Management Optimization of Power Consumption for Autonomous WSN used in Smart Buildings

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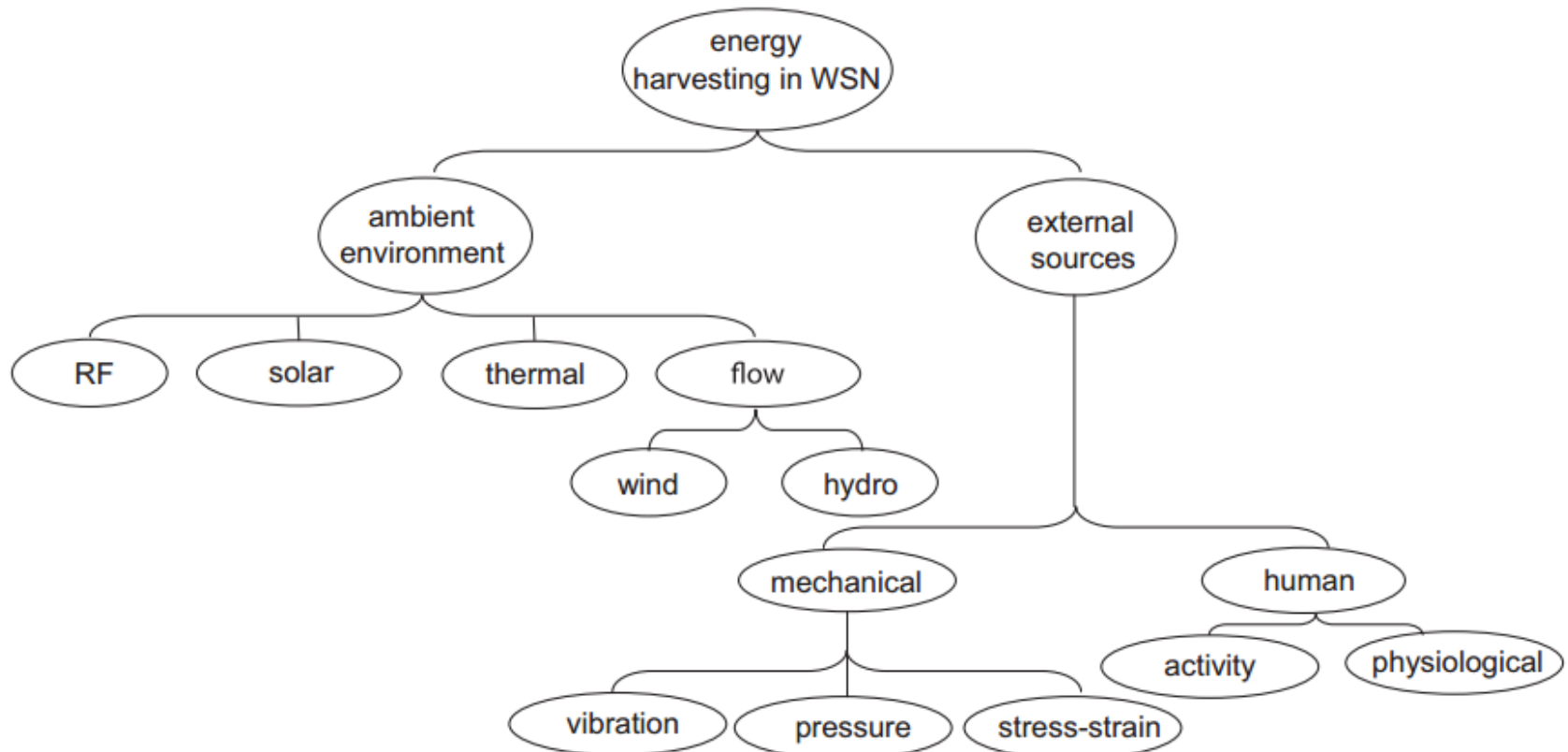ASEAN IVO Forum 2016, Hanoi

Sensors used in Smart Buildings

❖ Large numbers of

- ❑ Nodes
- ❑ Types
- ❑ Resources
- ❑ Measurement technologies
- ❑ Power requirements
- ❑ …

