Sensors and Actuators

An Overview

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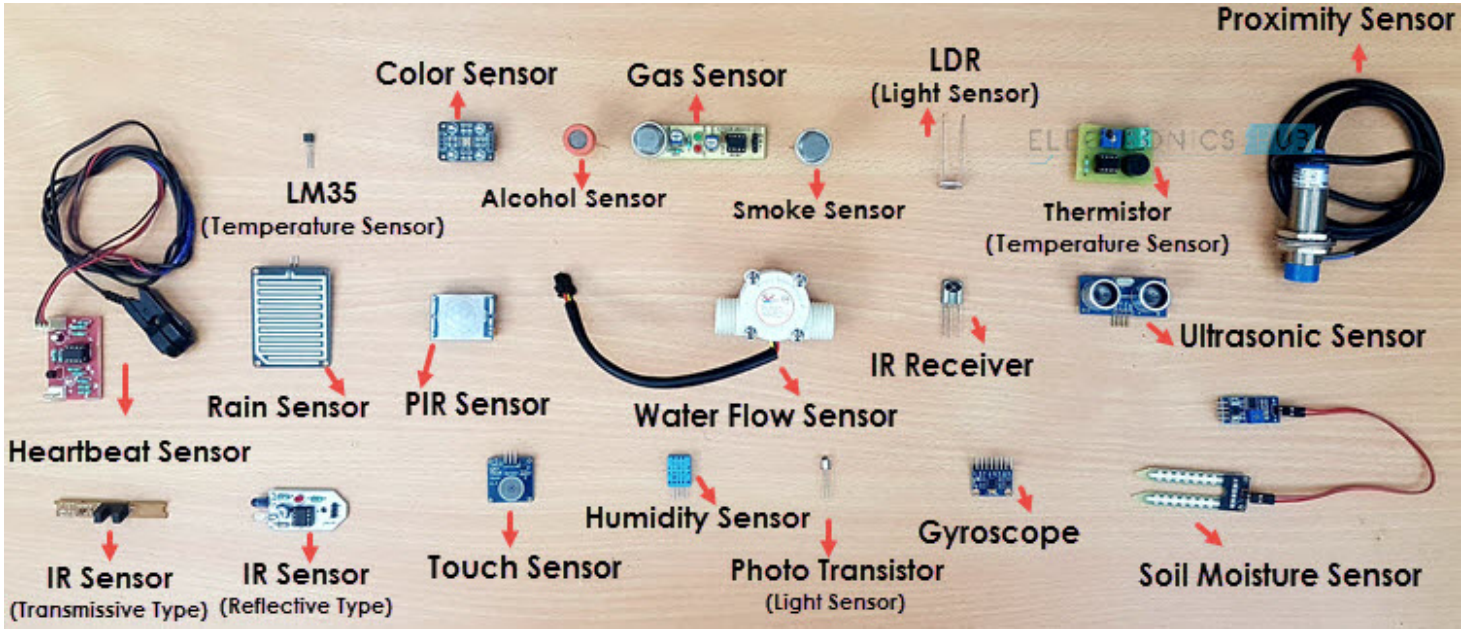
Sensors

Sensor A device which detects or measures a physical property and records, indicates, or otherwise responds to it



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Actuators

Actuator A component that is responsible for moving or controlling a mechanism or system; in simple terms, it is a "mover". An actuator requires a control signal and a source of energy. There are five main types of actuators – hydraulic, pneumatic, electrical, Thermal or Magnetic and Mechanical.

Various Electro-Mechanical Actuators

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UI

- Actuators and Sensors form the interface between a device and the world
- They determine what it can sense and what it can do
- i.e. How it interacts with us
- We must choose which to use based on purpose of device
- This is an important part of device design

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Measurement

- Purpose of these sensors is to measure something
- Sometimes we can use them to directly measure something
- but often we cannot measure what we want directly so we must use an indirect measurement
- That is, measure something else that serves as an indicator for what we want to measure

For each sensor on the next slide say what it measures directly and also give one example of something else it could be used to measure

