SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NAAC – UGC with 'A' Grade

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE NAME :19EE603 IoT for Electrical Engineers

III YEAR /VI SEMESTER

Unit 2-Sensors

Introduction

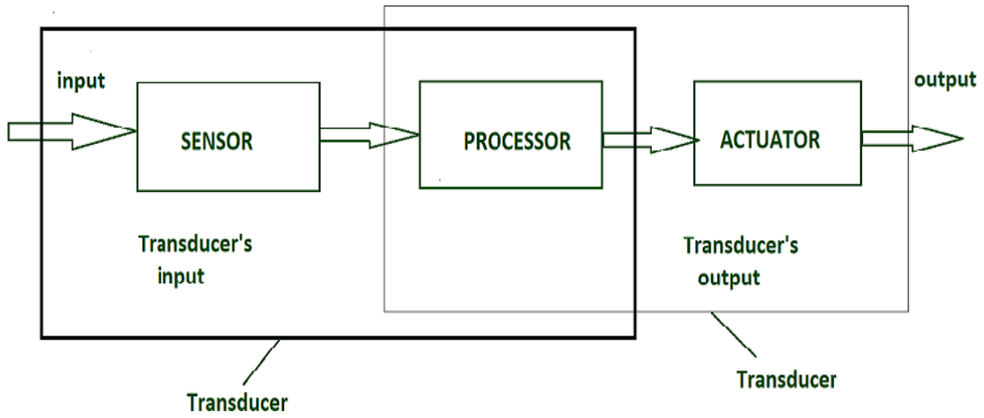
Applications of sensors in IoT

- Smart Home Automation
- Industrial IoT (IIoT)
- Smart Agriculture
- Environmental Monitoring
- Healthcare and Wearable Devices
- Smart Cities
- Energy Management
- Asset Tracking
- Smart Transportation

What is Sensors in IoT??

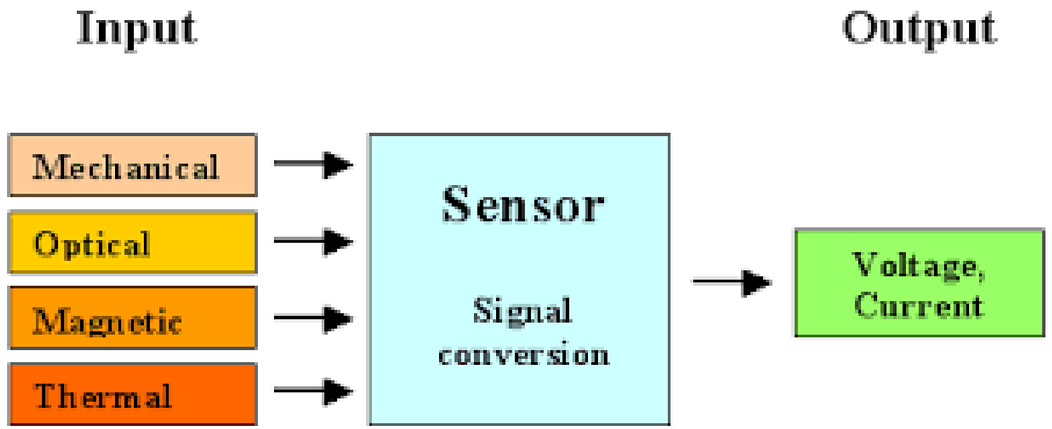
SENSORS IN INTERNET OF THINGS(IOT)

- Sensors are used for sensing things and devices etc.
- A device that provides a usable output in response to a specified measurement. The sensor attains a physical parameter and converts it into a signal suitable for processing (e.g. electrical, mechanical, optical) the characteristics of any device or material to detect the presence of a particular physical quantity.



