



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution



Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A+' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECT213- IoT SYSTEM ARCHITECTURE

II B.E. ECE / IV SEMESTER

UNIT 1 – BASICS OF IoT

various types of sensors and sensing Techniques



senors

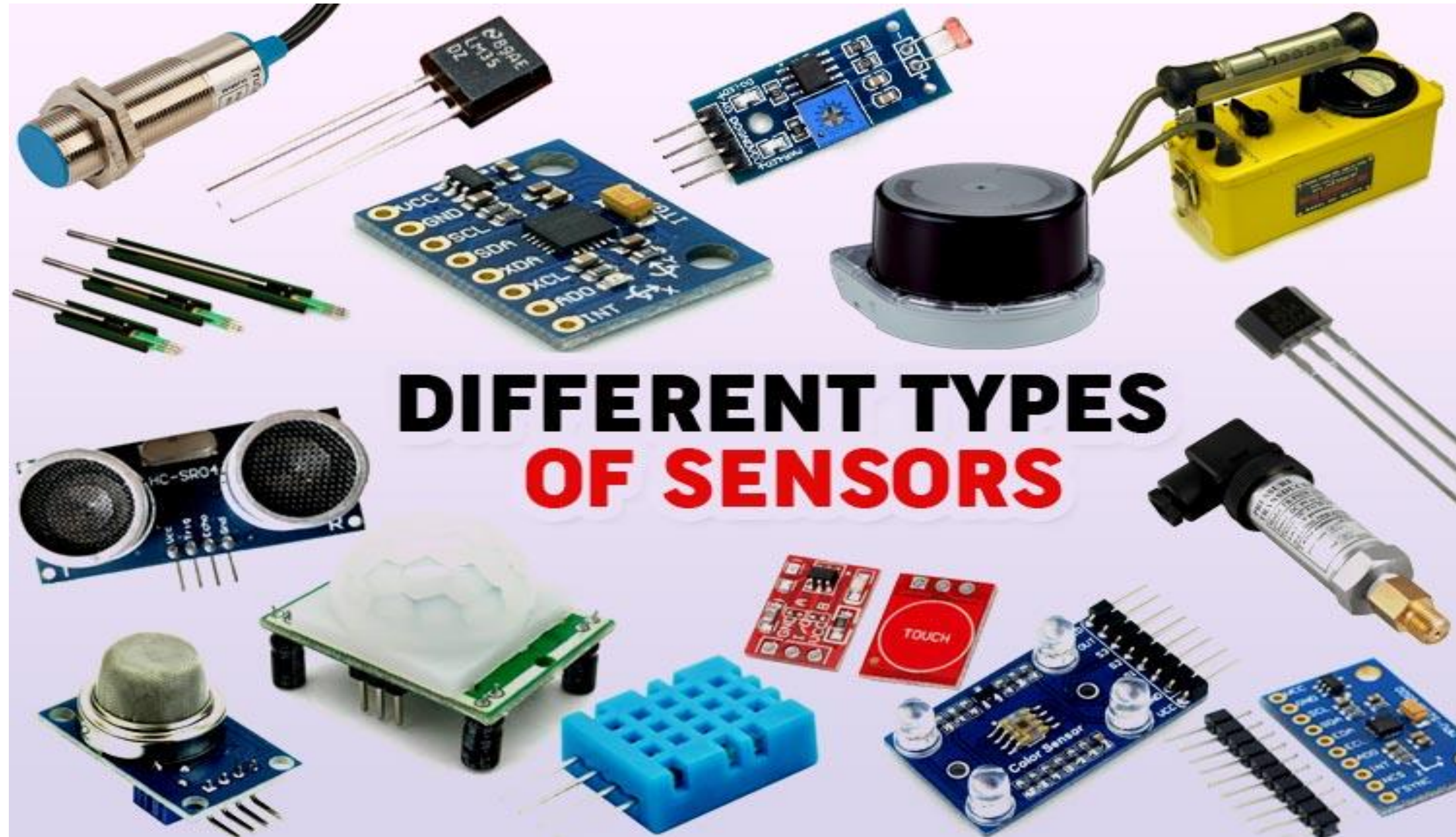


What is Sensors?

