Engineering Analysis Task Team (EATT)

Evangelos Farantatos (EPRI) – Co-Lead

NASPI Meeting

April 26 2018

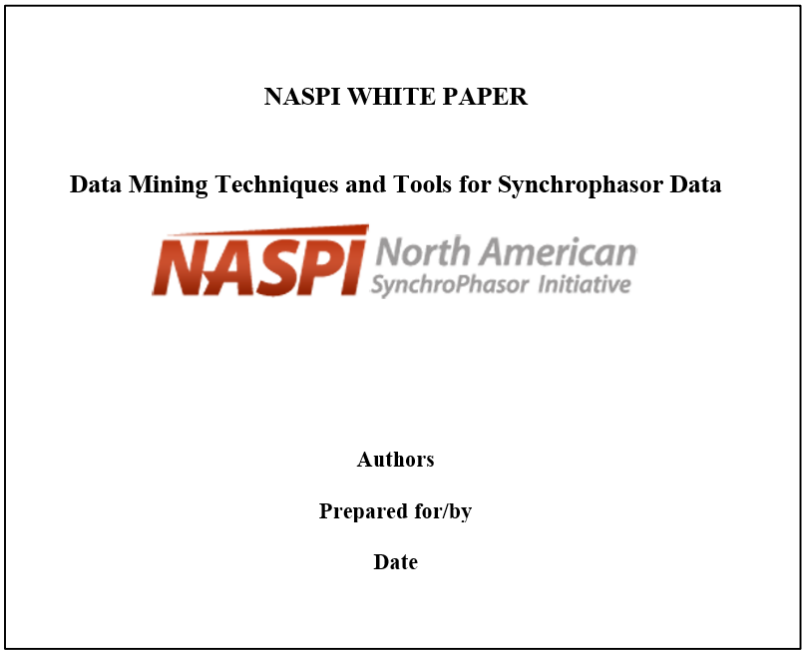
Albuquerque, NM

EATT Breakout Agenda

- Present Activities
- New Business
- Presentations
  - *"Machine Learning Techniques for Oscillation Baselining in the Western Interconnection"*, Jim Follum, Jason Hou, Pavel Etingov, Frank Tuffner, & Heng Wang, Pacific Northwest National Laboratory; Dmitry Kosterev & Gordon Matthews, Bonneville Power Administration
  - "*Big Data Framework for Synchrophasor Data Analysis*", Pavel Etingov, Jason Hou, Huiying Ren, Heng Wang, & Dimitri Zarzhitsky, Pacific Northwest National Laboratory
  - "*Surveying Time Series Data Platforms: A Technology Overview with Benchmarks*", Sean Murphy, PingThings, Inc.; Kevin D. Jones, Dominion Energy; Michael Andersen, UC Berkeley
  - "*Applicability of Synchrophasor Data for Fault Analysis*", Nuwan Perera, ERLPhase Power Technologies Ltd.
  - "*New Approaches to Protection and Control Enabled with GPS-Synchronized Merging Units*", Sakis Meliopoulos, Georgia Institute of Technology

Present Activities

- **Data Mining Techniques and Tools for Synchrophasor Data**
  - **NASPI White Paper**
  - **Lead: Brett Amidan (PNNL)**


NASPI WHITE PAPER

Data Mining Techniques and Tools for Synchrophasor Data

NASPI North American SynchroPhasor Initiative

Authors

Prepared for/by

Date

White Paper Focus:

- give a high level overview of data mining
- review how data mining has been used in industry
- present common big data architectures, software languages and tools that facilitate data mining
- provide use cases that show how data mining has been applied in the power systems community
- discuss possible future ways to apply data mining to the power grid and more specifically with synchrophasor data

Data Mining Techniques and Tools for Synchrophasor Data - Outline

1. Introduction
   - Synchrophasor Technology Background Information
   - Data Mining Background
     - Definition
     - Use of Data Mining in Other Industries
   - Big Data Architecture Background
2. Data Mining Techniques
   - Feature Extraction
   - Clustering (Unsupervised Learning)
   - Classification (Supervised Learning)
   - Model-based Approaches
   - Aggregation Strategies
3. Software Tools and Big Data Platforms for Data Mining
   - Data Mining Tools
     - Open Source Languages/Software
     - Commercial Languages/Software
   - Big Data Platforms and Databases
4. Use Cases
   - Data Mining Applications for the Power Grid
   - Data Mining with Synchrophasor Data
5. Conclusions

Contributors:

- PNNL – Bret Amidan
- PNNL – Pavel Etingov
- ORNL – Femi Omitaomu
- ATC – Xiangyang Zhou
- CSRA – Tom Rizy
- UTK – Kai Sun
- Columbia University – Daniel Bienstock
- FSU – Reza Arghandeh

Contact us if you are interested to contribute

Goal: Finalize white paper by the October 2018 NASPI meeting

New Business

Data repository for benchmarking various algorithms & tools

- Data availability is a challenge for AI applications development, testing and evaluation
- Synthetic data & actual data
- Anonymized data
- Data confidentiality and associated legal issues is a concern
- Different datasets for different applications

Calls will be scheduled to come up with a plan for future steps