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Sensors in IOT

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Abstract: *The Internet of Things (IoT) paradigm refers to the network of physical objects or "things" embedded with electronics, software, sensors, and connectivity to enable objects to exchange data with servers, centralized systems, and/or other connected devices based on a variety of communication infrastructures. IoT data collected from different sensors, nodes and collectors are transferred to the cloud over the internet. IoT devices are used by consumers, healthcare, and businesses as well as by the governments. It is being forecast that 31 billion IoT devices will be deployed all over the world by the year 2022. As the use of IoT devices is increasing every moment several IoT vulnerabilities are introduced. The results and analysis indicate that massive deployment of IoT with an integration of new technologies are introducing new security challenges in IoT paradigm.*

Keywords: Sensor, Iot, temperature, signal.

I. INTRODUCTION

The Internet of Things is one of the most important and promising technological topics today. Some market researchers estimate that there are more than 20 billion connected devices and counting. Around us, there are smartphones, wearables, and other devices, all of which use sensors. Nowadays, sensors play an important role in our everyday life and in IoT. Sensors monitor our health status (e.g. a heartbeat), air quality, home security, and are widely used in the Industrial Internet of Things (IIoT) to monitor production processes. For these reasons, it is important to know how they work and how we can use them to acquire information.

1.1 What is a Sensors?

Sensors play an important role in creating solutions using IoT. Sensors are devices that collect external information and convert it into an output that humans and machines can understand. Sensors have a very wide range, and there are many types, but at their root, sensor are devices that identify the characteristic quantity of a measuring item and convert it into a readable signal that is shown on an instrument. Simply described, sensor devices that applies sensors to obtain information by detecting physical, chemical, or biological property amounts and converting them into readable signals.

1.2 Classification of the Sensors

In the first classification of the sensors they are divide into Active and Passive

- **Active Sensors:** Active Sensors (also known as parametric sensors) are sensors that require an external power source to operate. Examples of active sensors include GPS sensors and radar sensors.
- **Passive Sensors:** Passive Sensors (also called self-generated sensors) generate their own electric signal and do not require any external power source. Examples of passive sensors include thermal sensors, electric field sensing, and metal detecting.

The final classification of the sensors are Analog and Digital sensors

- **Analog Sensors:** Analog Sensors produce continuous analog output signals, proportional to its measurement. A few examples of analog sensors are: accelerometers, pressure sensors, light, and sound sensors.
- **Digital Sensors:** Digital Sensors (also known as electronic or electrochemical sensors) convert the data transmission, digitally. Examples include digital accelerometers, pressure, and temperature sensors.

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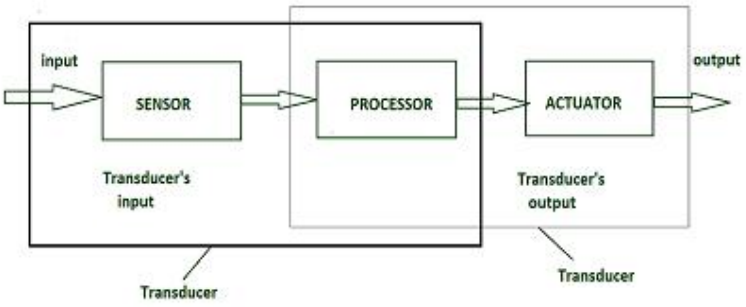

1.3 What Do The Sensors Do?

A sensor is a device that detects the change in the environment and responds to some output on the other system. A sensor converts a physical phenomenon into a measurable analog voltage (or sometimes a digital signal) converted into a human-readabledisplay or transmitted for reading or further processing. sensors are used in our everyday lives. For example, the common mercury thermometer is a very old type of sensor used for measuring temperature. Using colored mercury in a closed tube, it relies on the fact that this chemical has a consistent and linear reaction to changes in temperature.

II. Different Types of Sensors

- Temperature Sensor
- Proximity Sensor
- Accelerometer
- IR Sensor
- Light Sensor
- Ultrasonic Sensor
- Smoke, Gas and Alcohol Sensor
- Motion Sensor
- Humidity Sensor

  All these sensors are used for measuring one of the physical properties Temperature, Resistance, Capacitance, Conduction, Heat Transform etc.

2.1 Temperature Sensors

One of the most common and most popular is the Temperature Sensor. A Temperature Sensor is a device used to measure the quantity of heat energy that helps to identify a physical change in temperature from a particular source and converts the data for a device or user."

Figure: Temperature sensors

2.2 Proximity Sensor

Proximity Sensor are used to monitor the physical properties of a nearby object without the need for physical touch. These sensors are divided into capacitive, inductive, ultrasonic, magnetic, and photoelectric kinds. These sensors are commonly used for process monitoring, control, and object counting.

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This is all about an overview of IoT sensors. These sensors play a key role in our daily life. These are used to check your health status, home security, air quality, and are extensively used within the IIoT (Industrial Internet of Things) to observe the process in production.

Figure: Proximity Sensor

2.3 Accelerometer Sensor

Accelerometer sensors are used in aircraft, automobiles, and cellphones. Similarly, they are used in a variety of applications to determine an object's orientation, tilt, tap, shaking, placement, motion, vibration, or shock. Accelerometers are classified as capacitive, Hall-effect, or piezoelectric.

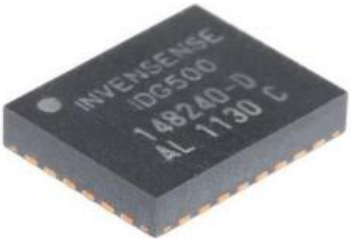

Figure: Accelerometer Sensor

2.4 Motion Sensor

The motion sensor is used for security reasons however these are also used in hand dryers, energy management systems, automatic parking systems, automatic door controls, automated toilet flushers, automated sinks, etc. These sensors are also applicable for the Internet of Things to check them with the help of computer otherwise smartphone.

Figure: Motion Sensor

2.5 Humidity Sensors

Humidity sensors measure the amount of water vapour in the air to determine the level of humidity. Otherwise, it will have an impact on human comfort and various industrialised procedures. RH (relative humidity), D/F PT (/frost point), and PPM are the humidity measuring units (parts per million). Humidity sensors measure the amount of water vapour in the air to determine the level of humidity. Otherwise, it will have an impact on human comfort and various industrialised procedures. RH (relative humidity), D/F PT (/frost point), and PPM are the humidity measuring units (parts per million).

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Figure: Humidity Sensors

2.6 Ultrasonic Sensor

Ultrasonic transducers convert ultrasound waves to electrical signals and vice versa. These devices work on a principle similar to that used by transducers in radar and sonar systems, which evaluate the attributes of the target object by processing the echo signals from radio or sound waves, respectively.

Figure: Ultrasonic Sensor

III. Conclusion

Recent advancements in IoT have drawn attention of researchers and developers worldwide. IoT developers and researchers are working together to extend the technology on large scale and to benefit the society to the highest possible level. However, improvements are possible only if we consider the various issues and shortcomings in the present technical approaches. In this survey article, we presented several issues and challenges that IoT developer must take into account to develop an improved model. Also, important application areas of IoT is also discussed where IoT developers and researchers are engaged. As IoT is not only providing services but also generates a huge amount of data. Hence, the importance of big data analytics is also discussed which can provide accurate decisions that could be utilized to develop an improved IoT system.

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