CPS: Medium: Collaborative Research: Security vs. Privacy in Cyber-Physical Systems

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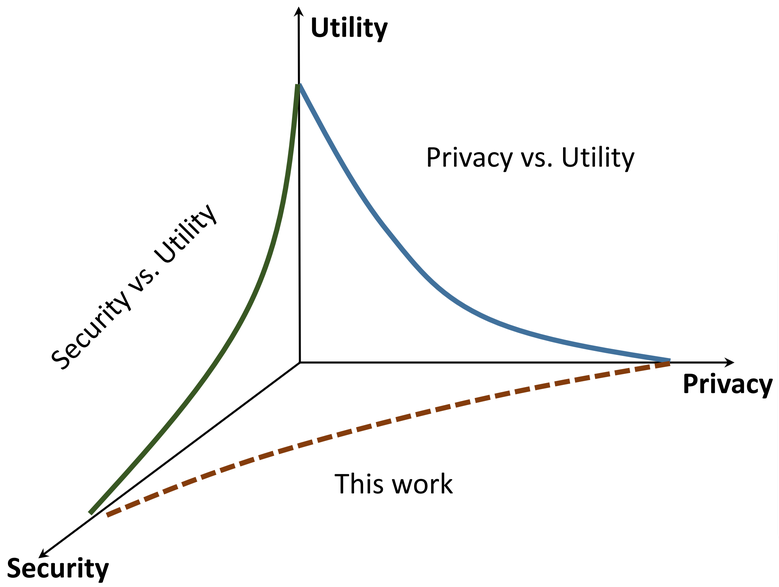


This research examines the scientific foundations for modeling security and privacy trade-offs in cyber-physical systems, focusing on settings where privacy-protection technologies might be abused by malicious parties to hide their attacks. The goal is to provide both security and privacy guarantees for a variety of cyber-physical systems.

Challenges

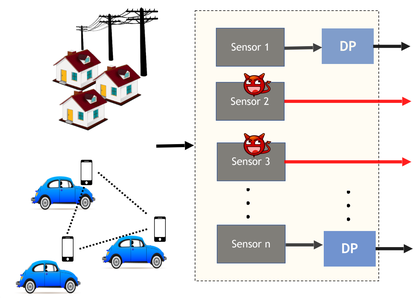
- Preserve confidentiality and security of sensor data.
- Minimize the overhead of confidentiality-preserving techniques for a real-time control system.

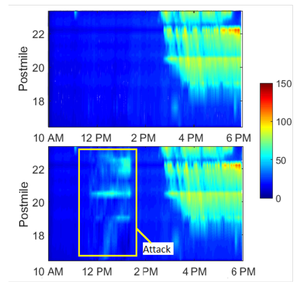
Security and Privacy with Differential Privacy in Cyber-Physical Systems

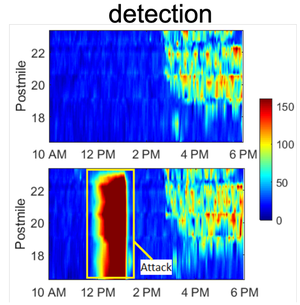
Classical Utility: Usable Statistics, Reason for data collection

Privacy: Protect consumer data

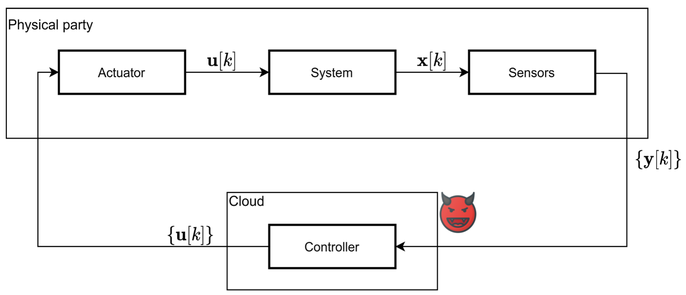
Security: Trustworthy data, Detect data poisoning, Different from classical utility because this is an adversarial setting







Ongoing Work:
Security and Privacy
Privacy-Preserving
Crypto



Recent Publications

- Giraldo, Cardenas, Kantarcioglu, Katz. Adversarial Classification Under Differential Privacy. **NDSS 2020**
- Ozdayi, Kantarcioglu, Gel. Defending Against Backdoors in Federated Learning with Robust Learning Rate. **AAAI 2021**

Broader Impacts

- Interdisciplinary theoretical advances (security/control) to consider privacy and security in the design of cyber-physical systems.
- Outreach and mentoring activities supporting underrepresented students in STEM at both graduate and undergraduate levels

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