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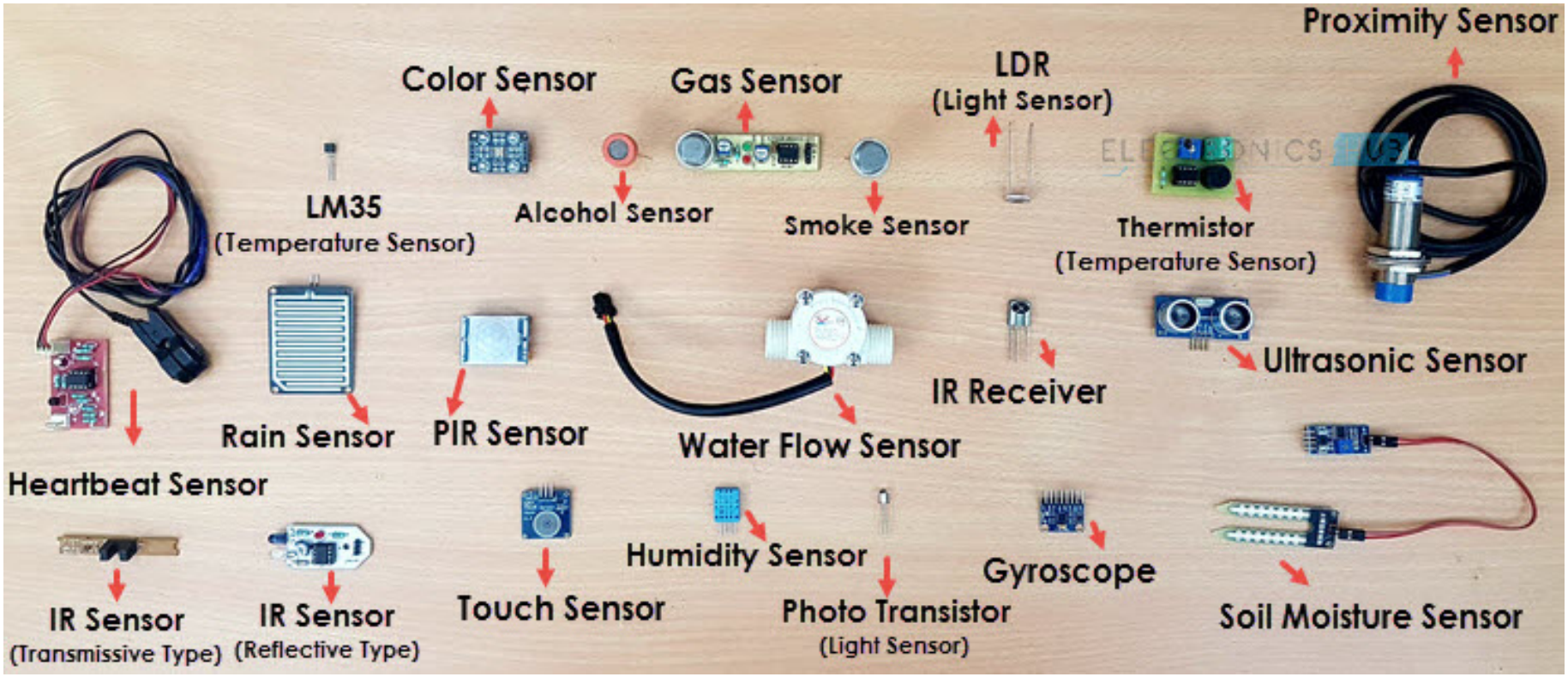
Sensors Types



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Smartphone

- List the sensors on a smartphone
- Determine for each one two different things it can measure
- Give one health based use case that employs smartphone sensors

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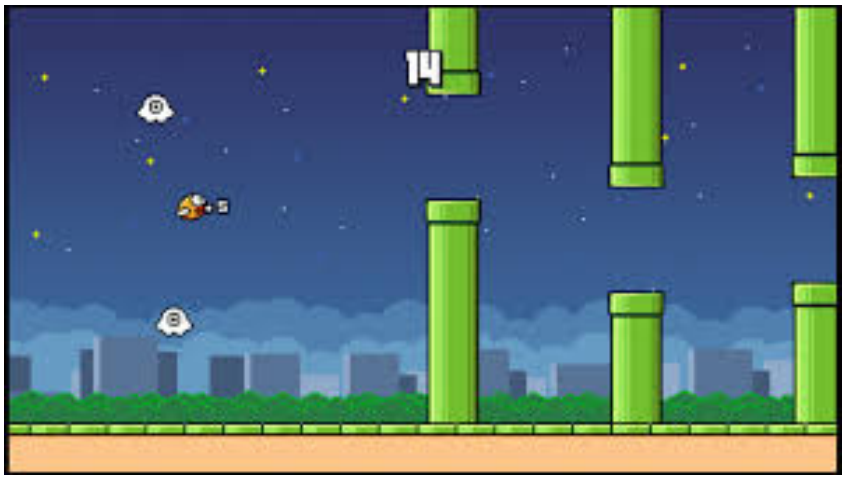
Grippy Bird

- Stroke patients sometimes need to develop their grip strength
- Requires repetitive use of grip strengtheners
- This is tedious and feedback is low
- Add Sensor to gripping device
- Turn repetitive work into a game: Grip causes bird to flap wings
- Rehab becomes fun and device/game records patient progress for medical staff



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Balance

- Stroke patients sometimes need to develop their balance/leg strength
- Use Nintendo balance board
- Use phone accelerometer
- Add accelerometer to wearable device
- Use XBox Kinect
- Use treadmill

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