Security Certification of Autonomous Cyber-Physical Systems

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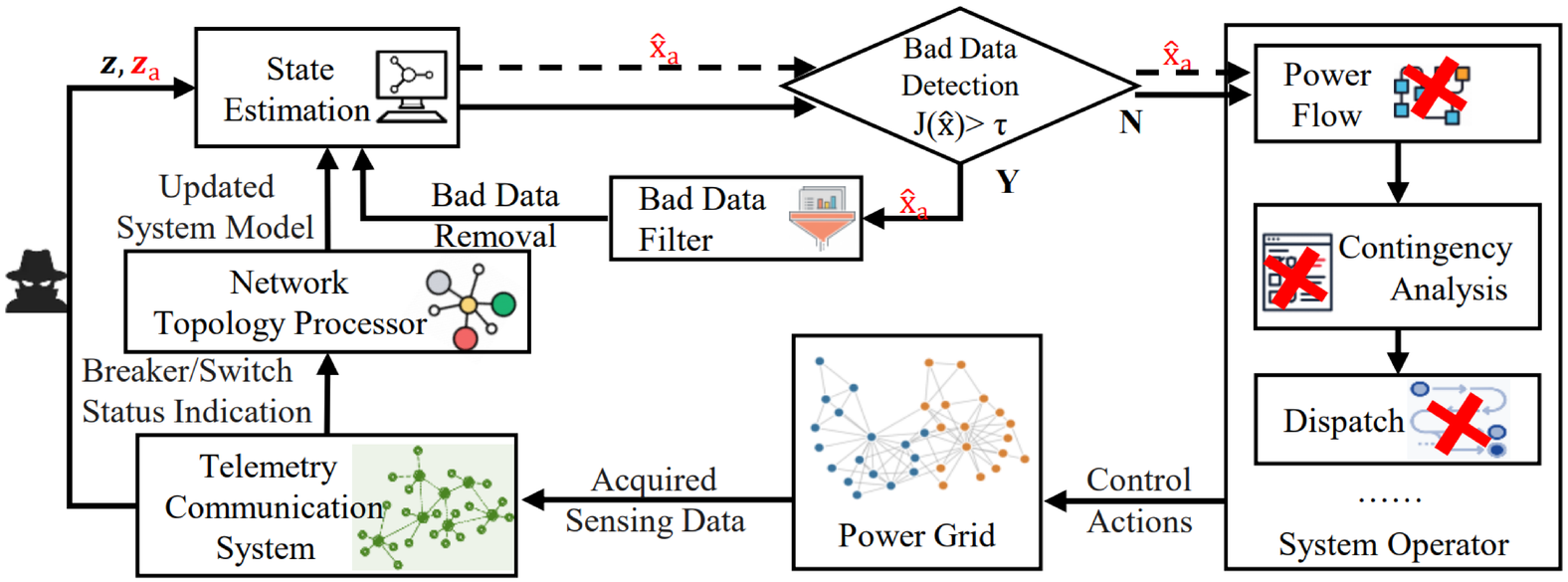
PI: Shuo Wang (University of Florida), Co-PI: Teng Zhang (University of Central Florida)

Challenge:

- Difficult to precisely model power system security especially when the scale increase.
- Sequential impacts of attacks on state estimations and following applications.

Solution:

- A physics-informed estimator constructed based on Long-Short-Term-Memory (LSTM) networks.
- A dynamic loss derived from physical grid information captures the temporal variation of measurements.
- Extensive simulations to justify the performance of the proposed algorithm.



Scientific Impact:

- An in-depth study to understand the relationship between attacks and system level properties of autonomous CPS.
- Design of novel robust state estimation methods that can particularly aid mission critical CPS, which cannot be abruptly stopped upon an attack.

Broader Impact:

- Our proposed framework will have enormous impact, not only on our daily lives, but also on national security.
- Engage high school students, undergraduates, and under-represented minorities in autonomous CPS and cybersecurity projects such as the smart grid and LEGO setup representing smart infrastructure.

Award# 1818500, University of Florida (shuo.wang@ece.ufl.edu), University of Central Florida (teng.zhang@ucf.edu)