A sensor is a device that measures physical input from its environment and converts it into data that can be interpreted by either a human or a machine.



IoT





Difference between sensor and Transducer



- Sensor is a module or chip that observes the changes happening in the physical world and sends the feedback to the microcontroller or microprocessor
- Transducer also observes the changes happening in the physical world, but unlike a sensor, it doesn't requires power, it measures the change and convert it into the form of voltage output.



Classification of sensors



Active and passive sensors

- Passive sensor requires an external source of power to work.
- Active sensor doesn't require any external source of power.

Analog and Digital sensor

- The analog sensor gives output in the form of analog output when they detect change in external parameter ranges from 0-5v
- Digital Sensor produce discrete values (0 and 1's)

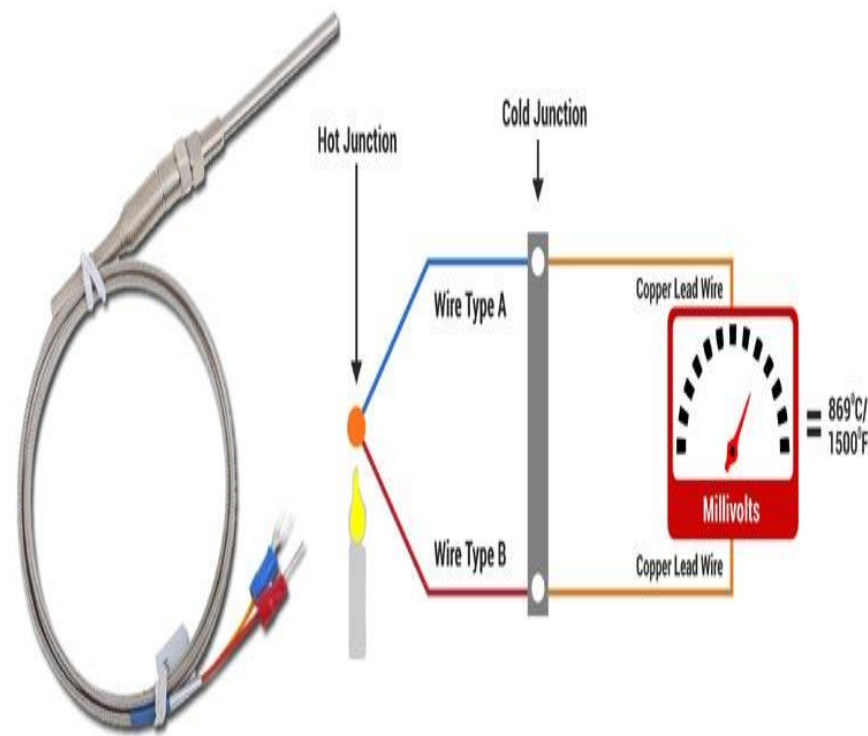


Temperature sensor



Temperature sensors are used for measuring the temperature of any object or medium.

Thermocouples:



