

Overview: Chapter 4 (cont)

▶ Location services

- Spatial quad-tree to allow node u to look for object at a certain location. The sensor at the location should let the location server know about it. U needs to be able to find this server



Chapter 5: Sensor tasking and control

- ▶ Techniques to task other sensors to perform some operations
 - Tracking objects require tasking sensors to take over the sensing, especially as the object moves towards those sensors
- ▶ Sensor are resource constrained
 - Reduce the number of nodes that need to be tasked
 - Utility and cost trade-off
- ▶ Task based sensing
- ▶ Information based tasking
- ▶ Groups



Task-driven sensing

- ▶ What are the important objects in the environment to be sensed?
- ▶ What parameters of these objects are most relevant?
- ▶ What relations among these objects are critical to whatever high-level information we need to know?
- ▶ Which is the best sensor to acquire a particular parameter?
- ▶ How many sensing and communication operations will be needed to accomplish the task?
- ▶ How coordinated do the world models of the different sensors need to be?
- ▶ At what level do we communicate information, in the spectrum from signal to symbol?



Roles of sensor nodes and utilities

- ▶ Sensors may take roles such as sending, routing, sensing and routing or idle

- ▶ Information-based sensor tasking
 - Base sensor selection decisions on information content as well as constraints on resource consumption, latency and other costs
 - Incrementally update the belief by incorporating the measurements of nearby sensors.
 - Not all sensors provide useful information (redundant)
 - Selection must be done without explicit knowledge of measurements residing at other sensors using known characteristics such as position, sensing modality, contribution and phenomenon being monitored



IDSQ: Information driven sensor query

- ▶ Information utility measure: Mahalanobis distance
- ▶ Cluster leader based protocol
 - Elect a cluster leader
 - When events are sensed, all sensors within range need to select a leader
 - Choose closest sensor: time stamp DETECTION message
- ▶ Sensor tasking in tracking relations
 - Am I surrounded?
 - Precise location note important



Joint Routing & Information aggregation

- ▶ Query proxy initiate query to high activity area and back.
- ▶ Moving center of aggregation
- ▶ Multistep information directed routing



Sensor group management

- ▶ Geographically based collaborative sensing groups

