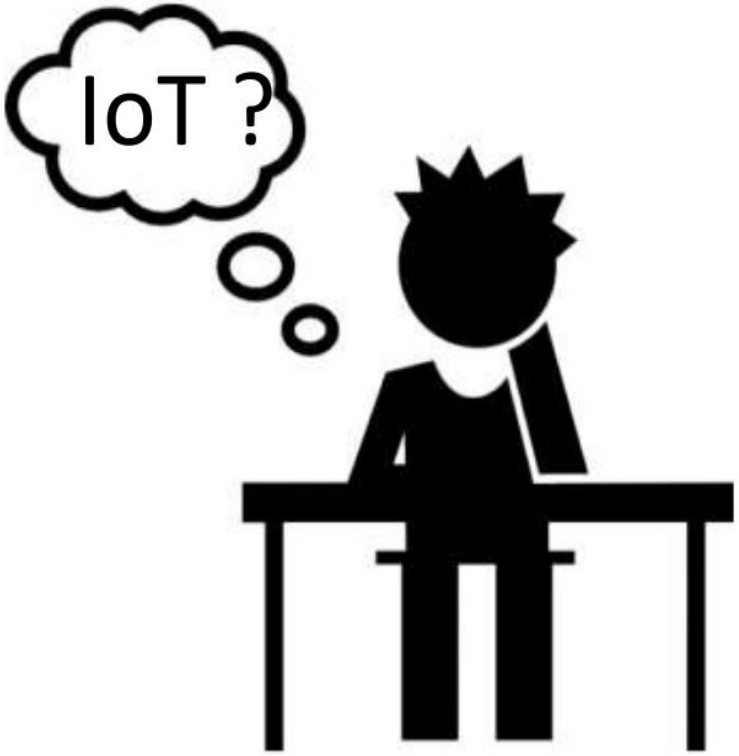
An Introduction to Internet of Things (IoT)

By:-
Shubhankar Mohan
Senior AI Engineer
(Impact Analytics)

WHAT IS INTERNET OF THINGS (IoT) ?



What is IoT

The Internet of Things is a platform where regular devices are connected to the Internet, so they can interact, collaborate and exchange data with each other

Why IoT ?

- Dynamic control of industry and daily life.
- Improves the resource utilization ratio.
- Integrating human society and physical systems.
- Flexible configuration.
- Acts as technology integrator.
- Universal inter-networking.

Really????

Why IoT?

- We are Lazy
- We want to automate everything
- We want to control everything remotely
- We want to see data in real-time

Components of IoT

Smart Systems and Internet of Things are driven by a combination of :

- Sensors
- Actuators
- Connectivity
- People & Processes

What is the scope of IoT ?

- Internet of Things can connect devices embedded in various systems to the internet.
- When devices/objects can represent themselves digitally, they can be controlled from anywhere.
- The connectivity then helps us capture more data from more places, ensuring more ways of increasing efficiency.

