LASS/Sensors
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Multi-user Data Sharing in Radar Sensor Networks

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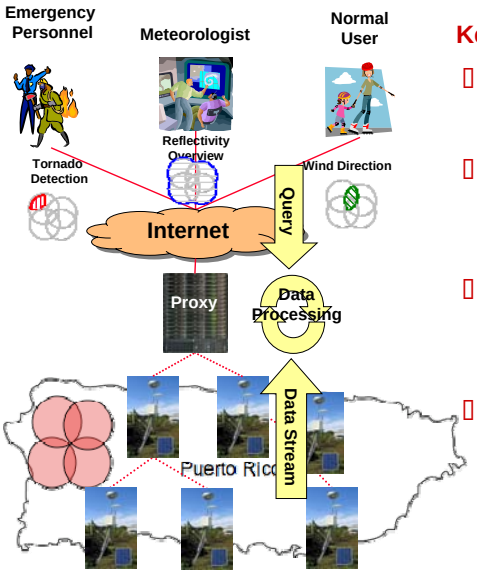
MUDS Motivation and Key Ideas

Challenges:

- Diverse data quality metrics
  - Tornado: location error in tornado detection.
  - Wind direction: direction error in wind direction estimation
- Different spatial areas of interest
- Different priorities and deadlines

Problem Statement:

- Jointly optimize for different data quality and network performance needs of different users
- Share bandwidth and data across different users
- Adapt gracefully to bandwidth dynamics
- Prioritize important data during critical weather events.



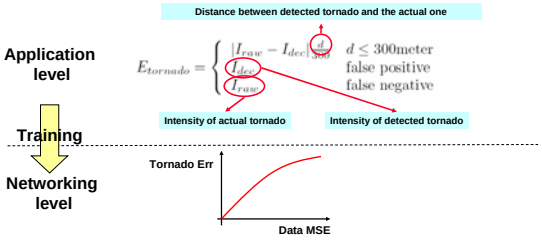
Key Ideas:

- **Multi Query aggregation** to maximize data sharing among users
- **Progressive compression** to minimize bandwidth usage and adapt to bandwidth fluctuation
- **Utility-driven transmission scheduling** to prioritize data transmission and maximize overall utility
- **Global transmission control** to prioritize data transmission among radars

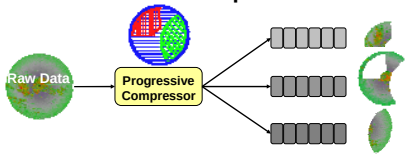
Key Techniques

Utility-driven Scheduler: Decides which packet offers greatest improvement to overall utility

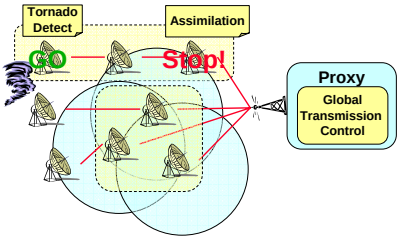
- How to determine utility of packet to an application?
- How to aggregate utilities across diverse queries?
- How to schedule packets based on their utilities?



Progressive Compressor: Compress raw data into progressive streams based on queries



Global Transmission Control: Proxy pauses streams that are achieving low/no utility gain

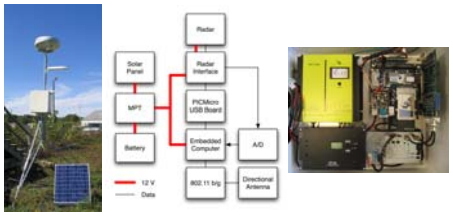


Wireless Radar Networks Testbed

Two ongoing off-the-grid radar testbeds:

Puerto Rico testbed, Amherst testbed

Portable Radar Prototype



One existing on-the-grid radar testbed: Oklahoma testbed

This work is supported primarily by the Engineering Research Centers Program of the National Science Foundation under NSF award number 0313747. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the authors and do not necessarily reflect those of the National Science Foundation.