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Software Engineering Aspects of Modifying and Enhancing NET-VISA to Incorporate Long Term Priors

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The NET-VISA software package features a physics-based probabilistic model combined with a heuristic inference algorithm to identify the most likely set of seismic events corresponding to a series of detections by a global seismic network. It has been enhanced to detect events occurring in three mediums – rock, air and water – and supports seismic, hydro-acoustic and infrasound sensors.

The International Data Centre (IDC) of the Comprehensive Nuclear-Test-Ban Treaty Organization is enhancing its event detection capabilities using NET-VISA. NET-VISA events are added to Standard Event Lists (SEL). We present efforts to incorporate long term priors into the system. This approach involves generating priors from an extensive dataset spanning approximately five-ten years, capturing averaged network and station behavior across diverse environmental conditions and configurations. The extended training period could yield a comprehensive set of priors, which would then be applied to all processing over periods of a year or longer, ensuring greater consistency in event detection and analysis. We also developed a new metric to evaluate the quality of automated seismic bulletins in comparison to human-annotated ones.

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