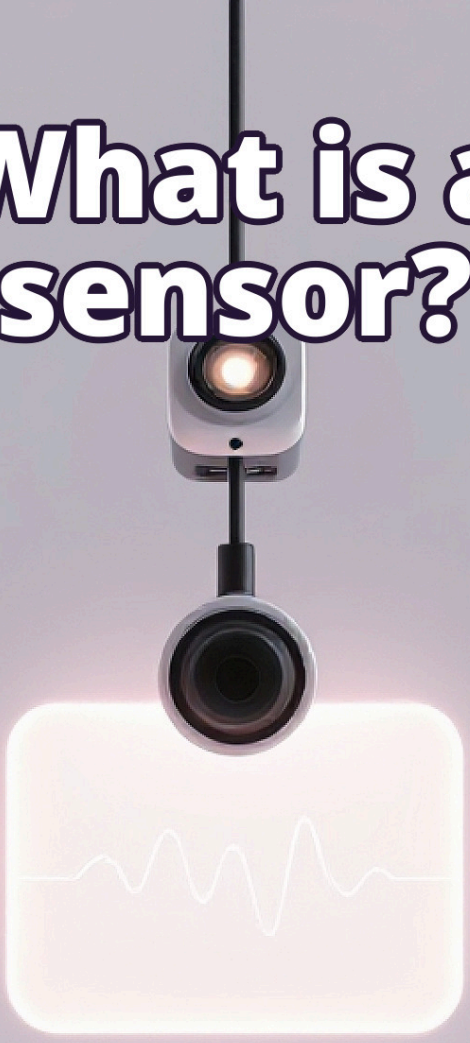
What is a sensor?



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A sensor is a device that turns a physical property into a measurable signal. You will meet this idea again and again, because it is the whole answer. A physical property is something real in the world, like heat or light. A measurable signal is something a machine can read, like a small electric voltage. The sensor is the bridge between the two.



A sensor takes something from the real world, such as heat, light, movement, or pressure, and changes it into a signal a machine can use. The signal is the sensor's way of reporting what it noticed. You do not need to know how the inside works to use a sensor. You only need to know that it reports the physical property as a signal.



Look at a temperature sensor as one concrete case. It notices how hot or cold something is, such as the air in a room or the water in a cup. It then turns that temperature into a signal that can be read. The signal changes when the temperature changes, so the reading follows the real world. This is a physical property turned into a measurable signal.