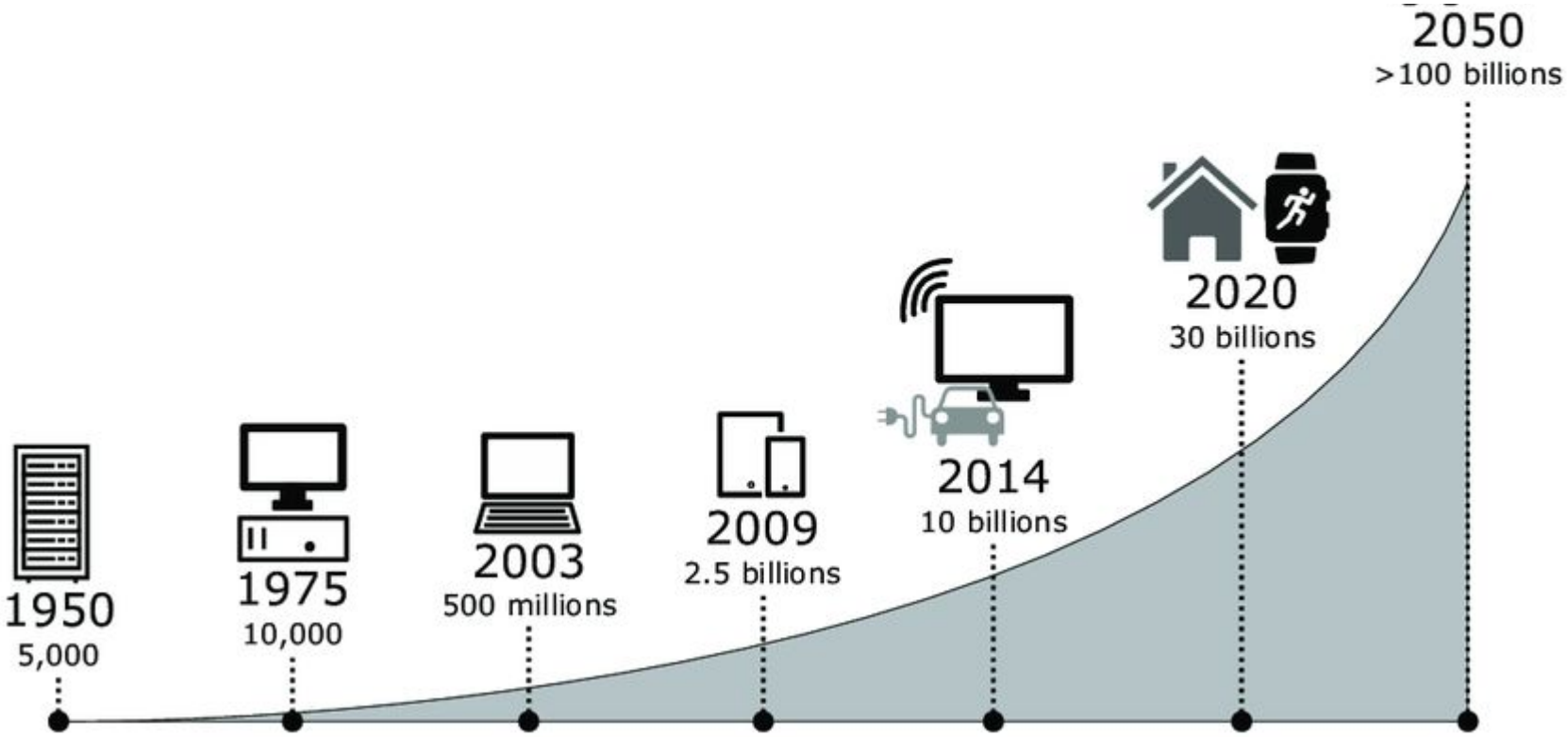
NEED FOR IoT

For all devices to

- Interact
- Collaborate
- Share experiences

Reducing human intervention into a machine cycle

Growth of IoT



The sky's not the limit. It's only the beginning with IoT!

Application of IoT - Healthcare

- Provides Real Time Data
- Makes Devices Smarter
- Provides Superior Analytics

Application of IoT - Smart Cities

- Innovative Solution to Traffic Congestion
- Energy-efficient Buildings
- Improved Public Safety