Thermistors

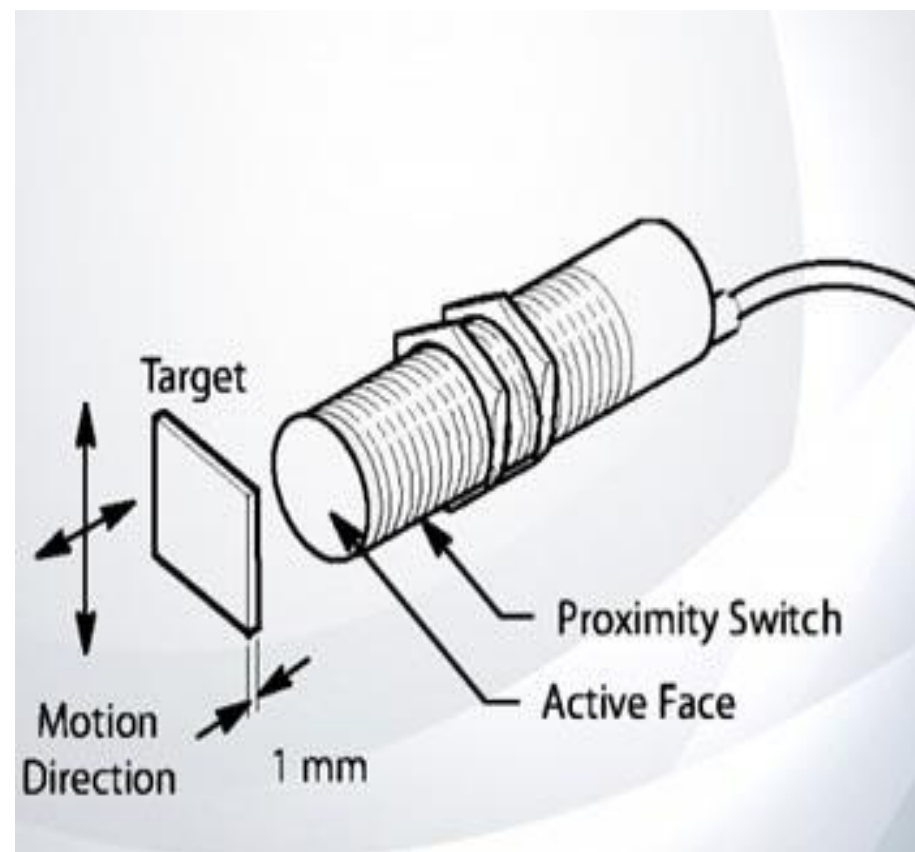




PROXIMITY SENSORS



Proximity sensors are sensing devices capable of detecting the presence of object without physical contact. These are among the most commonly used sensors. There are different kind of proximity sensors depending on the physical quantity they measure.