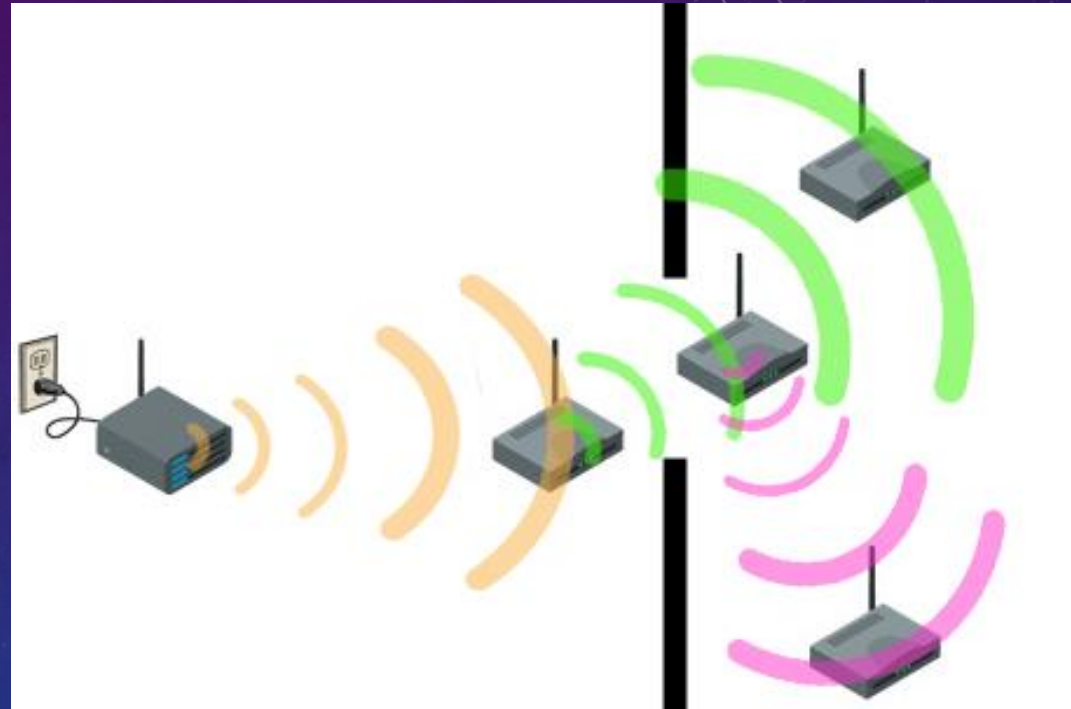➔ All sensors are going wireless in terms of communication, for what reason do they need to be powered by cables?

Energy Harvesting?

→ Not a radical solution for indoor applications!

Autonomous WSN by Energy Optimization

❖ One node can wirelessly share part of its energy

- ❑ To one or more neighbors
- ❑ Using RF technology
- ❑ With loss

➔ Energy "flows" through nodes

Why is it Challenging?

❖ High heterogeneity: nodes might have…

- ❑ Different roles in the network: giver and/or consumer

- ❑ Different priority

- ❑ Different power/storage/sharing technologies: RF, solar, cable, battery, wind,…

- ❑ Different power consumption requirements

- ❑ Different communication technologies & protocols

- ❑ Limited knowledge about their neighbors

➜A distributed optimization problem with constraints

Objectives

- ❖ Modeling the energy consumption, harvesting and sharing in WSN
- ❖ Developing a simulation platform for energy flow in WSN
- ❖ Developing wireless energy-sharing techniques
- ❖ Optimization of the energy sharing in autonomous WSN that allows to have different objectives and constraints, e.g.,
  - ❑ To have maximum life time of the whole network
  - ❑ To have maximum life time of certain important nodes

MICA Institute – HUST

- ❖ Located at B1 Building
- ❖ 3 research departments
  - ❑ Computer Vision
  - ❑ Speech Communication
  - ❑ Pervasive Spaces & Interaction
- ❖ 24 staff members (4 professors, 10 PhD)
- ❖ Dedicated projects, publications, theses in smart home/buildings/environments

Discussion

❖ Contact

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