

NIELIT, Gorakhpur

Course Name: A-level (1st Sem.)

Subject: IoT

Topic: Sensor and Transducer

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Sensor senses the physical changes occur in the surrounding whereas the transducer converts the physical quantity or nonelectrical into another signal or electrical signal.

The transducer and sensor both are the physical devices used in electrical and electronic instruments for measuring the physical quantities. The sensor detects the energy level of various quantities present in the atmosphere like temperature humidity etc. and changes it into an electrical signal which is easily measured by the digital meters. The transducer converts one form of energy into another form.

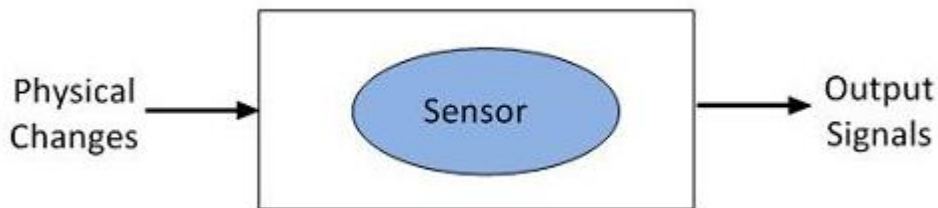
Difference between sensor and Transducer:

Parameter	Sensor	Transducer
Definition	Senses the physical changes occurs in the surrounding and converting it into a readable quantity.	The transducer is a device which, when actuates transforms the energy from one form to another.
Components	Sensor itself	Sensor and signal conditioning
Function	Detects the changes and induces the corresponding electrical signals.	Conversion of one form of energy into another.
Examples	Humidity sensor, Proximity sensor, Magnetic sensor, Accelerometer sensor, Light sensor etc.	Thermistor, Potentiometer, Thermocouple, Piezoelectric material etc.

Definition of Sensor

The sensor is a device that measures the physical quantity (i.e. Heat, light, sound, humidity etc.) into an easily readable signal (voltage, current etc.). It gives accurate readings after calibration.

Examples – The mercury used in the thermometer converts the measurand temperature into an expansion and contraction of the liquid which is easily measured with the help of a calibrated glass tube. The thermocouple also converts the temperature to an output voltage which is measured by the thermometer.

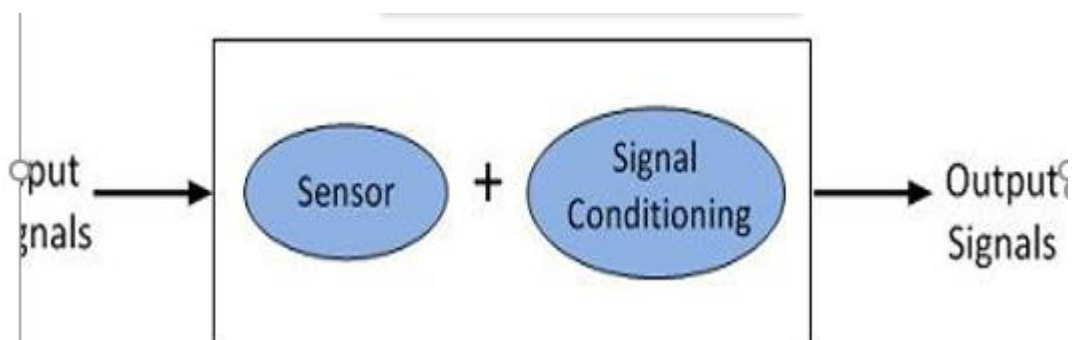


The sensors have many applications in the electronics equipment. The few of them are explained below.

1. The motion sensors are used in the home security system and the automation door system.
2. The photo sensor senses the infrared or ultraviolet light.
3. The accelerometer sensor use in the mobile for detecting the screen rotations.

Definition of Transducer

The transducer is a device that changes the physical attributes of the non-electrical signal into an electrical signal which is easily measurable. The process of energy conversion in the transducer is known as the transduction. The transduction is completed into two steps. First by sensing the signal and then strengthening it for further processing.



The transducer has three major components; they are the input device, signal conditioning or processing device and an output device.

The input devices receive the measurand quantity and transfer the proportional analogue signal to the conditioning device. The conditioning device modified, filtered, or attenuates the signal which is easily acceptable by the output devices.

Key Differences Between Sensor and Transducer

The following are the key differences between the sensor and transducer.

1. The sensor senses the physical change across the surrounding whereas the transducer transforms the one form of energy into another.
2. The sensor itself is the major component of the sensor, whereas the sensor and the signal conditioning are the major elements of the sensor.
3. The primary function of the sensor is to sense the physical changes, whereas the transducer converts the physical quantities into an electrical signal.
4. The accelerometer, barometer, gyroscope are the examples of the sensors whereas thermocouple is the examples of the transducer.