Application of IoT - Agriculture

- Precision Farming
- Smart Irrigation
- Smart Greenhouse

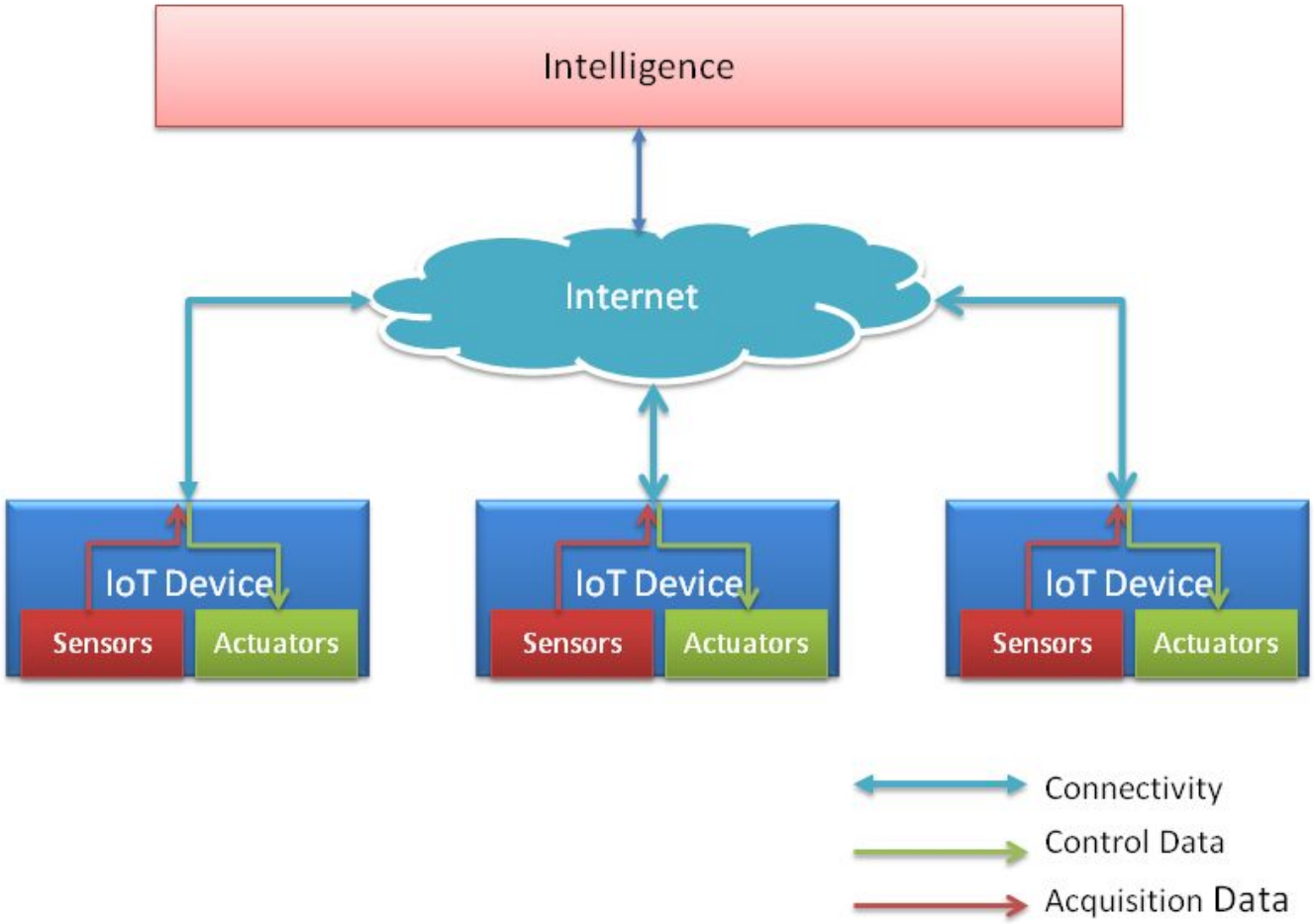
Application of IoT - Others

