENTS OF IOT :



WHAT THE INTERNET OF THINGS CAN DO FOR US

Some future consumer applications envisioned for IoT sound like science fiction, but some of the more practical and realistic sounding possibilities for the technology include:

- receiving warnings on your phone or wearable device when IoT networks detect some physical danger is detected nearby
- self-parking automobiles
- automatic ordering of groceries and other home supplies
- automatic tracking of exercise habits and other day-to-day personal activity including goal tracking and regular progress reports

Potential benefits of IoT in the business world include:

- location tracking for individual pieces of manufacturing inventory

- fuel savings from intelligent environmental modeling of gas-powered engines
- new and improved safety controls for people working in hazardous environments

IOT FUNDAMENTAL CHARECTERISTICS :

- **Inter connectivity :** can be dynamically discovered in the network
- **Heterogeneity :** Devices are heteregeneous, based on different hardware and networks • They have to interact with other devices through different networks
- **Dynamic changes & Self adaptivity :** Take actions based on operating conditions. The state of the device change dynamically :

  → Sleeping/waking up

  → Connected/disconnected

- **Enormous scale :**
  IoT devices are much bigger than the number of devices on Internet
  • A big data
  • A semantics of data
  • A data handling

IOT ENABLERS

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IOT is a wide and complex technical area which is on the verge of up-liftment. Different technologies evolved around the globe and these technologies by clubbing together are helping for the rise of IOT mechanism .

New technological advancements and overwhelming innovative products in each individual category are making the IOT feasible and helping it to evolve from the basic conceptual level to the practical implementation level .

For example sensors; they measure signals going from temperature, pressure, speed, GPS and heartbeat, to respiration, ect. Also connectivity, netwerks, security, applications, big data and cloud are essential iot enablers.

BACK BONE

We are on the verge of scenario where the system of IPv4 is going to get replaced by the newly developed Ipv6 mechanism .

Ipv4 supports 32 bit addresses, which translates to about 4.3 billion addresses . a number that has become largely exhausted by all the connected devices globally. In contrast, IPv6 can support 128bit addresses, translating to approximately 3.4 x 1038 addresses – an almost limitless number that can amply handle all conceivable IoT devices. 6LoWPAN is an acronym of IPv6 over Low power Wireless Personal Area Networks. The 6LoWPAN group has defined encapsulation and header compression mechanisms that allow IPv6 packets to be sent to and received from over IEEE 802.15.4 based networks.

CLOUD COMPUTING

Cloud is secret weapon in internet of things and IOT is the next big market for cloud. Cloud computing in nutshell is computing in which large groups of remote servers are networked to allow the centralized data storage, and online access to computer services or resources. They are classified as public, private or hybrid. Smart objects will be endowed with sensors that will feed data back to cloud platforms for analysis. With so much data flowing in from potentially
millions of different nodes, the diversity and precision of the knowledge we have about the world will explode. The cloud is the only technology suitable for filtering, analyzing, storing, and accessing that information in useful ways. Cloud computing will be driving Internet of things in every step of the way forward.

BIG DATA ANALYTICS

Big data analytics is the process of examining large amounts of different data types, or big data,
in an effort to uncover hidden patterns, unknown correlations and other useful information. As the IoT will by definition generate voluminous amounts of data, the availability of big data analytics is a key enabler

MARKET TRENDS :

FIRST OF ALL WHAT IS A MARKET TREND ???

A **market trend** is a perceived tendency of financial**markets** to move in a particular direction over time. These **trends** are classified as secular for long time frames, primary for medium time frames, and secondary for short time frames.

Market trends of IOT :

The Internet of Things is a phenomenon where tiny machines have the ability to sense, respond,compute, and connect to the Internet, providing unprecedented access to control things and the environment around us. While it is still in its infancy, the time is ripe now with all the key ingredients in place – low price points for the devices, explosion of smartphones, tablets, PCs which are essential for providing the ability to manage and control the devices,

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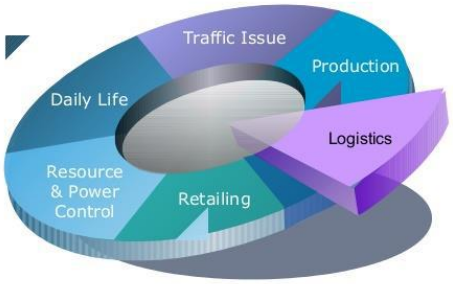
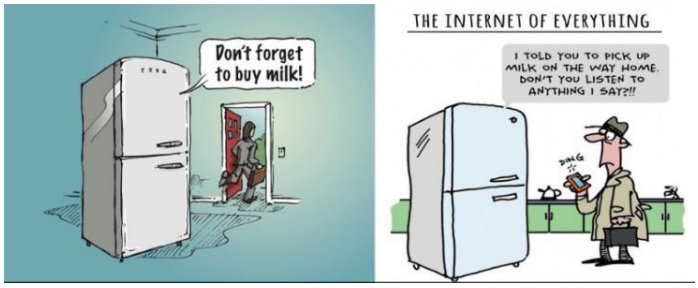
broadband access to the Internet in homes, consumer demand, and manufacturers providing the
capabilities to differentiate their products for an explosive growth over the next decade.

