2021 NSF CYBER-PHYSICAL SYSTEMS PRINCIPAL INVESTIGATORS' MEETING

CPS: Small: Data-driven Real-time Data Authentication in Wide-Area Energy Infrastructure Sensor Networks

Challenge:

- Data in wide-area energy infrastructure sensor networks are vulnerable to attacks from malicious cyber hackers.

Solution:

- Authentication of power system data by way of its unique spatio-temporal features.
- Multiple feature extraction and machine learning methods were used for cyber attack detection in CPS. These methods have been validated using actual field data collected by GridEye (link) in U.S. power grids.

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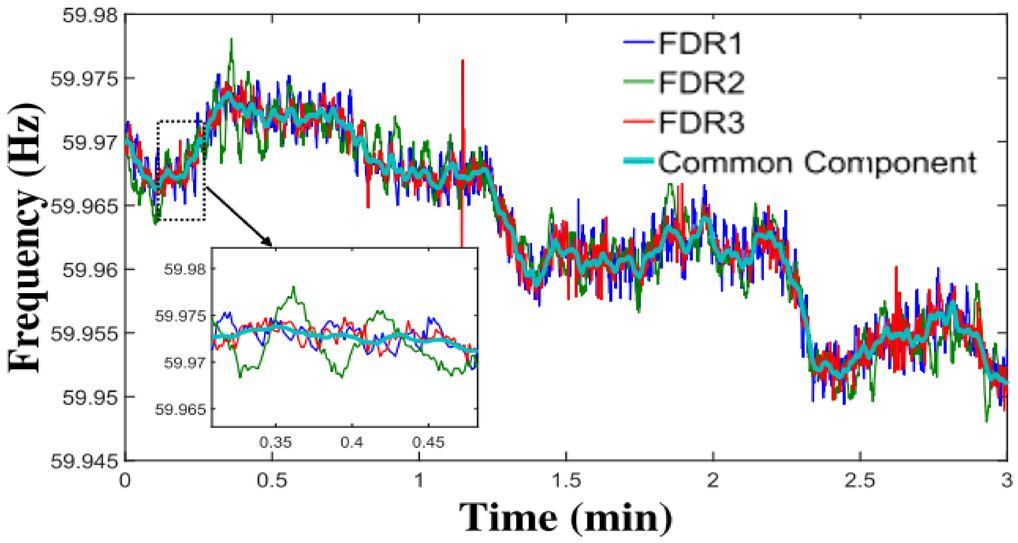
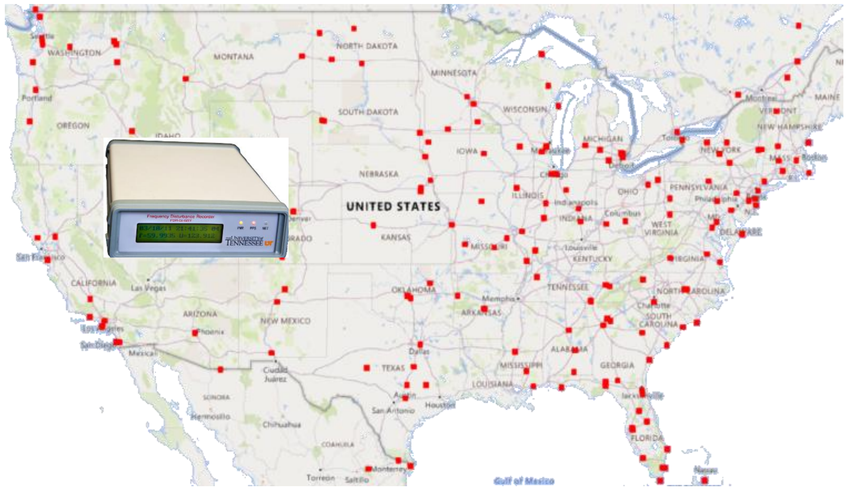
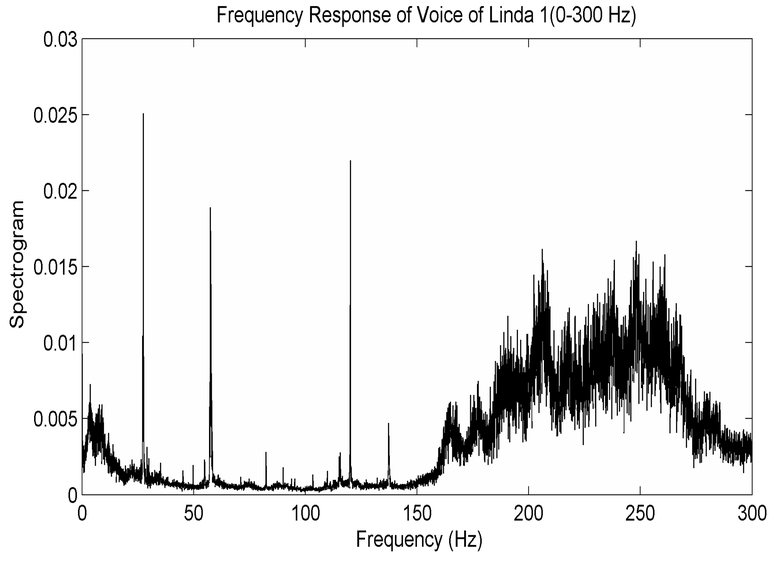


Spatial signatures of data at different locations



Locations of FDRs



Scientific Impact:

- Real-time data authentication applied to power grids data and other CPS.

Broader Impact:

- Unconventional security approach that could be used in other areas.
- A good example for students to see cross field application.