- Industrial Automation
- Disaster Management
- Smart Homes
- Vehicles

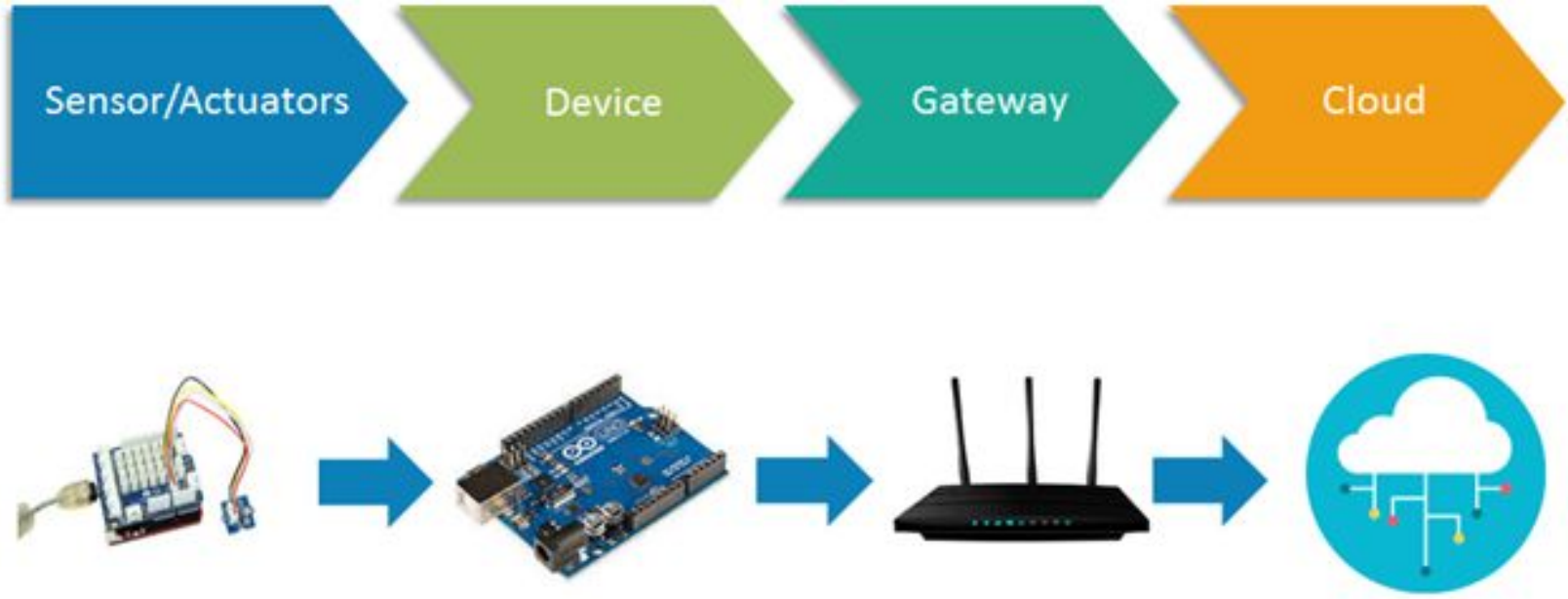
Let's watch a Video

(Show IoT part)

