Σιατερλής Γεώργιος
Μηχανικών Ηλεκτρονικών Υπολογιστών και Πληροφορικής
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Definition

- **sensor** is a device, module, or subsystem whose purpose is to detect events or changes in its environment and send the information to other electronics.

- **Robotic sensors** are used to estimate a robot's condition and environment. These signals are passed to a controller to enable appropriate behavior.

- Sensors in robots are based on the functions of human **sensory organs**. Robots require extensive information about their environment in order to function effectively.
On the robots
Categories

- Distance sensors
  - IR proximity sensors
  - Tof sensors
- IR color sensors QTR
- Encoders
- Gyroscope-accelerometer
Tof

High delay
High accuracy ~ 25cm
Wide range
I2C
Error ~ 5-10 %
Cost: 25 $
Tof

High accuracy ~ 25cm
Wide range
I2C
Error ~ 5-10%
cost: 25 $

2.8V Regulator
I$^2$C Level Shifter
VL6180 Sensor
I$^2$C Pull-up Enable
• Low cost
• Low delay
• Error
• Low cost
• Low delay
• Error
- Colour

- Distance
void loop() {
    int A = AnalogRead(analogInput1);
}

• Range 0…1023

Analog to Digital Converter
A/D η ADC
• Serial monitor

• Serial plotter
Maze sensors

- 4 Custom ir sensor
- Imu sensor
- Encoders
How they work

- **IR distance sensors:**
  - They work with potensiometer like switch. They turn on every 4ms.

- **Imu-gyroscope sensor:**
  - Delay 10s to calibrate
Filters

- Encoders
- Median filter
- Smoothing the acnes
- Reduce the noise

\[
\text{median}(A) = \left\{ \begin{array}{ll} 
\frac{a_{n+1}}{2} & n, \text{perittos} \\
\frac{1}{2} \left( a_{\frac{n}{2}} + a_{\frac{n+1}{2}} \right) & n, \text{aritios} 
\end{array} \right.
\]
Filters

- IR
- Average filter
- Median filter
- Mechanical filter (above the sun)
Encoders

- It is an electromechanical device that converts the angular position or movement of an engine shaft into an analog or digital code.
Parts of calibrator

- Servo
- Stepper
- Pc
- Arduino
- Simulation program (user interface)
Results-targets

- Data analysis
- Lineraization
- Callibrate
- High accuracy
• We try to make a equalation like linear $y=e^{(ax+b)}$
Linearization.
Why so important

- investigate and accuracy study
- You know what you have to do every time you need
- Code experience
- Control experience
Robotics Club
Questions?

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