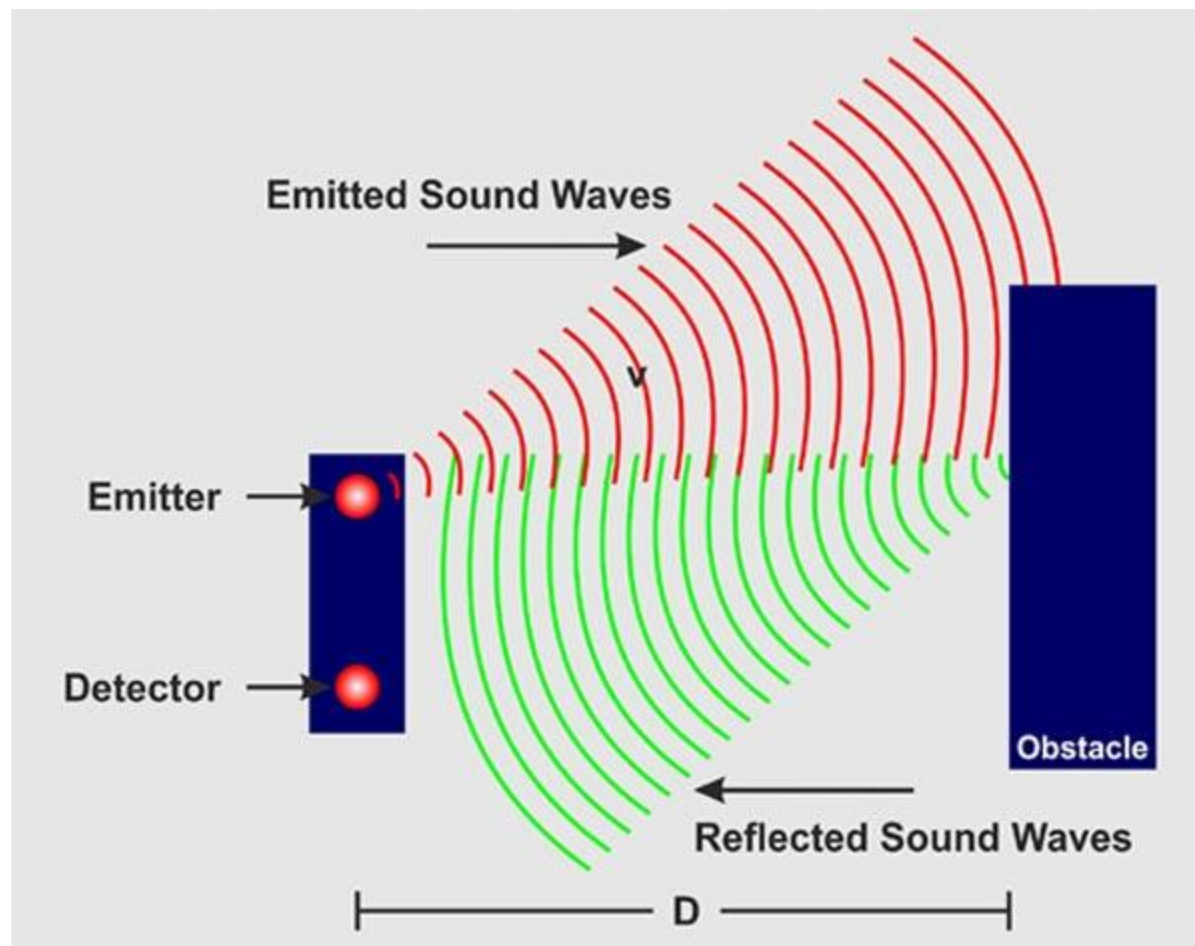
Proximity sensor



ULTRASONIC SENSOR



This sensor uses ultrasonic waves to detect any object in its path. It has a transmitter and a receiver which are made by piezo electric crystals. The transmitter produces the ultrasonic waves and the wave hits the object and returns back to the same path which is detected by the ultrasonic receiver.



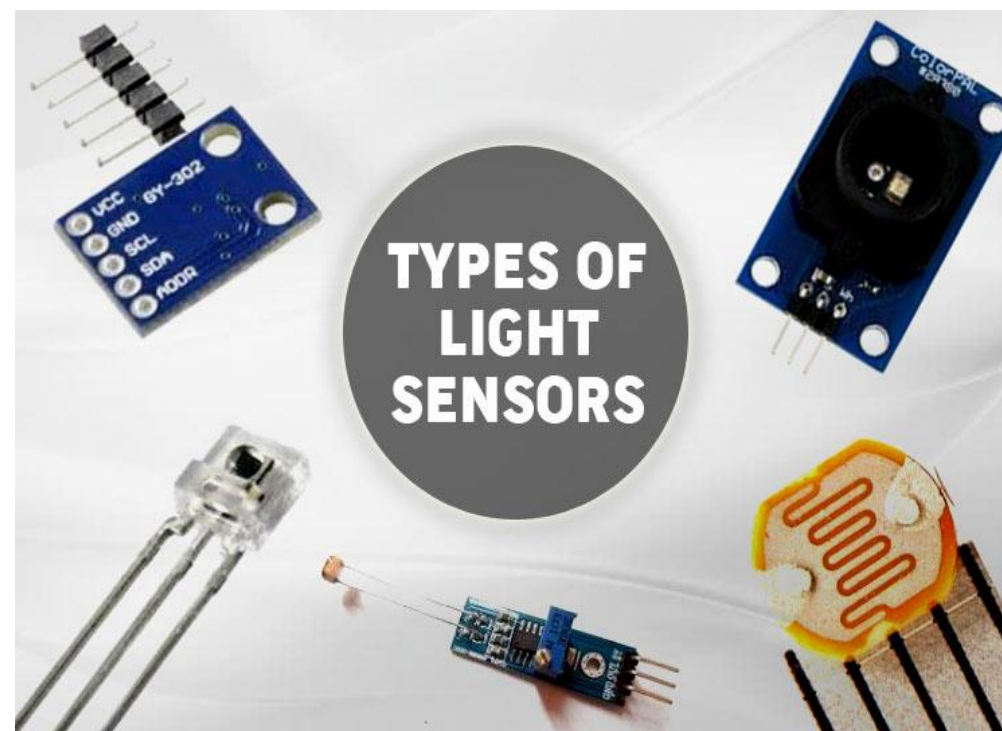
Ultrasonic sensor



LIGHT SENSOR



Light sensors also known as Photoelectric Devices or Photo Sensors converts light energy (photons) into electronic signal (electrons). Photoelectric sensors use light to detect the presence or absence of an object. It emits a light beam (visible or infrared) from its light-emitting element. A reflective-type photoelectric sensor is used to detect the light beam reflected from the target. A beam of light is emitted from the light emitting element and is received by the light receiving element.