Architecture of IoT



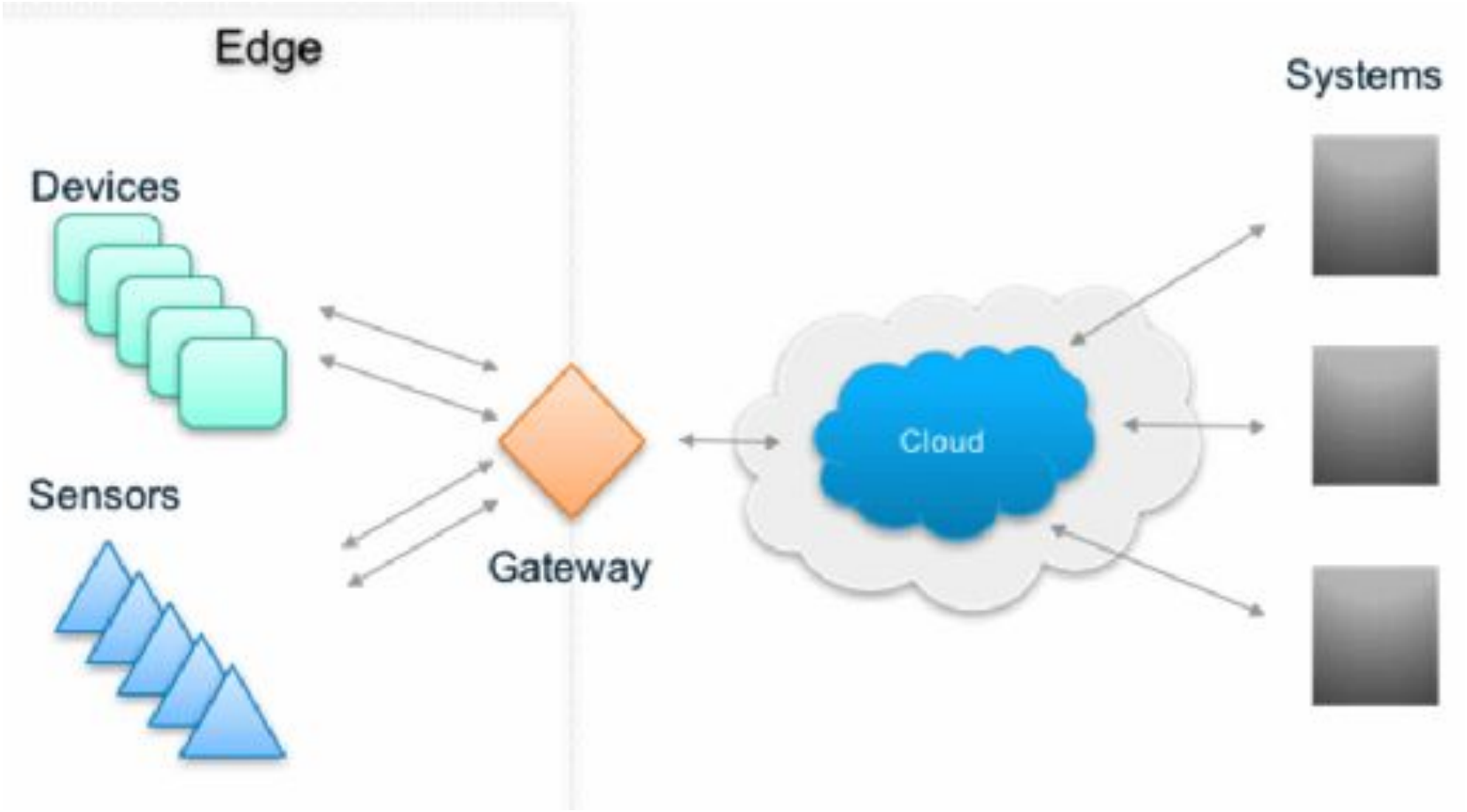
Flow



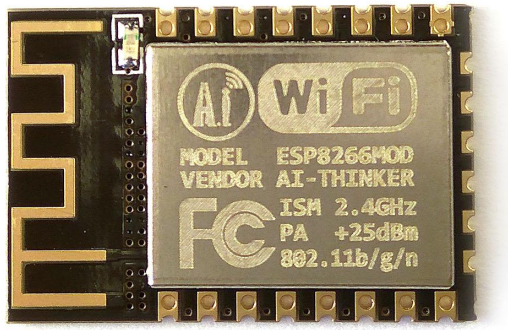
Lets Gets out hand dirty...

- (A small demonstration using Arduino, LED, Comm Programming, Python API)

