QUESTIONS AND ANSWERS (Q&A)

THE NORTH AMERICAN SYNCHROPHASOR INITIATIVE &
IEEE SYNCHRO-WAVEFORM TASK FORCE

JOINT WEBINAR

Synchro-Waveform Data Analytics Architecture and Big Data Platform for Grid Operations and Situational Awareness

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Q: How would availability of CPOW data continuously, rather than snippets, change your ability to develop AI/ML models?

A: A main aspect is event grouping. With CPOW, event grouping is easier (grouping for snippet-based is also possible but needs better orchestration with the sensor settings). Also, with CPOW, there's lower chance of missing any signatures

Q: How is the AMI and waveform merged/augmented to help identify/localize? Do they always agree? If not is there a way to give more weightage to waveform signatures?

A: Waveforms give context to the many AMI data points. If the pattern recognition is successful, then location can be established. So, waveform analytics is key here.

Q: Could you comment on (1) the extent of effort involved in training the models. (2) false positives and false negatives.

A: Most of the computational bottlenecks are around feature extraction and augmentations rather than model training. 2) we have achieved almost perfect precision for anomaly detection and >85% for characterization.

Q: Thank you for your great presentation. Does the classification stage identify the Type of the events or does it only categorize (cluster) the different groups of signatures without particular labels?

A: Clustering is performed for all detections, but classification is performed for specific categories of event types that we decide within Grid Ops

Q: Most of the example applications you described (for example, incipient fault detection) used waveforms recorded at a single location. Have you done any work yet on analyzing correlations between waveforms at different locations?

A: We have done RTDS studies, but in our real system application, we only have waveform records from the substation. With next-generation AMI 2.0 and enhancements to our grid communications network, we will get waveform records from downstream of the substation in the future.

Q: How do you determine the location of the fault? please elaborate on the details.

A: We've developed several algorithms for this. In the AMI-based approach, waveforms give context to the many AMI data points. If the pattern recognition is successful, then the location can be established through the AMI geo-locations. However, these are augmented with the grid and device metadata and triangulated with other sensors and fault location methods to get the most accurate and actionable locations.

Q: You mentioned that there have been new vendors since 2021 that were impressive. Which vendors and what solutions were you impressed with?

A: As mentioned during the webinar, we are agnostic to the vendor or technology. However, many data platforms (AWS, Google, Azure, Cloudera etc.) should support open and/or coordinated analytics development and model deployment to allow this type of augmentation and interoperability with other/external data types. In addition, we've seen power systems specialized vendors like PingThings and Toumetis that build a targeted platform for waveform data analytics for power systems. We cannot comment on how well they work, but we know Dominion Energy has had some success with PingThings and San Diego Gas & Electric is doing a pilot with Toumetis. You may try reaching out to those utilities for more insight.