PIR SENSOR

The passive infrared sensor more commonly called as PIR sensor detects the Infrared light radiating from a body. It use a pair of pyroelectric sensors to detect heat energy in the surrounding environment. It use a pair of pyroelectric sensors to detect heat energy in the surrounding environment. These two sensors sit beside each other, and when the signal differential between the two sensors changes

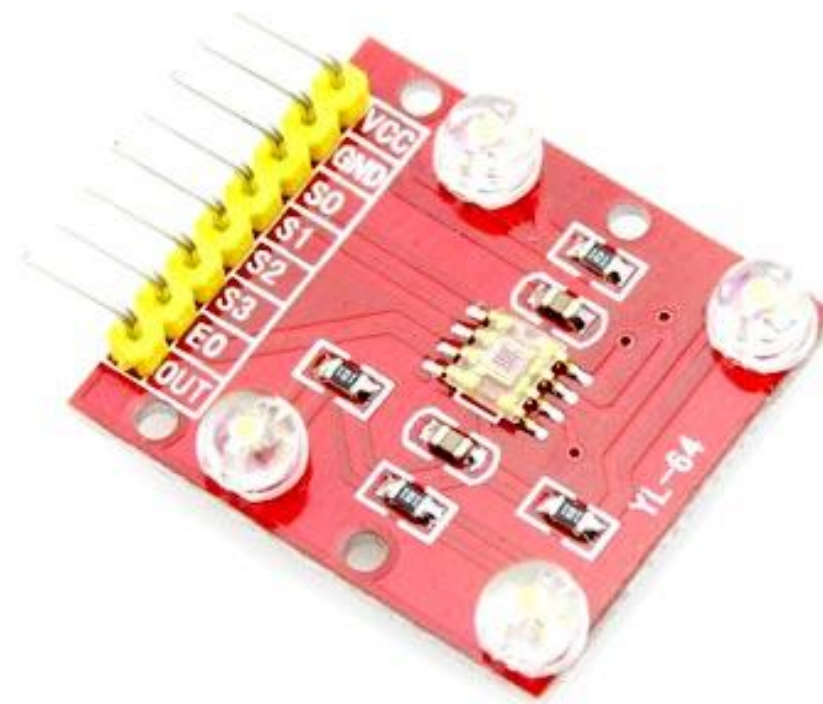


PIR SENSOR



COLOR SENSOR

A color sensor is used to detect the color of a material. It emits a light on an object and detects the reflected light to measure the intensity of red, blue, and green light reflecting back from the sensor. These sensors are also equipped with filters to reject the unwanted IR light and UV light.