Gateway



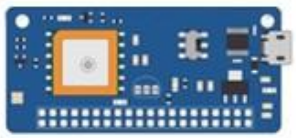
Zigbee/ESP8266/Raspberry Pi



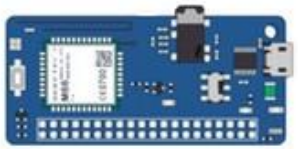
3G Shield

4G/LTE Shield

GPS Shield

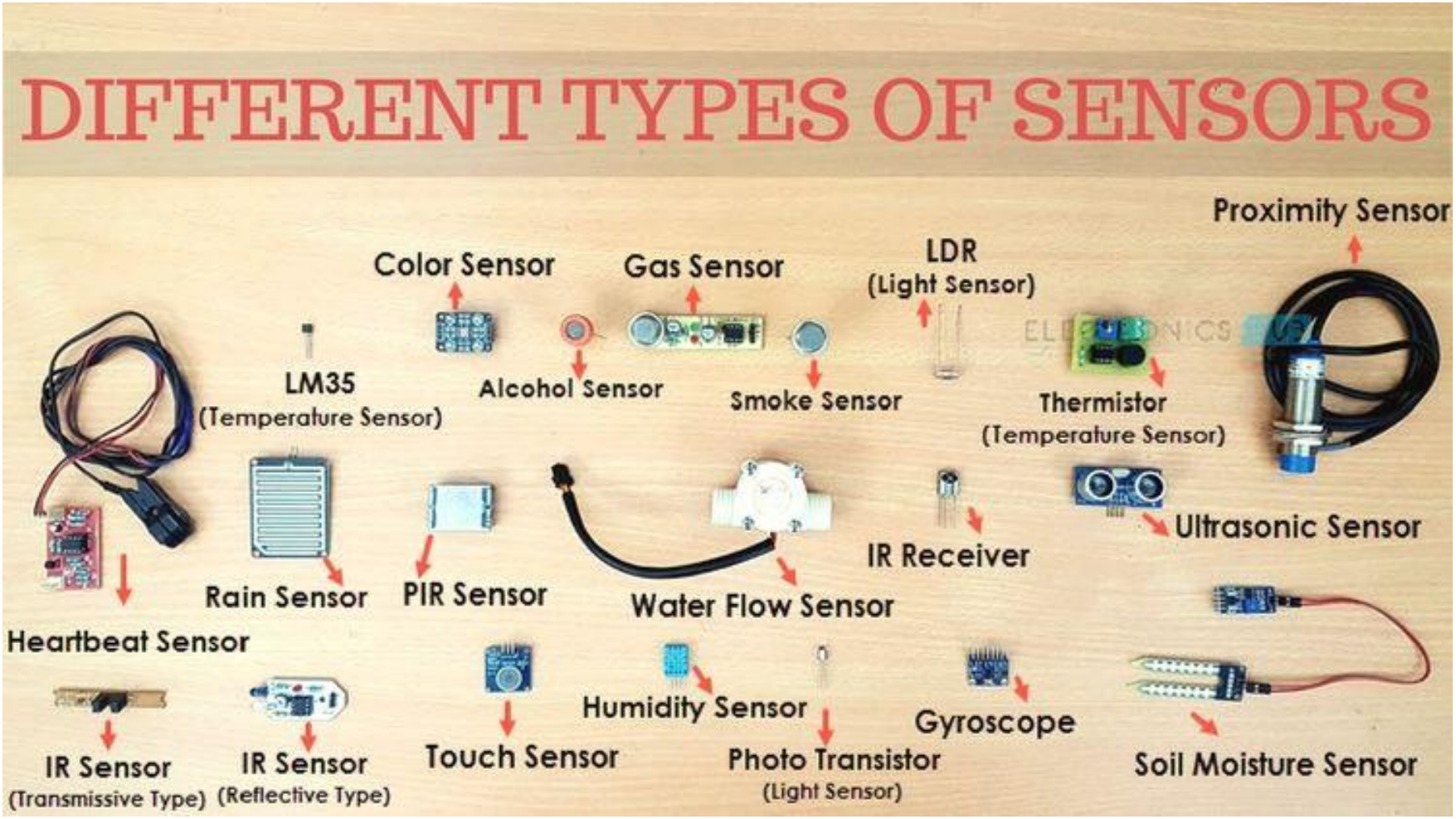


GPRS Shield

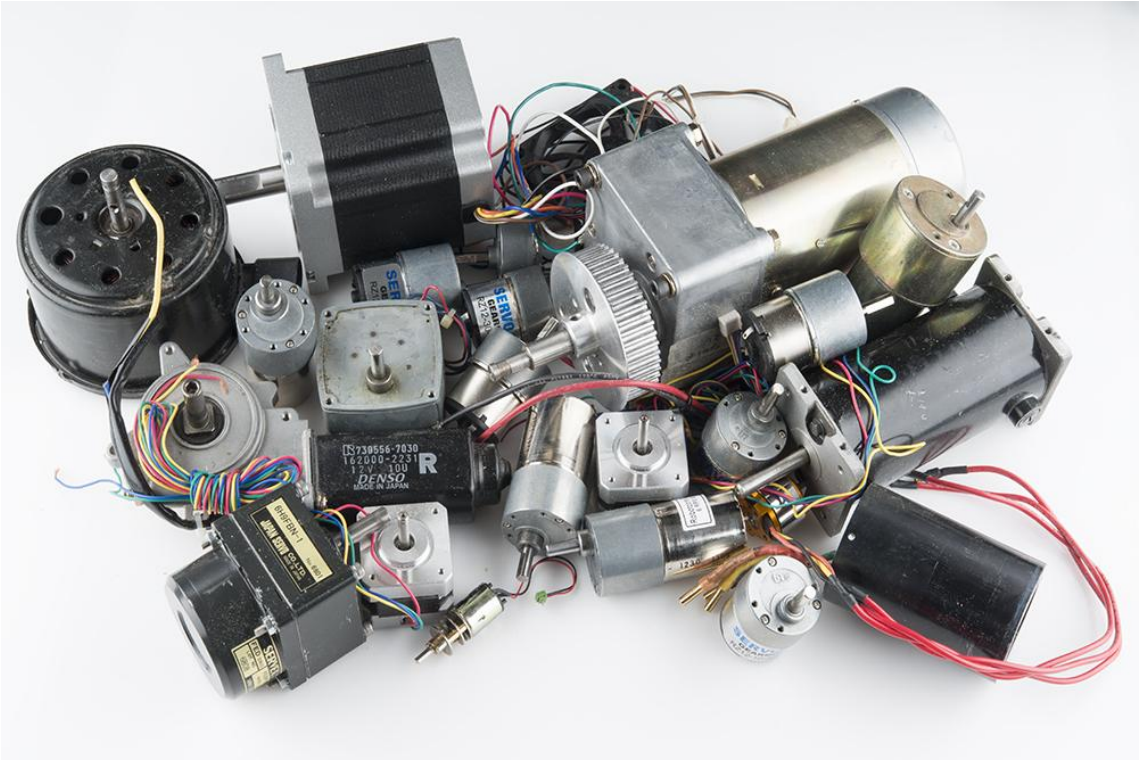


