**Objective**

First responders at the edge want to monitor open source social media feeds in real-time to enhance public safety.

**Operational Challenges**

**Increased cognitive load**
Volume and velocity of raw data increases the cognitive load on edge users.

**Dynamic environment**
Relevance is dynamic

**Discovery**
What needs to be monitored is unknown and changing

**Local Context**
Global trends may not be relevant to local events.

**Hypothesis and Technical Challenges**

**Hypothesis:**
Given a local context where patterns of interest are scattered without any dominant trend or pattern, events and emerging trends can be identified in sufficient time to inform operations.

**Technical Challenges:**
How can we summarize streaming data?
How fast can we determine changes?

**Flexible infrastructure**
- **Process real-time streams**
- **Scalability:** Quickly from a laptop to enterprise cloud
- **Platform:** Support multiple programming languages
- **Development Time:** Rapid and parallel development

**Solution**

Monitor social media streams (e.g., Twitter) in real time
- Sentiment analysis
- Topic modeling
- Social network analysis

**Reduce Cognitive Load**
- Flexible searching
- Custom alerting
- Transform data into patterns
- Visualize patterns

**Types of Trend Analysis**

**Macro**
- Collective trends
- Noise-tolerant
- Privacy protecting
- Large data volume

**Micro**
- Targeted and context specific
- Requires higher accuracy
- Privacy issues

**Field Experiments and Results**

**Pilots**
1. Huntingdon County EMA (Creation Festival 2013)
2. Weapons of Mass Destruction Civil Support Team (Little League World Series)

**Observations & Feedback**

**HCEMA and WMD-CST showed the potential**
- HCEMA - “Harlem Shake”: Event took 7 minutes to verify after Edge Analytics picked it up
- WMD-CST - “Bomb threat”: Detected and determined to be a hoax

**Challenges and Future Work**

- False positives from keywords
- Dynamic and adaptive discovery of relevant artifacts
- Non-textual inputs
  - Voice
  - Multi-lingual challenges and Leetspeak
  - Images and Video
- Feedback to support preventative/influence operations