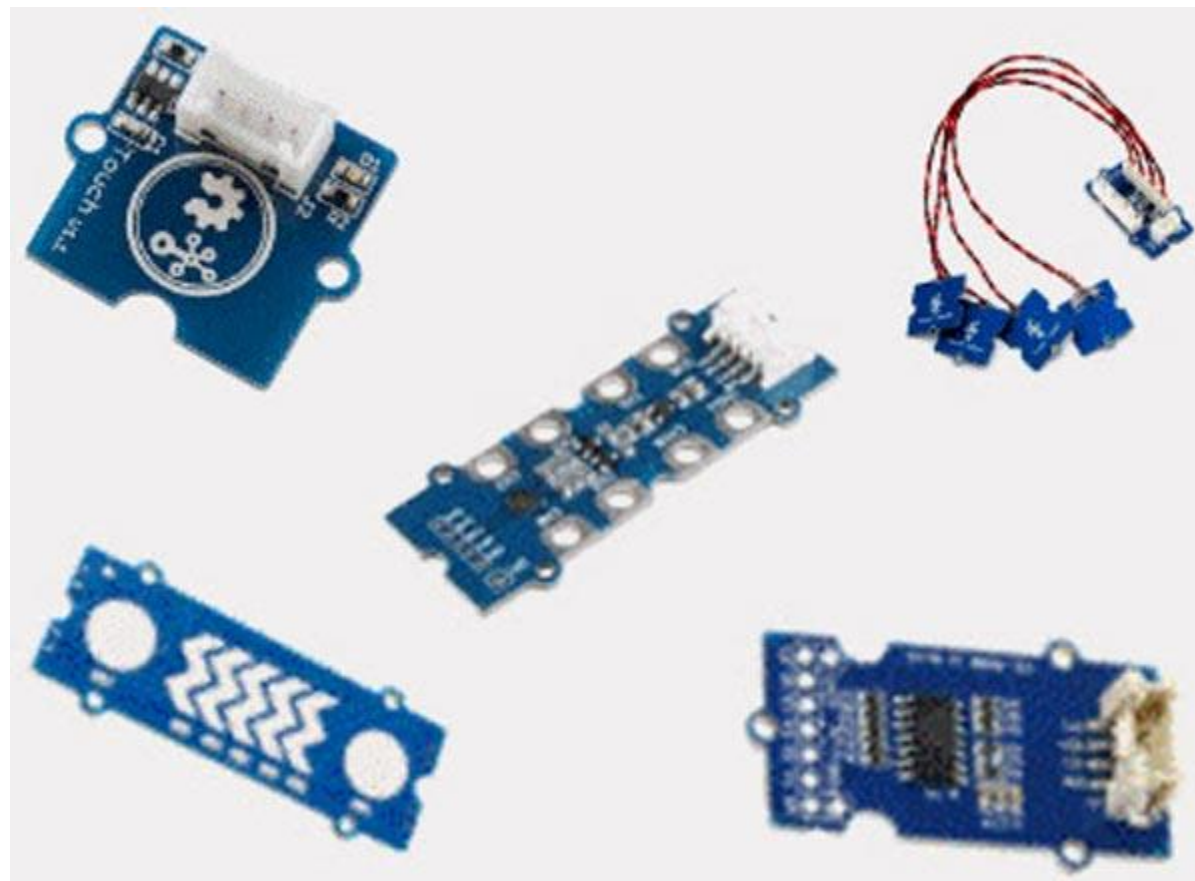


TSC3200 - COLOR SENSOR

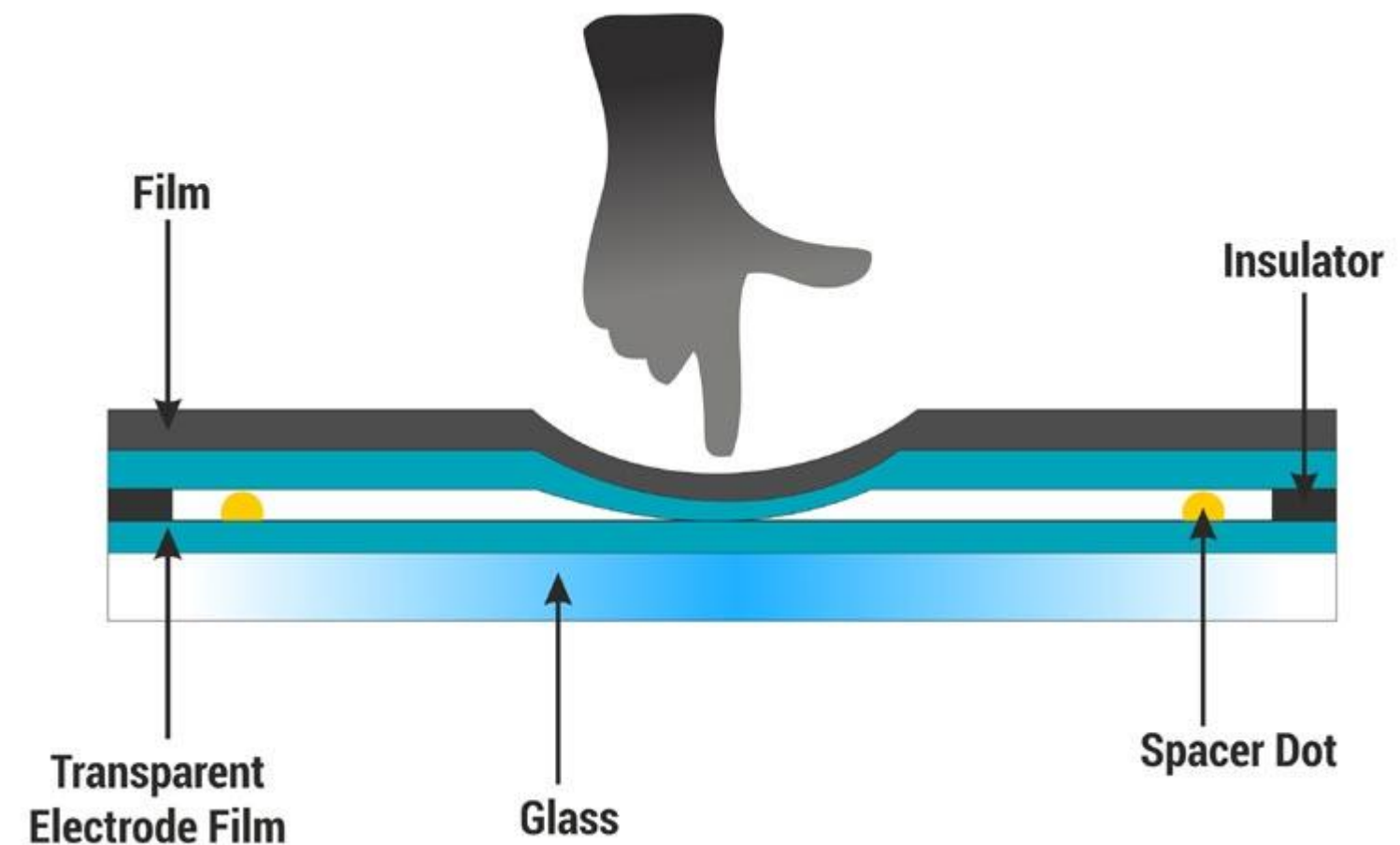


TOUCH SENSOR

Touch sensors also known as tactile sensors are used for detecting or recording physical touch. They work by either allowing or changing the flow of current in the circuit. These sensors are widely used as switches or are embedded in displays to make displays register a command.



TOUCH SENSOR





GAS SENSOR

These sensors are used to detect the presence of different types of gasses and their concentration present in the atmosphere. They are commonly used to detect