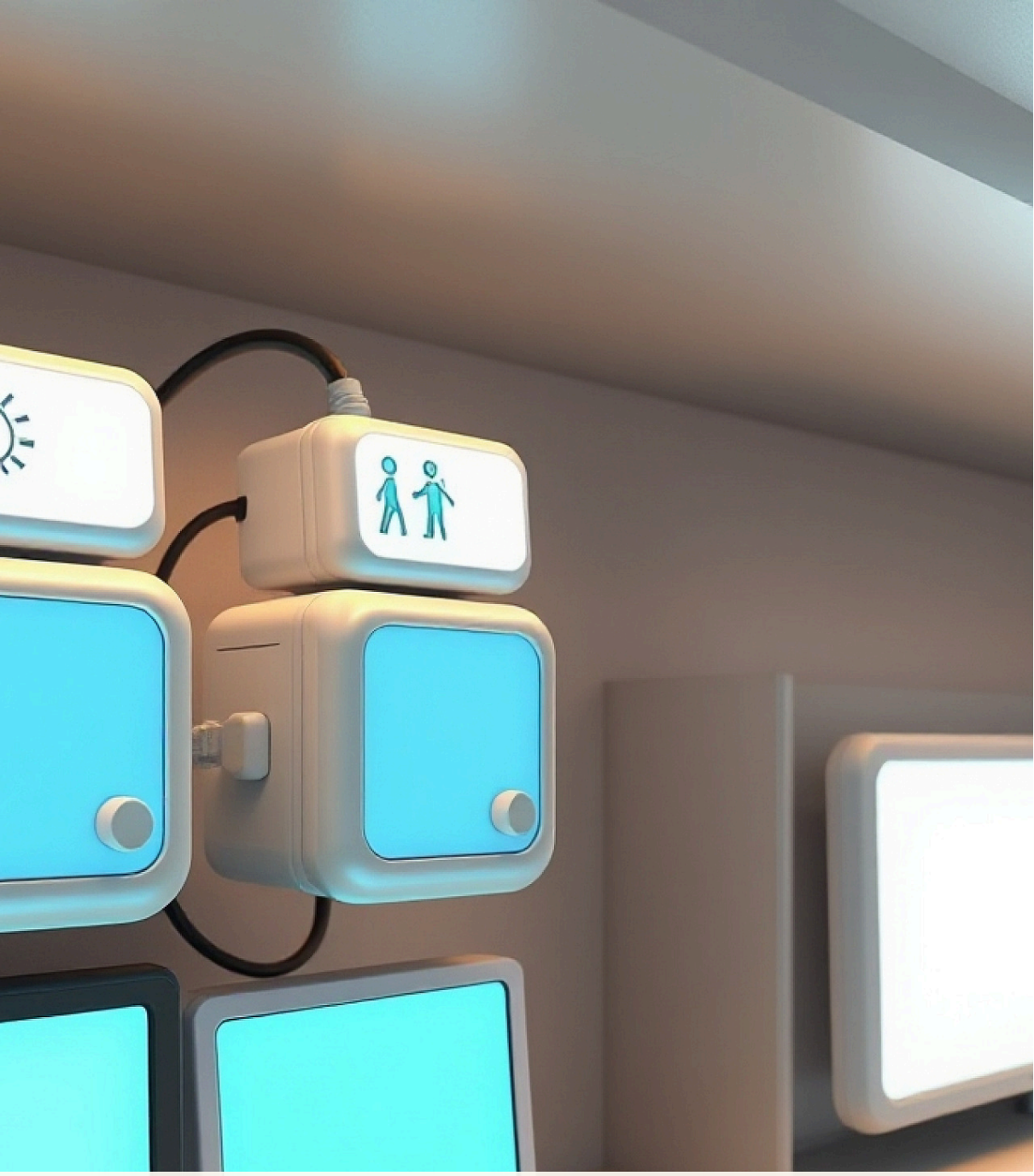
Look at a light sensor as a second concrete case. It notices how bright or dark the surroundings are, such as a sunny window or a dim hallway. It turns that brightness into a signal. When the light level changes, the signal changes too. The sensor reports the amount of light, not the reason for it.



Look at a motion sensor as a third concrete case. It notices movement in the area it watches, such as a person walking past. It turns that movement into a signal. When nothing moves, the signal stays quiet; when something moves, the signal changes. The sensor reports movement, not who or what caused it.



