CONCEPT Physical sensors allow robots to perceive and interact with its environment. By sensing various physical phenomena such as temperature, pressure, light, sound, and motion, sensors provide feedback to the robot's control system, which can then adjust the robot's actions accordingly. This enables the robot to perform tasks in real-world scenarios, such as navigating through a room, avoiding obstacles, and interacting with objects. Without physical sensors, a robot would be limited in its ability to perceive and respond to the world around it.

BACKGROUND

1960s: Early robots were primarily used in manufacturing settings and equipped with simple sensors such as limit switches and photoelectric sensors to detect the presence of objects.

1970s: The development of microprocessors enabled more complex sensors to be used in robots, such as proximity sensors and force-torque sensors, which allowed robots to interact more effectively with their environment.

1980s AND 1990s: The use of physical sensors continued to expand as robots became more autonomous and were used in a wider range of applications, such as space exploration and medical procedures.

Recent advancements in sensor technology, such as the development of 3D cameras and Lidar sensors, allow them to perceive and navigate with greater accuracy.

Make sure it measures up

EXAMPLES

TRANSDUCER: Device that converts one form of energy into another form. In the case of physical sensors, a transducer converts physical phenomena into an electrical signal that can be processed by the robot's control system.

SENSING ELEMENT: The part of the physical sensor that responds to the physical phenomena being measured. For example, a temperature sensor might use a thermistor as its sensing element.

TYPES OF SENSORS: Proximity Sensors, Temperature Sensors, Pressure Sensors, Light Sensors, and Motion Sensors.

DATA

TEMPERATURE SENSORS can provide data on the temperature of the robot's environment, to regulate the temperature of the robot's components or monitoring environmental conditions.

PRESSURE SENSORS can provide data on the pressure of the robot's environment, which can be used to detect changes in altitude or to measure the pressure of a fluid or gas.

LIGHT SENSORS can provide data on the level and intensity of light in the robot's environment, which can be used to adjust the robot's behavior or to detect the presence of objects.

PROXIMITY SENSORS can provide data on the distance between the robot and other objects in its environment.

REAL WORLD CONNECTIONS

Proximity sensors are commonly used in agricultural robotics to detect the presence of crops and guide the robot's movements. They enable the robot to navigate through a field and avoid colliding with plants or other obstacles. The sensors can also be used to measure the distance between the robot and the crops, allowing the robot to perform precision tasks such as planting or harvesting.

Temperature sensors and moisture sensors are also commonly used in agricultural robotics in Nebraska. These sensors can be used to monitor environmental conditions such as soil temperature and moisture levels, allowing farmers to optimize crop growth, input costs and yield.

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