Event Detection in Wireless Sensor Networks

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Key Ideas

First steps to providing robust real time WSN event detection:

- Support the specification of complex events
- Facilitate the translation from specification to code
Event Service Framework

Event specification
- Specification
- Analysis

Event transformation
- Event detection code

Event detection
- Event detection module
- Other modules

Sensor readings, time, localization, topology ...
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Sensor readings, time, localization, topology ...
• An extended class of Petri nets
• Extended to model additional features of WSNs:
  - communication
  - actuation and conditional events
  - timeliness
The three readings are present AND they have been generated within 30 seconds.
AND they have been generated within 5m distance of each other.
Analysis Capabilities

• Reachability analysis of Petri nets
  – Can events be detected?
  – What input is required for an event to occur?

• Topology analysis
  – Does the topology satisfy the application logic requirements?

• Communication pattern

• Real-time requirements of the system.

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Problem Statement

- Ease the burden on the programmer
- Decrease the cost of code development
- Improve code correctness
Automating The Process

• Currently:
  – This was applied for a fire detection application

• Future work:
  – Extend the work to generate the code for more complex MEDAL models
  – MEDAL GUI tool
Thank you