Experiment – 2

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Subject Name: Internet of Things Lab Subject Code: 20CSP-358

1. Aim/Overview of the practical:

Identification of different sensors used in IOT applications.

Sensor: A sensor is a machine, module or a device made up of single crystal silicon that detects changes in the environment and transfer those signals to the electronic devices in the form of a signal.

Some common sensors used in IOT applications are:

- *Temperature Sensor*
- *Proximity Sensor*
- *Pressure Sensor*
- *Water Quality Sensor*
- *Gas Sensor*
- *Smoke Sensor*
- *IR Sensor*
- *Motion detection Sensor*
- *Gyroscope Sensor*

Temperature Sensor: A device used to measure the amount of heat energy that allows to detect a physical change in temperature from a particular source and converts the data for a device.

- Working: Temperature sensors measure temperature readings via electrical signals. They contain two metals that generate an electrical voltage or resistance when a temperature change occurs.

- Application: From our refrigerators and freezers to help regulate and maintain cold temperatures as well as within stoves and ovens to ensure that they heat to the required levels for cooking, air confectioners/heaters.

Proximity Sensor: A device that detects the presence or absence of a nearby object, or properties of that object, and converts it into signal which can be easily read by user or a simple electronic instrument without getting in contact with them.

- Working: Detect magnetic loss due to eddy currents that are generated on a conductive surface by an external magnetic field. An AC magnetic field is generated on the detection coil, and changes in the impedance due to eddy currents generated on a metallic object are detected.

- Application: Used in machine vibration monitoring to measure the variation in distance between a shaft and its support bearing.

Pressure Sensor: A pressure sensor is a device for pressure measurement of gases or liquids.

- Working: Pressure transducers have a sensing element of constant area and respond to force applied to this area by fluid pressure. The force applied will deflect the diaphragm inside the pressure transducer. The deflection of the internal diaphragm is measured and converted into an electrical output.

- Application: Pressure sensors are used in a range of industries, including the automotive industry, Biomedical Instrumentation, aviation and the marine industry, to name a few.

Smoke Sensor: A smoke detector is a sensor that detects smoke as a primary indication of fire.

- Working: When smoke enters the chamber, it disrupts the flow of ions, thus reducing the flow of current and activating the alarm.

- Application: It automatically senses the presence of smoke, as a key indication of fire, and sounds a warning to building occupants. Commercial and industrial smoke detectors issue a signal to a fire alarm control panel as part of a building's central fire alarm system.

Motion Sensor: A motion sensor (or motion detector) is an electronic device that is designed to detect and measure movement.

- Working: This sensor emit radio waves, which reflect off nearby objects and reflect back to a detector.
  Infrared (heat) energy levels are analysed by passive detectors. The sensor can detect objects that vary from the ambient temperature of the area being scanned.

- Application: These sensors are used in regions where no movement should be observed at all times, and they make it simple to notice anyone's presence when installed. Intrusion detection systems, automatic door control, boom barrier, smart camera, toll plaza, automatic parking systems, automated sinks/toilet flushers, hand dryers.

Gyroscope Sensor: A gyroscope is a device that uses Earth's gravity to help determine orientation. Gyro sensors are devices that sense angular velocity which is the change in rotational angle per unit of time. Angular velocity is generally expressed in deg/s (degrees per second).

- Working: Besides sensing the angular velocity, Gyroscope sensors can also measure the motion of the object. For more robust and accurate motion sensing, in consumer electronics Gyroscope sensors are combined with Accelerometer sensors.

- Application: Gyroscopes are used in compasses and automatic pilots on ships and aircraft, in the steering mechanisms of torpedoes, and in the inertial guidance systems installed in space launch vehicles, ballistic missiles, and orbiting satellites.