Future of IOT



Home automation with the proliferation of IoT is becoming a reality now, and a variety of players like, Apple, Amazon, Google, Samsung, are all converging into this space to provide the
platform and solutions for smart homes. Homes account for more than 30% of electricity usage, have natural overlap with consumeroriented devices (e.g., smartphones), and ample room to digitize. While the concept of "smart homes" has existed since the 1960s, the house remains one of the few elements in our lives still governed by physical / analog solutions. Digitization within the home is going to increase, specifically in home energy efficiency, home comfort, and security as initial key areas of focus.

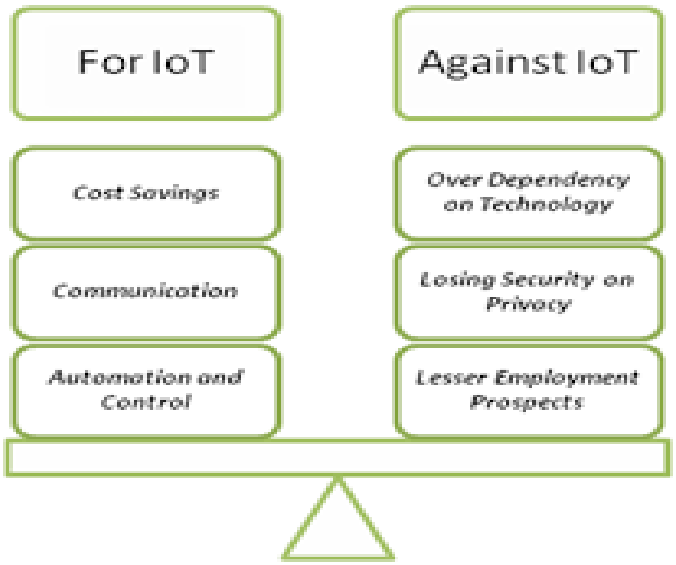


Connectedhome device shipments will grow 67% over the next five years, much faster than smartphone or tablet device growth, and hit 1.8 billion units shipped in 2019, according to BI Intelligence estimates. Connectedhome devices include all smartappliances (washers, dryers, refrigerators, etc.), safety and security systems (internetconnected sensors, monitors, cameras, and alarm systems), and energy efficient equipment like smart thermostats and smart lighting, healthcare for remote monitoring, diagnostics and services.

Some of these areas like healthcare are in the stages of infancy, whereas, security and energy efficient equipment are in the early growth phase.

THE ADVANTAGES AND DISADVANTAGES OF INTERNET OF THINGS

IOT is tagging our day to day objects with machine readable identification tags .Sensors may be a couple with these tags to collect more information about the condition the everyday objects and present around them .



The time is not that far when you are out of home and your computers at home contact you to let you know that your medicines have expired or that the milk is over or you need more pepper. This isn't just a fantasy but soon to be a reality due to the amazing possibilities of the Internet of Things (IoT).

Before we understand the impact IoT can have on our way of living, it's important to go through its advantages and disadvantages:

ADVANTAGES

Here are some advantages of IoT:

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1. **Data**: The more the information, the easier it is to make the right decision. Knowing what to get from the grocery while you are out, without having to check on your own, not only saves time but is convenient as well.

2. **Tracking**: The computers keep a track both on the quality and the viability of things at home. Knowing the expiration date of products before one consumes them improves safety and quality of life. Also, you will never run out of anything when you need it at the last moment.

3. **Time**: The amount of time saved in monitoring and the number of trips done otherwise would be tremendous.

4. **Money**: The financial aspect is the best advantage. This technology could replace humans who are in charge of monitoring and maintaining supplies.

DISADVANTAGES

Here are some disadvantages of IoT:

1. **Compatibility**: As of now, there is no standard for tagging and monitoring with sensors. A uniform concept like the USB or Bluetooth is required which should not be that difficult to do.

2. **Complexity**: There are several opportunities for failure with complex systems. For example, both you and your spouse may receive messages that the milk is over and both of you may end up buying the same. That leaves you with double the quantity required. Or there is a software bug causing the printer to order ink multiple times when it requires a single cartridge.

3. **Privacy/Security**: Privacy is a big issue with IoT. All the data must be encrypted so that data about your financial status or how much milk you consume isn't common knowledge at the work place or with your friends.

4. **Safety**: There is a chance that the software can be hacked and your personal information misused. The possibilities are endless. Your prescription being changed or your account details being hacked could put you at risk. Hence, all the safety risks become the consumer's responsibility.

CONCLUSION

In conclusion, the Internet of Things is closer to being implemented than the average person would think. Most of the necessary technological advances needed for it have already been made, and some manufacturers and agencies have already begun implementing a small-scale version of it. The main reasons why it has not truly been implemented is the impact it will have on the legal, ethical, security and social fields. Workers could potentially abuse it, hackers could potentially access it, corporations may not want to share their data, and individual people may not like the complete absence of privacy. For these reasons, the Internet of Things may very well be pushed back longer than it truly needs to be.

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