

# Detecting Seismic Events Using a Supervised Hidden Markov Model (HMM)

- **Objective:** detect the arrival of P-waves in streaming seismic data more efficiently than current methods; detect more events while maintaining or decreasing the detection of false signals.
- **Technical Approach:** train a Hidden Markov Model (HMM) on expert-picked arrivals and apply it to streaming seismic data. HMM's have successfully been applied to temporal pattern recognition problems in the past, such as speech recognition.
- **Results:** when applied to P-waves from 3 IMS stations, HMM's have fewer false detections than STA/LTA while maintaining the same true detection rate. The HMM's use 64 features to make detections, including STA/LTA, polarization characteristics, frequency content, and higher-order statistics.

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