SnT 2025 CTBT: SCIENCE AND TECHNOLOGY CONFERENCE
8 SEPTEMBER ONLINE DAY
9 TO 12 SEPTEMBER AT HOFBURG PALACE, VIENNA & ONLINE

Generative Neural Networks in Nuclear Test Monitoring

LIGHTNING TALK P2.1-601

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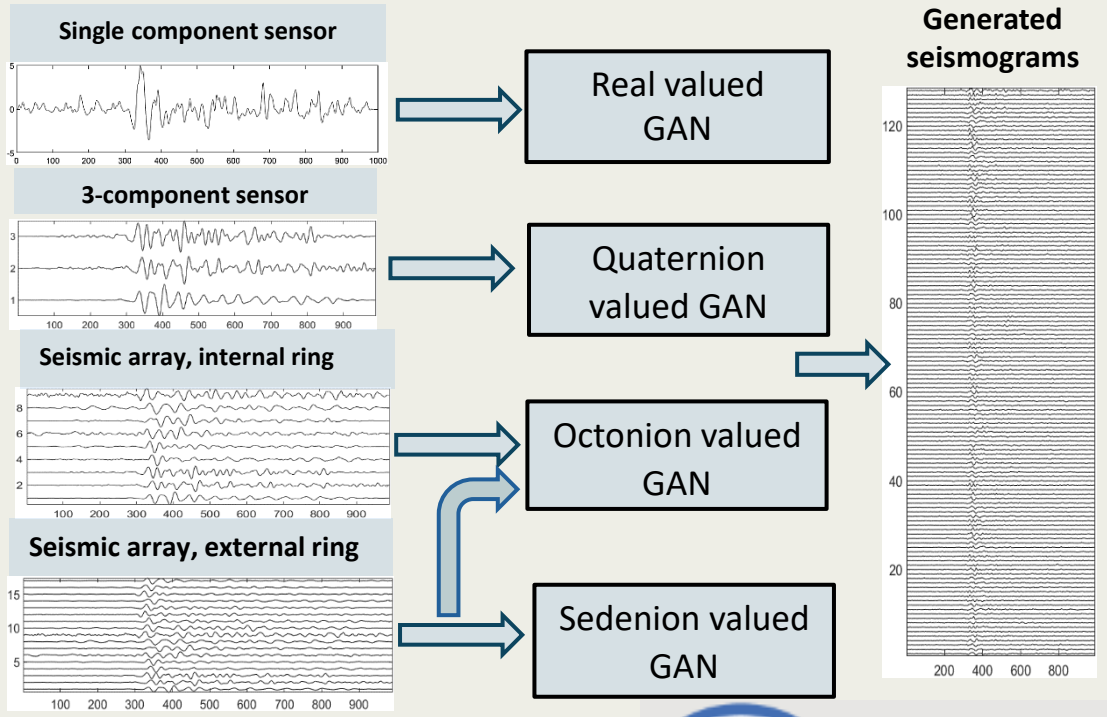
- This poster is about our Temporal Generative Adversarial Neural Networks developed for producing quality multicomponent synthetic seismograms. It's important, because synthetic seismograms are the basis in many CTBT-related tasks, such as seismic source characterization, mechanism determination and hypocenter determination
- What's new? Seismic waves arriving at a sensor array are not independent signals. They are the same wavefield measured at different points in space. The phase and amplitude of the signals across the array's sensors are fundamentally correlated. By representing the data from a group of sensors as a single hypercomplex number, the network's operations become more expressive and parameter-efficient. It learns a single transformation on a richer mathematical object, instead of independent transformations on multiple real-valued channels.
- In contrast to well-know 1D time series generative models, we developed deep hypercomplex networks, treating time samples of multichannel seismic installation as components of hypercomplex numbers thus preserving cross-sensor coupling/awareness. This is also a Physics-Informed and Geometry-Informed Network (PINN/GINN).
- The most important result of our work is producing extremely diverse highly realistic synthetic seismograms.
- If you want to find out more, come over for a chat in front of our poster P2.1-601



Instrumental Software Technologies, Inc.