Sensor Data Management: New Applications and New Challenges

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Challenge #5

Real-time
Large Synoptic Survey Telescope

- LSST first light in 2015
- 15 TB/night
- transient alerts
- <30sec
- detecting NEOs
Challenge #4

Integration
Integration Needs

- **Capabilities**
  - JOIN/Aggregate over multiple sensor types
  - JOIN with historical data
  - JOIN with non-sensor data (APIs?)

- **Improvements**
  - Query optimization?
Challenge #3

Declarative
- Users want to only see (high-level) events of interest
  - e.g., detect traffic violation VS report all car speeds

- Must have high-level declarative way to program/query sensor networks

- Some progress in this area: event detection languages/systems
Challenge #2

Personalization
I do not drink coffee

Do not accept calls from Fred

Personal Threshold
I do not drink coffee.

Do not accept calls from Fred before the tunnel.

Personal Threshold
Challenge #1

User Interfaces
Technology Trend:
Proliferation of smart mobile devices

for: Networked Sensing

for: Information Access

UI Challenge
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☐ CAREER: User-Centric Data Management

☐ Algorithms and Metrics for Next Generation Data Stream Management Systems

☐ Secure CITI: A Secure Critical Information Technology Infrastructure for Disaster Management