toxic or explosive gasses and measure gas concentration by changing the resistance value. Detailed explanation on gas sensor can be found [here](#). MQ2 gas sensor is widely used for detecting methane, butane, LPG and smoke.

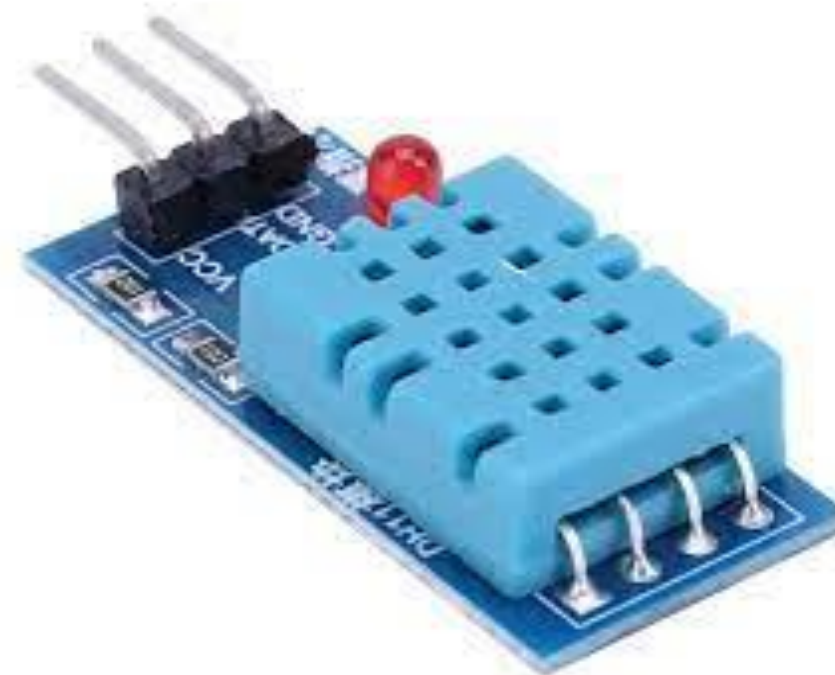


GAS SENSOR



HUMIDITY SENSOR

Humidity sensor also known as a hygrometer is a sensor used for measuring humidity in air. It senses and measures both moisture and air temperature. The ratio of moisture in the air to the highest amount of moisture at a particular air temperature is called relative humidity.



HUMIDITY SENSOR