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Science Slam
1-mn poster presentation
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Detecting Low Magnitude Seismic Events using Convolutional Neural Networks

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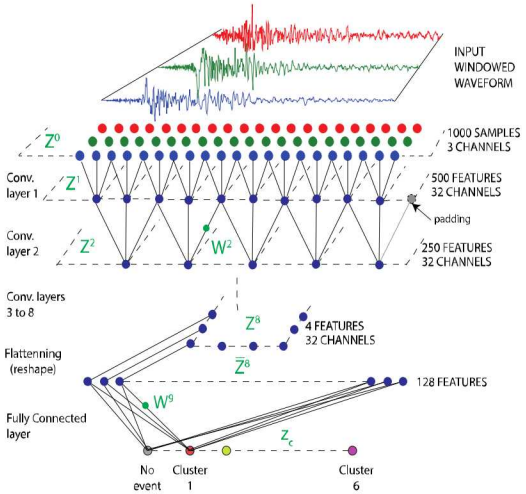


Input: 10 second windows. Eight convolutional layers; down sample the signal by two; 32 filters each.
Output: 128 features then a fully connected layer containing class scores.
Batches of 128 windows consisting of 64 noise and 64 signal events per batch. We use the ADAM optimizer and a learning rate of 10E-4.

MAIN POINT:

- Use new CNN methods on a new expert picked arrival dataset to understand advantages and limitations of current CNN methods.
- **This approach has the potential to rival or surpass traditional methods of detecting low magnitude seismic arrivals.**

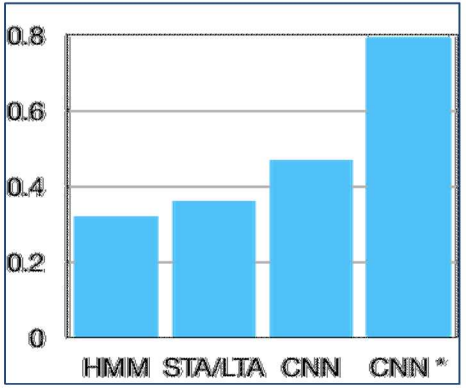
WHY

- More sensitive modern methods suffer from performance drawbacks, requiring large libraries of templates or lots of computing.

HOW

- Create a Convolutional Neural Network that understands 3 component seismic data.
- Train it with DNE18 data and low magnitude events.
- Examine initial performance and compare to existing methods.

Results - Precision



Precision of various detection algorithms on this dataset.

HMM – Hidden Markov Model detection algorithm.
CNN – ConvNetQuake
CNN * - ConvNetQuake with potential newly discovered arrivals

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