

## Sensors

- "...detects changes in environment."
- Classical Sensors (light, temperature, etc.)
- Information Sensors

### CHALLENGES ↴

- Need for Calibration
- Inaccuracy } within specification
- Unreliable }
- Noise
- Mechanical issues

Read Specifications  
"Think before you build!"

### Digital vs Analog

Binary State  
e.g. Push Button

e.g. Distance Sensor  
→ PWM & Frequency Output  
(→ value can be coded)



## Power!

### Minimize Power Consumption

Minimize LD Wake up Processor with Sensor

Harvest LD Use Sensors that generate Power

Smart Sampling LD Sampling Strategy!

Trigger LD Use a low power sensor to wake up the system

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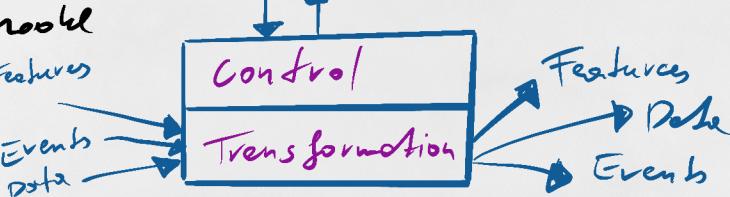


## Perception

### Bridge Gap between Sensors & Application

Perception model

Crowley 2002



## Design

### Requirements

### Arrangement

- Usability
- Energy Consumption
- Calibration & Robustness
- Portability
- Price
- precision
- ...

position matters!  
→ What to measure?  
→ How much Power?

- Multiple Sensors of same Type?
  - Can make things easier (e.g. multiple microphones).
  - Correlation (→ Communication?)

## Sensing Options & Context

| Intrinsic | Entity | Observer | Anybody |
|-----------|--------|----------|---------|
| ✓         | ✓      | ✓        | ✓       |
| ✗         | ✗      | X        | ✓       |
| ✗         | ✓      | ✓        | ✓       |

→ When do / need to communicate?

Low

High

### Signal Processing

- Basic Stats
- Filtering
- FFT
- Feature Extraction
- Data Acquisition

Buffering & Histories  
can help

to reduce noise

• Features are characteristic  
for Context  
• Higher Level Processing

- used to acquire Context
- Responsibility
- frequency
- source

• Push/Pull  
• Intervals  
• Where source comes from