

# Computational intelligence algorithms for seizure prediction

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## Epilepsiae

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# EPILEPSIAE

## Computational Intelligence Algorithms For Seizure Prediction

- Feature Extraction from EEG signal
  - ▣ energy, time-frequency and nonlinear dynamic
- Classification of the brain state into four classes:
  - ▣ inter-ictal, pre-ictal, ictal, post-ictal.
- Artificial Neural Networks in the original 14 features space (several architectures are compared: feedforward, with and without memory, radial basis function, Elman, etc).
- Multidimensional Scaling to reduce the 14th dimensional space to 3-dimensional space where classification may be done in an easier way.

Feature  
Extraction

Classification

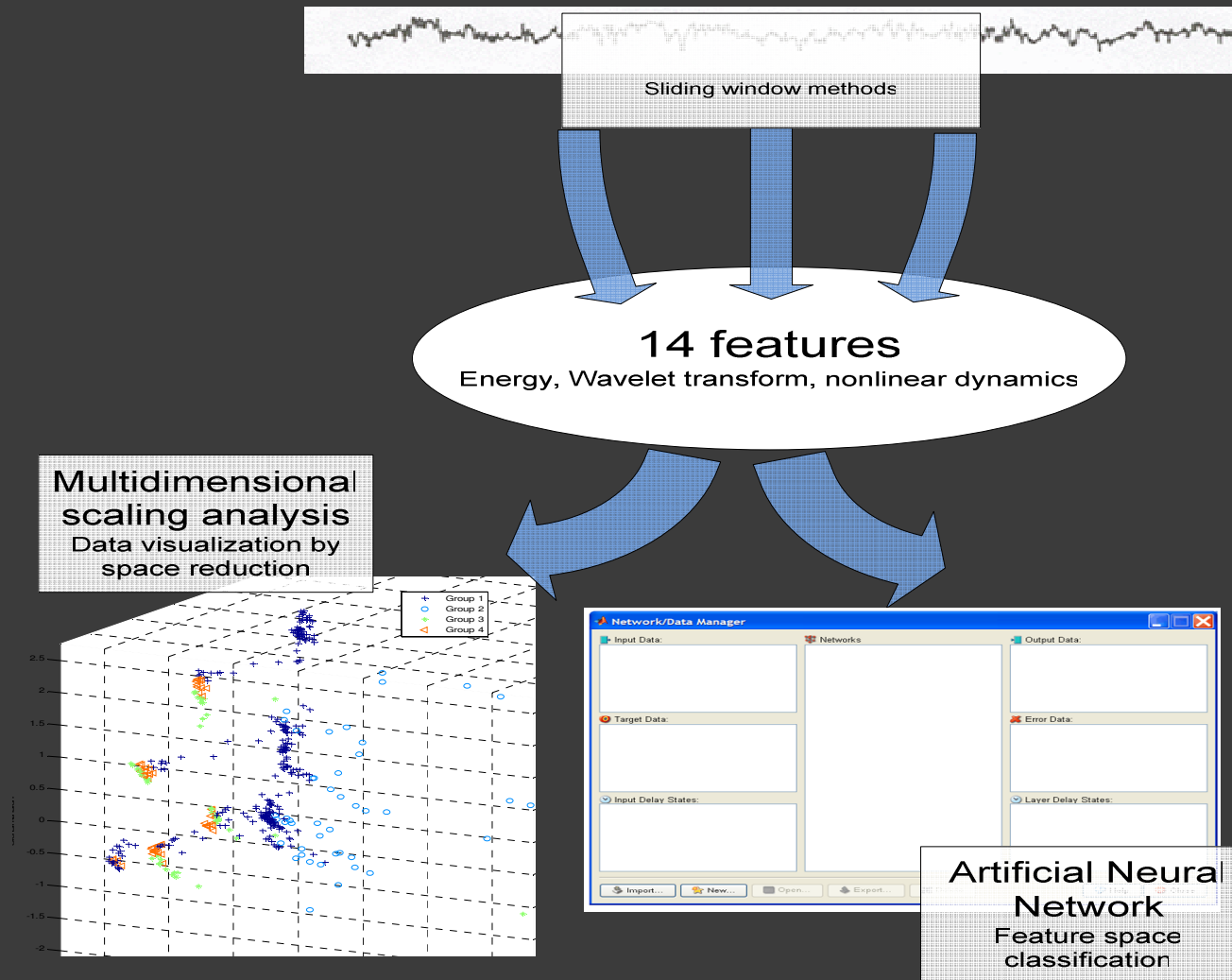
Artificial Neural  
Networks

Multidimensional  
scaling

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## Computational Intelligence Algorithms For Seizure Prediction

### Study Overview



-Group 1 – normal state, Group 2 – pre-ictal state, Group 3- ictal, Group 4 – post-ictal.

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## Computational Intelligence Algorithms For Seizure Prediction

### Artificial Neural Network

- Improved results, both sensitivity and specificity, with patient-specific architectures

### Multidimensional Scaling

- Improved identification of brain activity class, specially combining different features of individual patient.

Seizure prediction systems must be personalized, finding the adequate algorithm.

Artificial neural networks and Multidimensional Scaling demonstrated the plasticity necessary to support the research of such personalized systems.