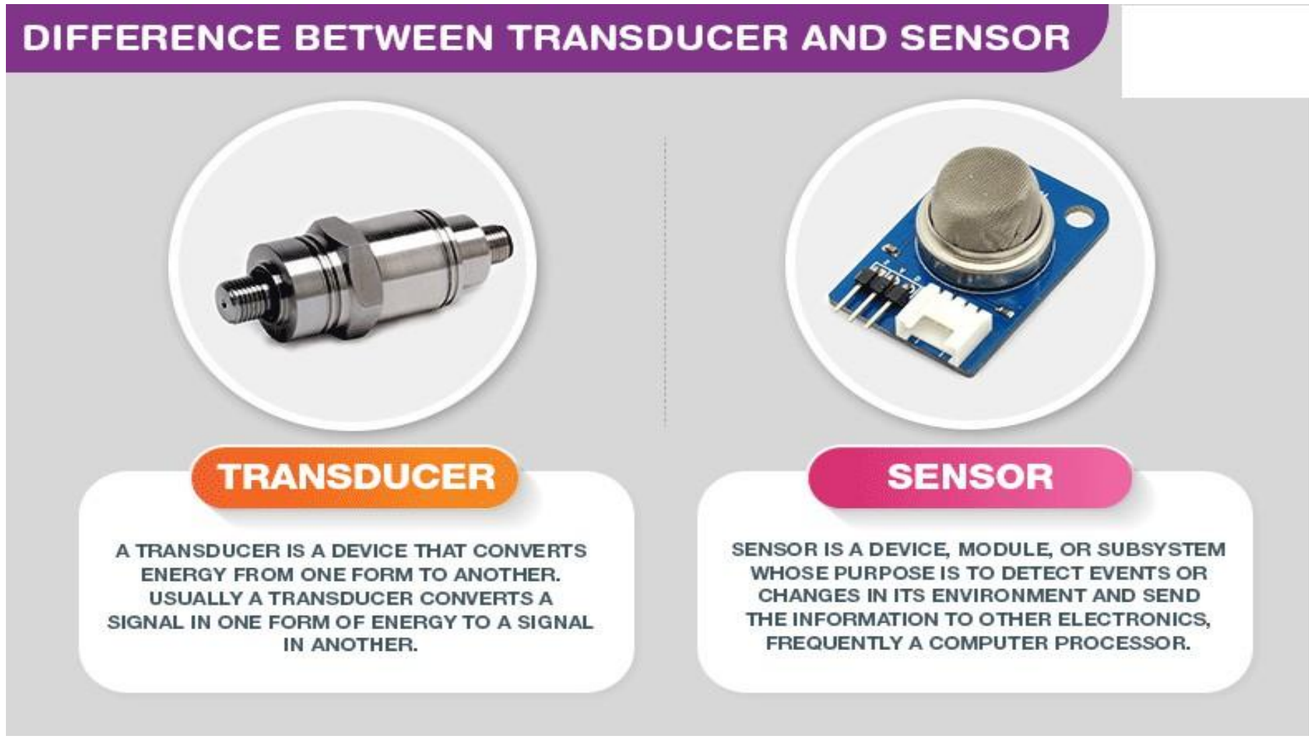
PRINCIPLE OF SENSOR

- Sensor produces a usable output in response to a specified quantity. it uses the sensing principle, that is it senses or detects a physical phenomenon.
- A transducer converts one form of energy to another form. The process of conversion of energy from one form to another is called transduction.



TRANSDUCER

- A transducer converts a signal from one physical structure to another.
- It converts one type of energy into another type.
- It might be used as actuator in various systems.



SENSORS CHARACTERISTICS

- Static
- Dynamic
- 1. Static characteristics :

