Energy-aware strategies for environmental monitoring with the MICAz

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Introduction:

• MICAz
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- MICAz
- WSNs
- Our goal: Energy management
Calibration

- Why?
- Method
- Problems
Calibration
Queueing

- Goal

- Very linked to radio control
Radio Control

- Radio is the main energy consumer

- Turn it on less often
Adaptive Sampling

- Sample fast only when needed
- A lot of different ways to do it
- Our choice
Adaptive Sampling

- **Goals**
  - Diminution of the sampling rate when possible
  - Keep high measurements performance

- **Threshold**
  - $Dt_{max}$
Results

* Queue size
Results

- Queue size
- Threshold
- $D_t$ max variable vs $D_t$ max fixed
Results

- Measurements performance: $Ma$ around 0.8 and 0.85

$$M_{\text{measurement}} = 1 - \int_0^T \frac{(\delta_2(t) - \delta_1(t))^2}{(\delta_1(t))^2} dt$$

- Energy performance: $Me=0.92$

- Attention, LEDs! $Me=0.96$

$$M_{\text{energy}} = 1 - \frac{E_2}{E_1}$$
Conclusion

- Satisfied with our results
- A lot of problems during the project
- Possible to spare a lot of energy, always be aware of this
Sources

- Christopher M. Cianci, Distributed Intelligent Algorithms for Robotic Sensor Networks Monitoring Discontinuous Anisotropic Environmental Fields, EPFL, 2009
- Signal Instruments and Systems Course, Bachelor 6 SIE, 2013
- Signal Instruments and Systems Assignments, Bachelor 6 SIE, 2013