

CONCEPT Sensors measure a physical quantity in the environment.

BACKGROUND

Many sensors relate the change in the environment to a change in an electrical property such as voltage, resistance or current. The voltage can be used directly as analog output or can be converted into a digital quantity to be used by a microprocessor controller. A change in resistance or current can be converted to a change in voltage.

Analog sensors apply basic electricity concepts to the physical world.

CURRENT: flow of electric charges such as electrons in a conductor

RESISTANCE: opposition to the flow of electric charges such as electrons

VOLTAGE: difference in electric potential between two points

Analog sensors are constructed so the output voltage is proportional to the quantity to be measured. This creates a linear relationship between the value of the physical quantity and the output voltage.

A calibration curve can be used to scale the output voltage back to the original value from the environment.

HALL EFFECT SENSORS: create a change in voltage in the presence of a magnetic field

TACHOGENERATOR: create a change in voltage due to rotational speed

RESISTIVE HYGROMETER: create a change in voltage due to change in air moisture

	Biological Senses	Robotic Sensors
Processing	Brain	Central Processing Unit (CPU)
Signaling	Nervous System	Wires or Wireless
Vision	Eyes	Photoresistor, Color Sensor, Camera
Hearing	Ears	Air Pressure, Microphone
Smell, Taste	Nose, Tongue	Chemical Sensors
Touch	Skin	Physical Pressure, Force
Balance, Movement	Inner Ear	Acceleration, Angular Rate Gyro
Positioning	Muscles and Joints	Rotational Shaft Encoder