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Task1

Define the term sensor and describe the advantages of using sensors.

Definition:

A sensor is a device which sense the physical quantities from the environment and can give us outputs like the measurement, quantity, concentration etc of the physical factors. They give output in various forms. The output depends on the sensor. Some sensor give output in the form of variable voltage while some sensor give output in the form of the variable resistance or variable capacitance.

When we use any kind of the development board or any kind of microcontroller then they helps us to show the output of any sensor. Because we are not able to see the output of any sensor. To see the exact output of any sensor then we have to use and code the microcontroller as per the requirement and then we are able to see the converted output and we can get the exact measured values.

For example if we are doing the project of ultrasonic and we used to measure the distance between the object and the sensor. Then we are not able to see the values came out from the sensor. To see the exact the values we need to do some mathematical calculation of the output and that can be done by the development board.

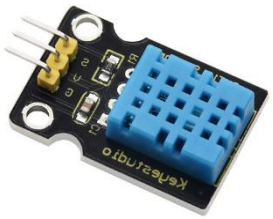
Now looking to the advantages of the sensor we can say they reduce the work of human. Like we can sense that the temperature is hot but we cannot sense the quantity of the temperature. To measure the quantities of the physical factors we need sensor, without them we are not able to do that.

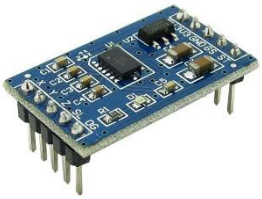
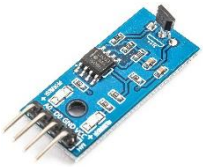
Advantages:

1. Accelerate processes and make them more accurate.
2. Collect process and asset data in real time.
3. Monitor processes and assets accurately, reliably, and continuously.
4. Increase productivity and reduce total cost of ownership.
5. Lower energy wastage.
6. Detection without physical contact.
7. Compact size and low cost.
8. High sensitivity.
9. Variety of object detection.
10. Maintenance free.

Task2

Fill in the table with an image of the device and an explanation of situations where it should be used

Device	Image	Use
Light sensor		Now a days in cars the light sensors are used, if you are driving the car in evening the light sensor detects the brightness if there is no light or brightness is not detected the light sensor will turn on the headlight or car.
Temperature sensor		Temperature sensors are used in measuring temperature of hot water tanks, refrigerators, digital medical thermometers, which are used in hospitals and millions of homes every day, all have a temperature sensor in them.
PIR Motion sensor		It is used in motion detecting, like motion detecting security camera, in this when motion is detected in that direction the camera will move and capture the vide.
Magnetic field sensor		Magnetic field sensors are often used for security and military applications such as detection, discrimination and localization of ferromagnetic and conducting objects, navigation, position tracking and antitheft systems.
Gas sensor		Gas sensors are used in factories and manufacturing facilities to identify gas leaks, and to detect smoke and carbon monoxide in homes.

Color sensor		in the food industry, colour sensors are used for monitoring colour changes in the plastic in which the eating product is wrapped to detect whether the quality has deteriorated.
EMG sensor		EMG is used as a diagnostics tool for identifying neuromuscular diseases, assessing low-back pain, kinesiology, and disorders of motor control.
Accelerometer		Accelerometers is used to measure vibration on cars, machines, buildings, process control systems and safety installations.
Gyroscope		The motion of a pair of sensing arms produces a potential difference from which angular velocity is sensed. The angular velocity is converted to, and output as, an electrical signal.
Pressure Sensor		Pressure sensor is used in the wheels of automobiles, where it measures the air pressure of tyer.
Hall Effect Sensor		to measure magnetic fields, or inspect materials (such as tubing or pipelines) using the principles of magnetic flux leakage. Hall effect devices produce a very low signal level and thus require amplification.
Doppler Sensor		It detects the distance of targeted of object with the help of the two antennas present on it.