XBee Shield

Types of Sensors

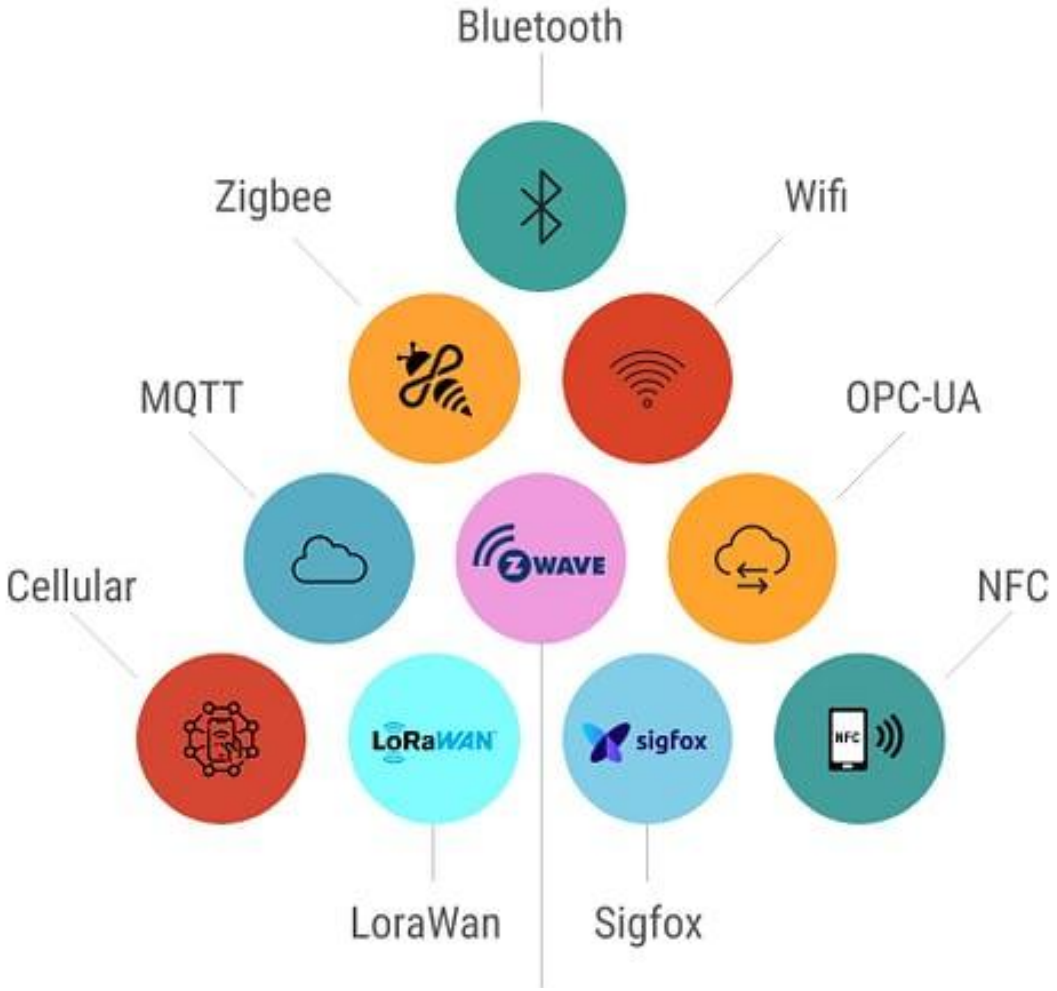


Actuators



IoT Communication Protocols

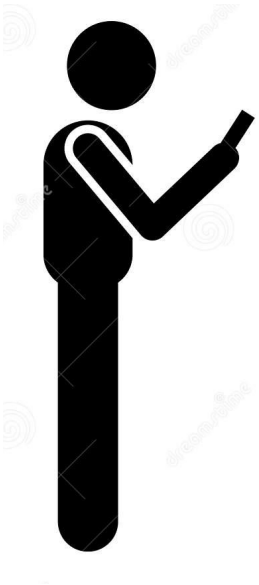
https://hashs



People & Process

- Who is going to make a decision?