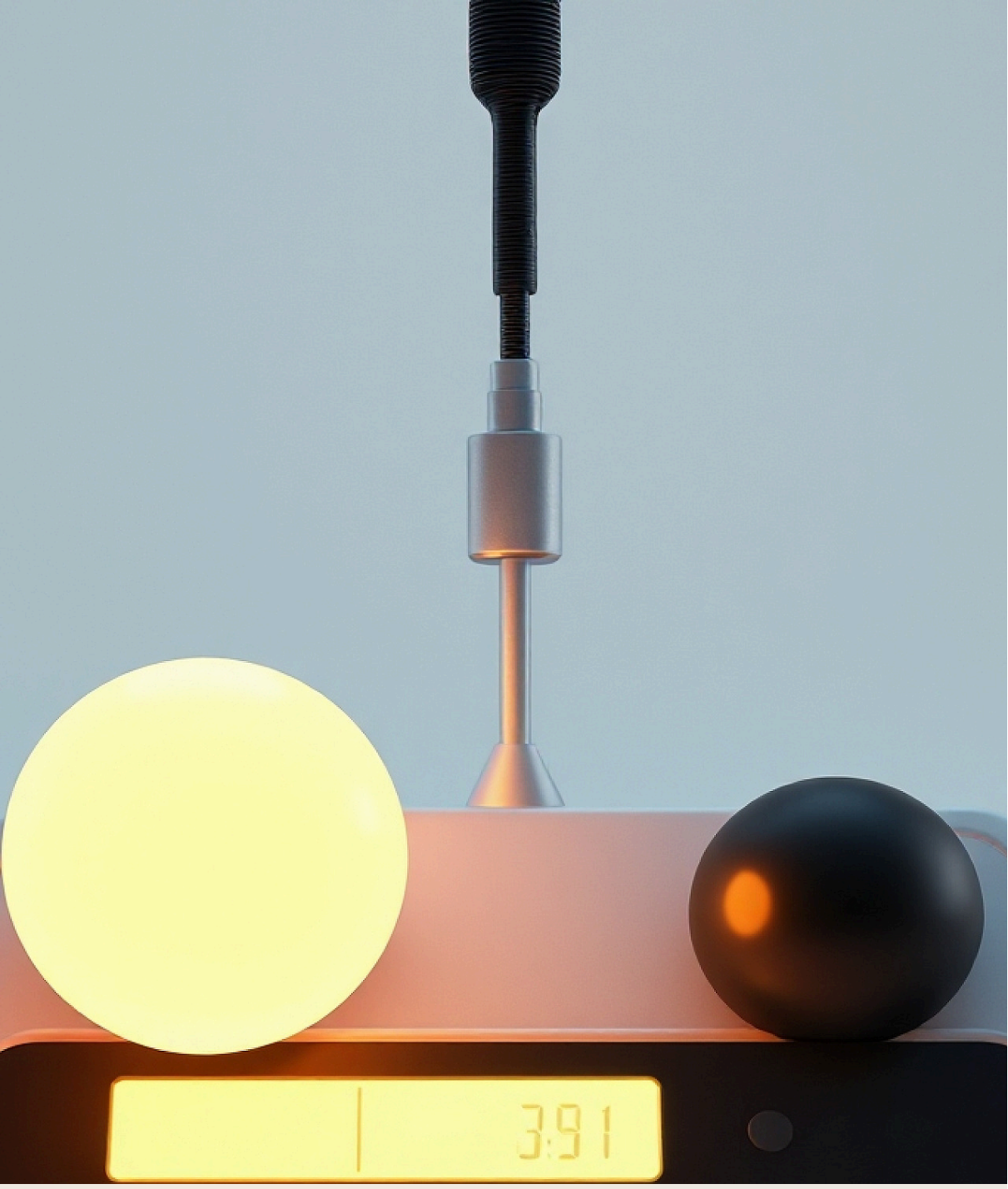
Look at a pressure sensor as a fourth concrete case. It notices how hard something pushes on a surface, such as air in a tire or a finger on a button. It turns that push into a signal. Stronger pressure gives a different signal than weaker pressure. The sensor reports the push as a measurable signal.



Put the four sensors side by side: temperature, light, motion, and pressure. Each one notices a different physical property, but all four do the same basic job. They notice a physical property and report it as a signal. The property changes, and the signal changes with it. That shared job is what makes them all sensors.



