Energy Efficiency vs “Performance” in Sensor Networks

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Sensor Network for Event Detection

In order to:

- Minimize Energy Consumption
  (i.e. Maximize Longevity)
- Maximize Probability of Event Detection

- Fusion Center
- Individual Nodes need to measure Correlated Quantities
- Must “learn” their neighbors
- Must settle on a MAC
- Must choose routes
Simplify the Problem

• Strip away multi-hop complexity focus on processing/transmission energy trade-off (L. Yu, A. Ephremides 2004)

• Focus on multi-hop (and routing) with only transmission energy expenditure (without worrying about MAC, neighbor discovery etc.)

• Unique and novel trade-off:
  – Choose nearest neighbor routing (from Energy Consumption viewpoint)
  – Choose farthest neighbor routing (from Event Detection Probability viewpoint)
  – Very recent work (Youngchul, Tong, Ephremides)