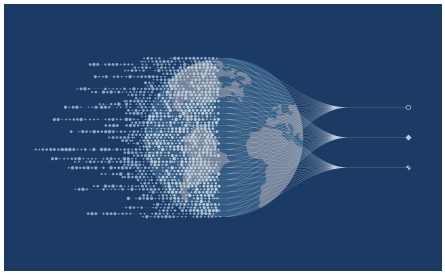

ID: **P3.5-429** Type: **E-poster**

Towards Precision Monitoring: A Scalable CNN-Based Signal Classification Framework

Thursday 11 September 2025 11:00 (1 hour)

The increasing volume and complexity of seismic data require advanced techniques for efficient signal classification, particularly in monitoring compliance with the Comprehensive Nuclear-Test-Ban Treaty (CTBT). This study introduces a robust approach using Convolutional Neural Networks (CNNs) to automate seismic signal classification, significantly improving both accuracy and classification speed. Unlike most traditional methods that rely on separate feature extraction tasks performed by experts, the CNN model autonomously learns and extracts pertinent patterns directly from data, enabling more precise and objective classification. Trained on a real seismic dataset encompassing a diverse range of seismic events, the model achieves impressive performance with classification accuracy exceeding 96%. The approach allows for rapid automated feature extraction and classification with robust handling of noisy and complex data, making it easily adaptable for diverse seismic environments.
Comprehensive implementation details are provided, ensuring scalability and facilitating replication across global seismic monitoring networks, thus contributing to advancements in seismic analysis and global security.

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Session Classification: P3.5 Analysis of Seismic, Hydroacoustic and Infrasound Monitoring Data

Track Classification: Theme 3. Monitoring and On-Site Inspection Technologies and Techniques: T3.5 Analysis of Seismic, Hydroacoustic and Infrasound Monitoring Data