Person



Process (ML algorithms)

Image and Audio as Data

- Access Control using voice or face
- Voice Commands to control devices
- Light dance while singing
- Forest Protection

BLE

- Bluetooth Low Energy (BLE) is a low power wireless communication technology that can be used over a short distance to enable smart devices to communicate.
- Smart watch, fitness tracker, wireless headphones and computer.
- Indoor Navigation

FUTURE SCOPE

ENERGY

Energy efficient algorithms need to be designed for systems to be active longer

SECURITY

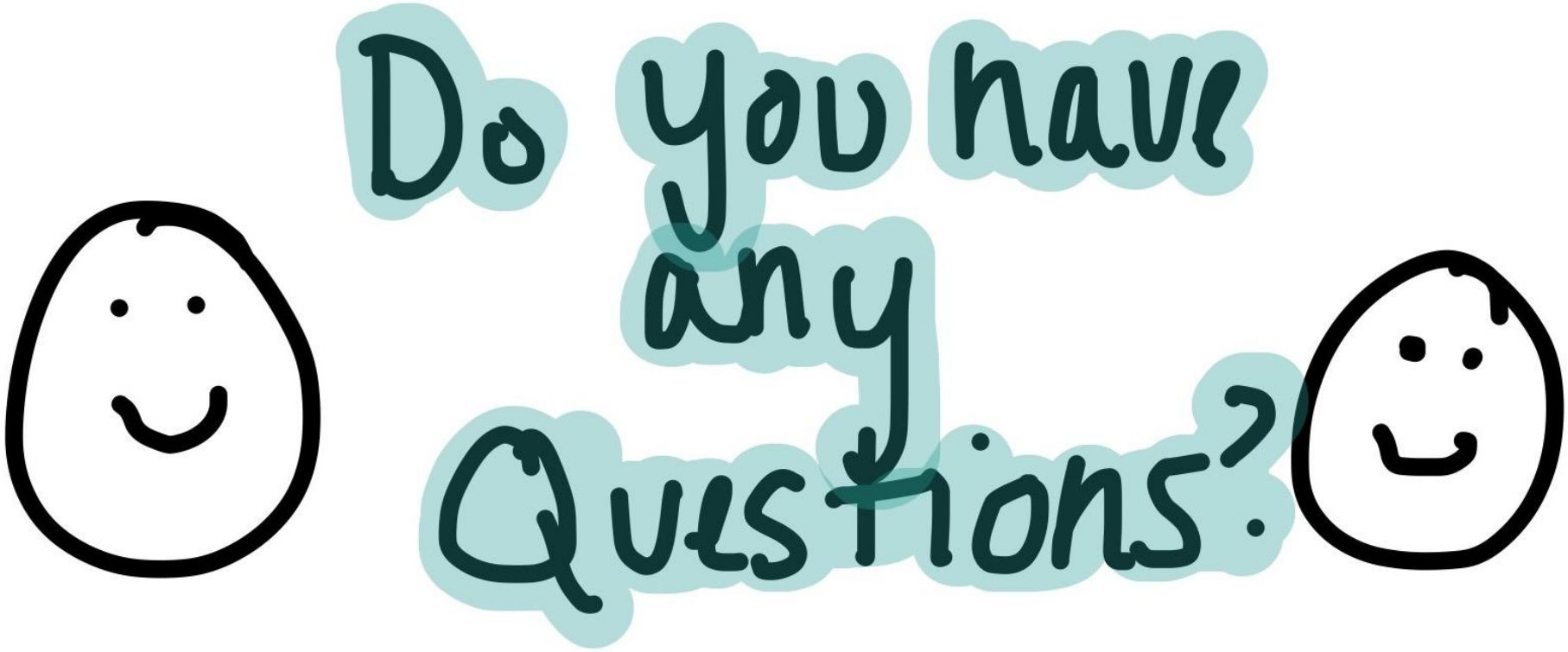
We need information seclusion methods to secure data and privacy

REAL TIME

We need to reduce the gap between machine real-time and actual real-time

From where the IPs come?

IPv4	IPv6
Deployed 1981	Deployed 1998
32-bit IP address	128-bit IP address
4.3 billion addresses Addresses must be reused and masked	**7.9×10^{28} addresses** Every device can have a unique address
Numeric dot-decimal notation **192.168.5.18**	Alphanumeric hexadecimal notation **50b2:6400:0000:0000:6c3a:b17d:0000:10a9** (Simplified - 50b2:6400::6c3a:b17d:0:10a9)
DHCP or manual configuration	Supports autoconfiguration


Do you have any Questions?

01010100 01101000 01100001 01101110
01101011 00100000 01011001 01101111
01110101 00100001 00100001 00100001