

Event Notification in the Embedded Domain

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Dagstuhl Seminar on Event Notification

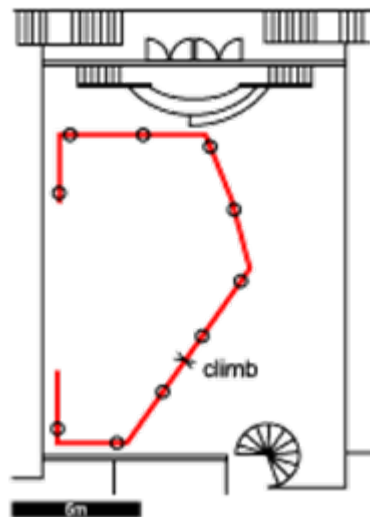
WIRELESS SENSOR NETWORK TO DETECT RT-EVENTS



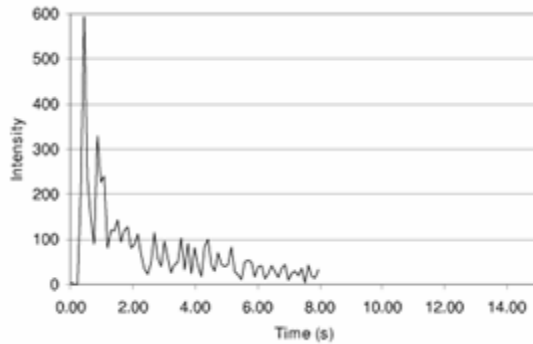
KH, KT, AV Event Detection in the Embedded Domain

TESTBED SETUP

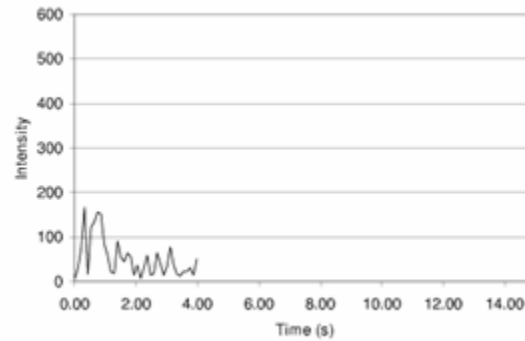
- Detection of security related events
- Discrimination of a person climbing over the fence among other events it may possibly be exposed to



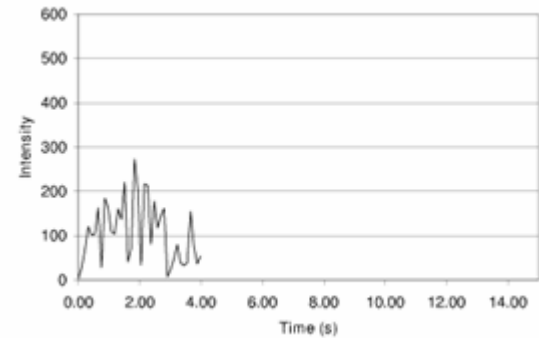
RAW DATA OF EVENTS



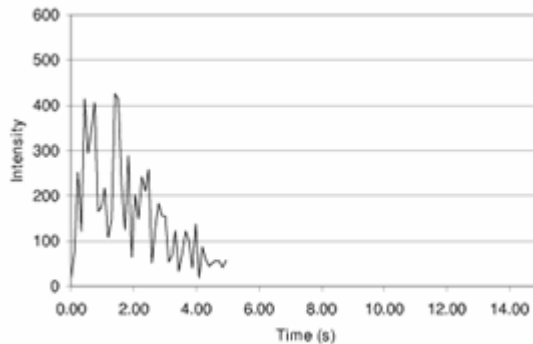
Kick event



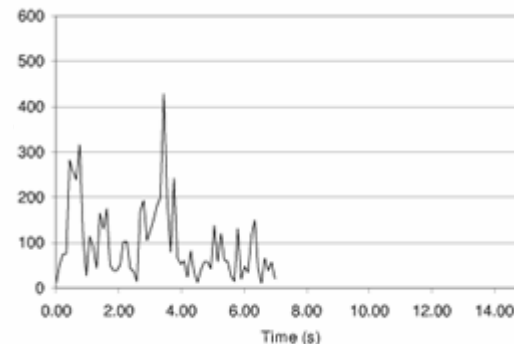
Lean event



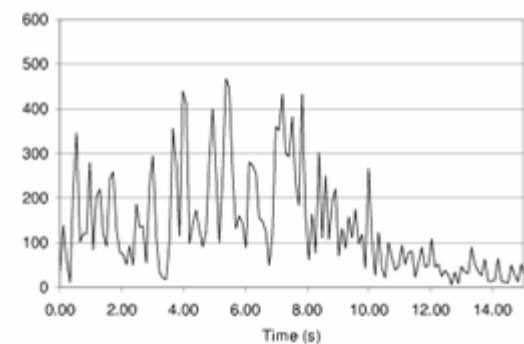
Shake (short) event



Shake (long) event



Peek event



Climb event

CHALLENGES

- Scarce resources (energy, memory, CPU)
- Distributed event-detection
 - Reduce network traffic
 - Multiple sources involved
 - Real-time event delivery
- Raw data streaming vs. in-network event detection

SCENARIO

- Detection of levels of danger of avalanches
- Different levels of risk
- Influential parameters
 - “static”: steepness, soil features
 - “dynamic”: amount of snow, temperature, pressure,
 - History of dynamic parameters
- What is the best deployment to cost-efficiently detect the local risk of avalanches and notify subscribers?



POSSIBLE SETUPS

- Scenario 1
 - Light-weight sensor nodes are used to regularly sample environment
 - All samples are forwarded to base station
 - Base station calculates current risk
- Scenario 2
 - Intelligent sensors nodes are aware of their *static* variables
 - Nodes locally calculate risk according to local samples
 - Aggregation of samples in local surrounding
 - If risk level changes, notification is sent to base station

CHALLENGES

- Find cost-efficient configuration
- Identify crucial costs for configuration decision
 - Energy, communication
 - Hardware, maintenance
 - Delivery time
 - Capture of history
 - ...?
- Is it possible to derive an (application specific) *cost model* to base decision on?

REFERENCES

- G. Wittenburg, K. Terfloth, F. López Villafuerte, T. Naumowicz, H. Ritter and J. Schiller:
Fence Monitoring – Experimental Evaluation of a Use Case for Wireless Sensor Networks.
In Proceedings of the 4th European Conference on Wireless Sensor Networks (EWSN'07), Delft, The Netherlands, January 2007 (slides partially taken from the corresponding talk)