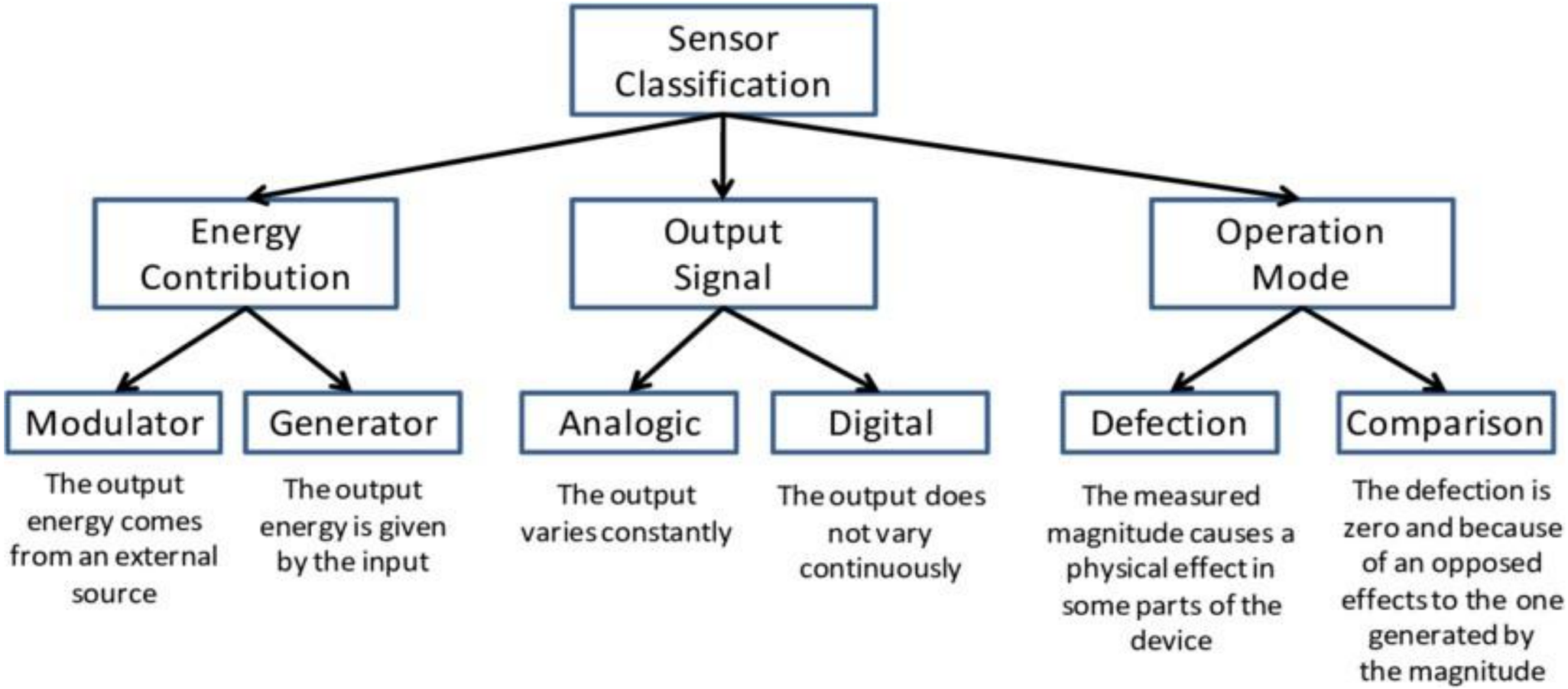
Characteristic	Description
Accuracy/Precision	The correctness of the measured absolute value or event
Drift	The degree to which the measured value shifts away from the correct value over time
Dynamic range	The allowed lower and upper limits of the instruments' input or output given the required level of accuracy
Reliability	The ability to consistently return correct measures
Resolution	The finest measurable change in input value
Repeatability	The ability to consistently return the same measure for the same input conditions
Update rate	The rate at which a new signal value is collected

DYNAMIC CHARACTERISTICS OF SENSORS

Dynamic Characteristics

- The dynamic characteristics of sensors are due to its characteristics of being able to respond to a stimulus.
- This causes error because of the delay time and time constant.
- These are named dynamic error. It is the error over and above the static error.
- Speed of response – how fast can it respond to a stimulus.

CLASSIFICATION OF SENSORS



SENSORS AND THEIR PARAMETERS

SENSORS	PARAMETER
Electrocardiograph	Heart Rate
	ECG(Signals)
Pulse Oximeter	Oxygen Saturation in Blood
Blood Pressure Meter	Systemic arterial pressure
	Diastolic arterial pressure
	Average arterial pressure
Glucometer	Glucose
Scale	Weight
Passive InfraR (PIR)	Presence
InfraRed	Pass through
Door opening	Doors or windows opening / closing

SENSOR PARAMETERS

- Instantaneous field-of-view (IFOV),
- Overall field-of-view,
- S/N ratio,
- Linearity,
- Wavelength band,
- Swath width,
- Dwell time,
- Resolution

Assessment

Sensors used in Smart Phones???

References

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