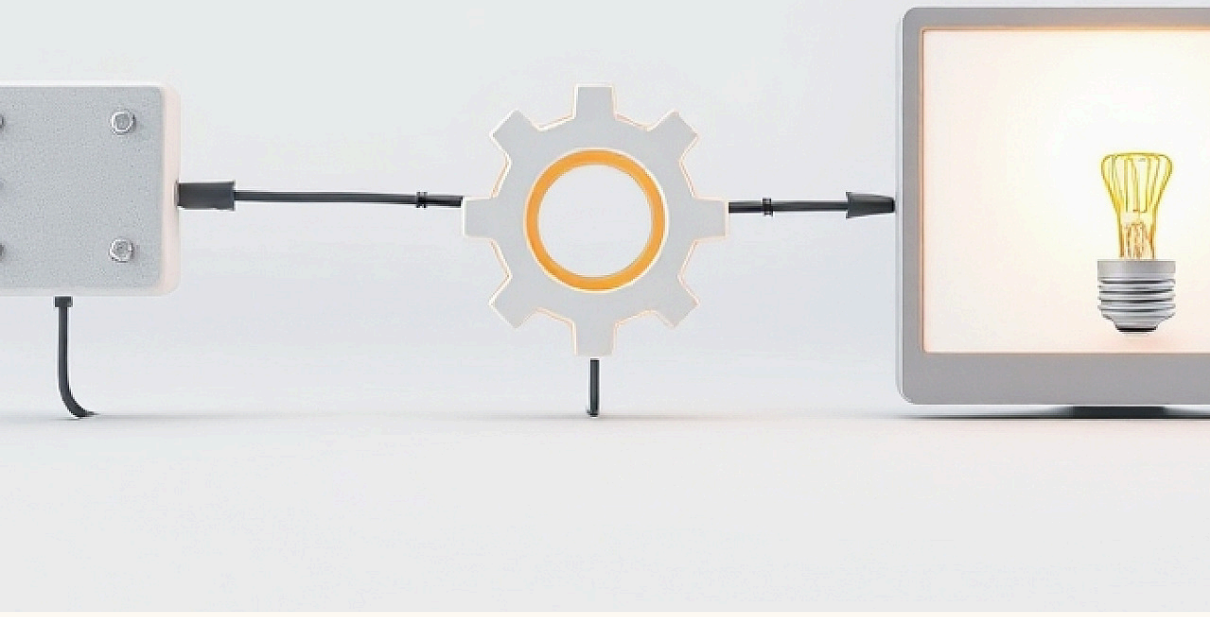
A lamp that turns on by itself is a helpful example. Something in that lamp must notice the ambient light, meaning the light already present in the room. That something is a sensor. Without a sensor, the lamp would have no way to know whether the room is bright or dark. The sensor gives the lamp its eyes.



Inside the automatic lamp, a light sensor measures how bright the room is. It turns that brightness into a signal the lamp's electronics can read. When the room is bright, the signal has one value; when the room is dark, it has another. The sensor only measures and reports. It does not yet decide anything.



The sensor only reports; it does not decide. A program reads the sensor's data and makes the decision to turn the lamp on or off. The program might compare the reading to a threshold, which is a chosen cut-off value. If the light is below the threshold, the program decides the room is dark. The sensor supplies facts, and the program supplies judgment.



Follow the full chain from signal to action. Light is measured by the sensor, a signal is sent to the electronics, the program interprets it, and the lamp switches. Each part has its own job: the sensor senses, the program decides, and the switch acts. Sensing and deciding work together, and neither replaces the other.



Every sensor can only measure within a certain range. The measurement range is the span from the smallest to the largest value the sensor can handle. Outside that range it cannot give a useful result, and it may even be damaged. So the range matters for reliability: a sensor used beyond its range gives readings you cannot trust.



Sensitivity is how strongly a sensor responds to a small change. A sensor that reacts to tiny changes gives finer information than one that does not. For example, a sensitive light sensor notices a small dimming that a less sensitive one would miss. Higher sensitivity is not always better, because it can also pick up unwanted noise.



Calibration means checking and adjusting the sensor so its readings match reality. You compare the sensor's reading with a known true value and correct any difference. Without calibration, even a working sensor can give misleading results. Calibration keeps the measurable signal honest, so the program's decisions rest on accurate data.



Watch for typical beginner errors. One is expecting the sensor to decide for itself; in truth, the sensor only reports and a program decides. Another is ignoring measurement range, which limits what the sensor can measure. A third is skipping sensitivity and calibration, which affects reliability. Each mistake is easy to avoid once you know what is actually true.



Keep the key points in mind. A sensor turns a physical property into a measurable signal. A program interprets that signal and decides what to do. Measurement range, sensitivity, and calibration affect how reliable the results are. With these points, you have a clear foundation for understanding any sensor you meet.