

Data Reliability Challenge of Future Cyber-Physical Systems for Smart Cities

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Data Reliability Challenge in CPS

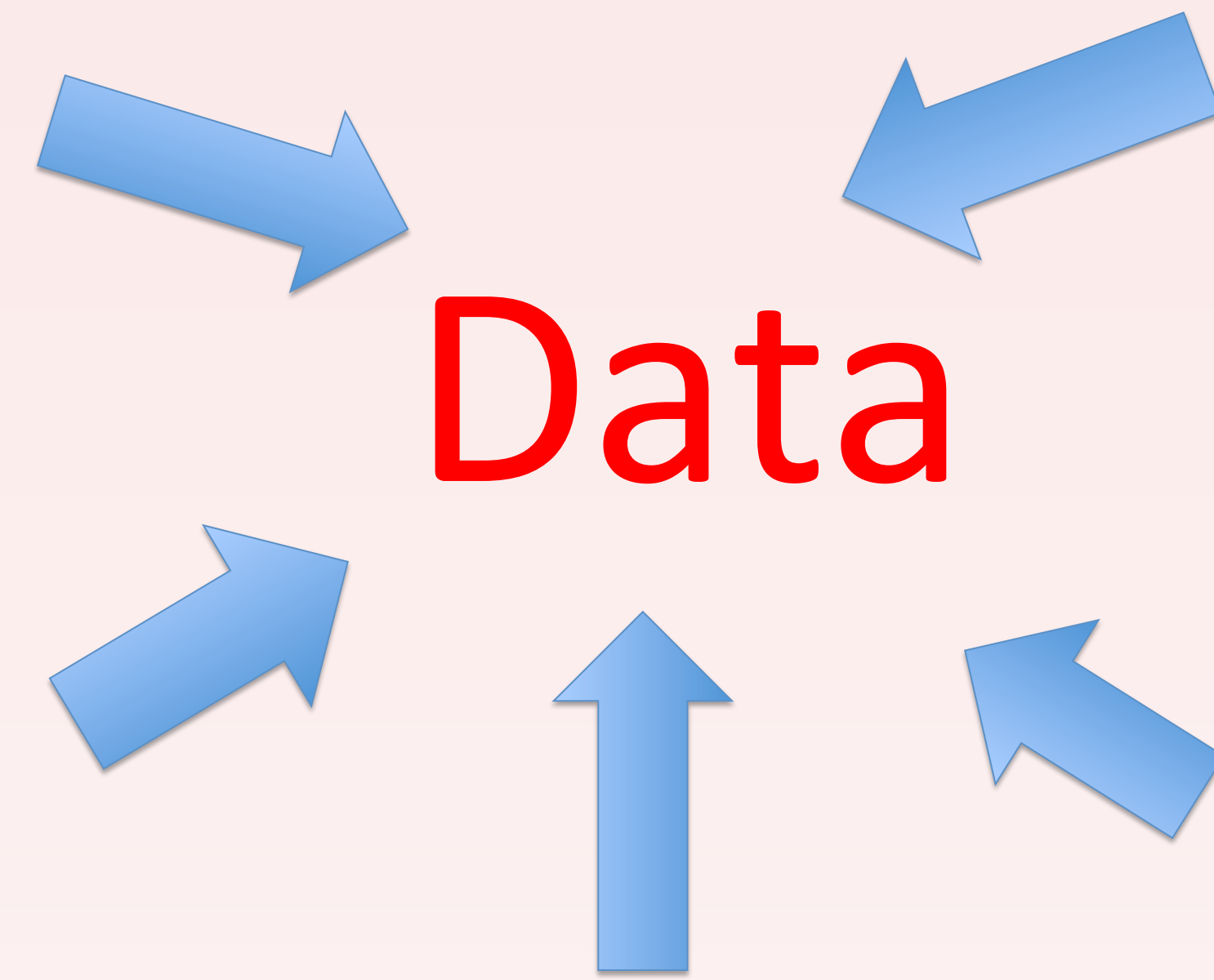
- Traditional reliability dimensions in CPS: Temporal Correctness and Functional Correctness
- An emerging dimension of reliability in CPS: **Data Reliability**
- Motivated by the trend of having human in the loop of CPS
- Data reliability challenge exists in many CPS applications (e.g., transportation, energy, environment sustainability, agriculture, health and disaster response)



Agriculture



Energy



Disaster Response



Health and Fitness



Environment Sustainability

Social (Human-centric) Sensing: An Emerging Application Paradigm for Smart Cities

Events



Nepal Earthquake



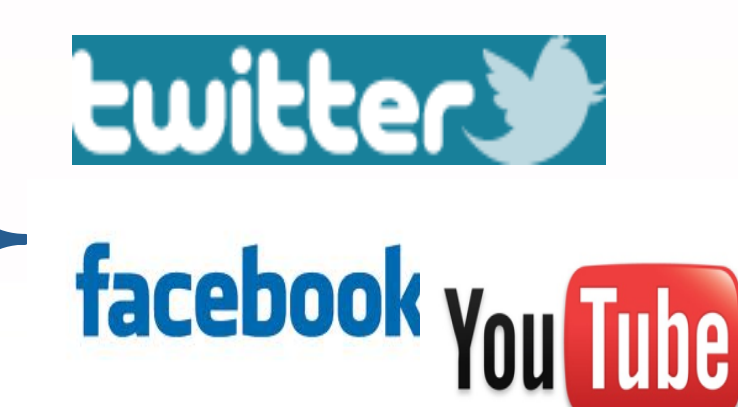
Paris Attack



Boston Marathon Explosion



News and Public Sources



People



Sensors

Analytics



Data



Decision Support



Emergency Response



Intelligent Transportation



Smart City

Research Goal and Technical Challenges

- **Goal:** Design a reliable state estimator to reconstruct the states of the world, both physically and socially
- **Challenge 1:** How to achieve reliable sensing using unreliable data sources?
- **Challenge 2:** How to ensure the quality of the analysis results (e.g., compute error bounds)?
- **Challenge 3:** How to address both physical and social constraints brought by having humans in the loop of CPS?
- **Challenge 4:** How to validate the estimator using real world CPS applications?



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