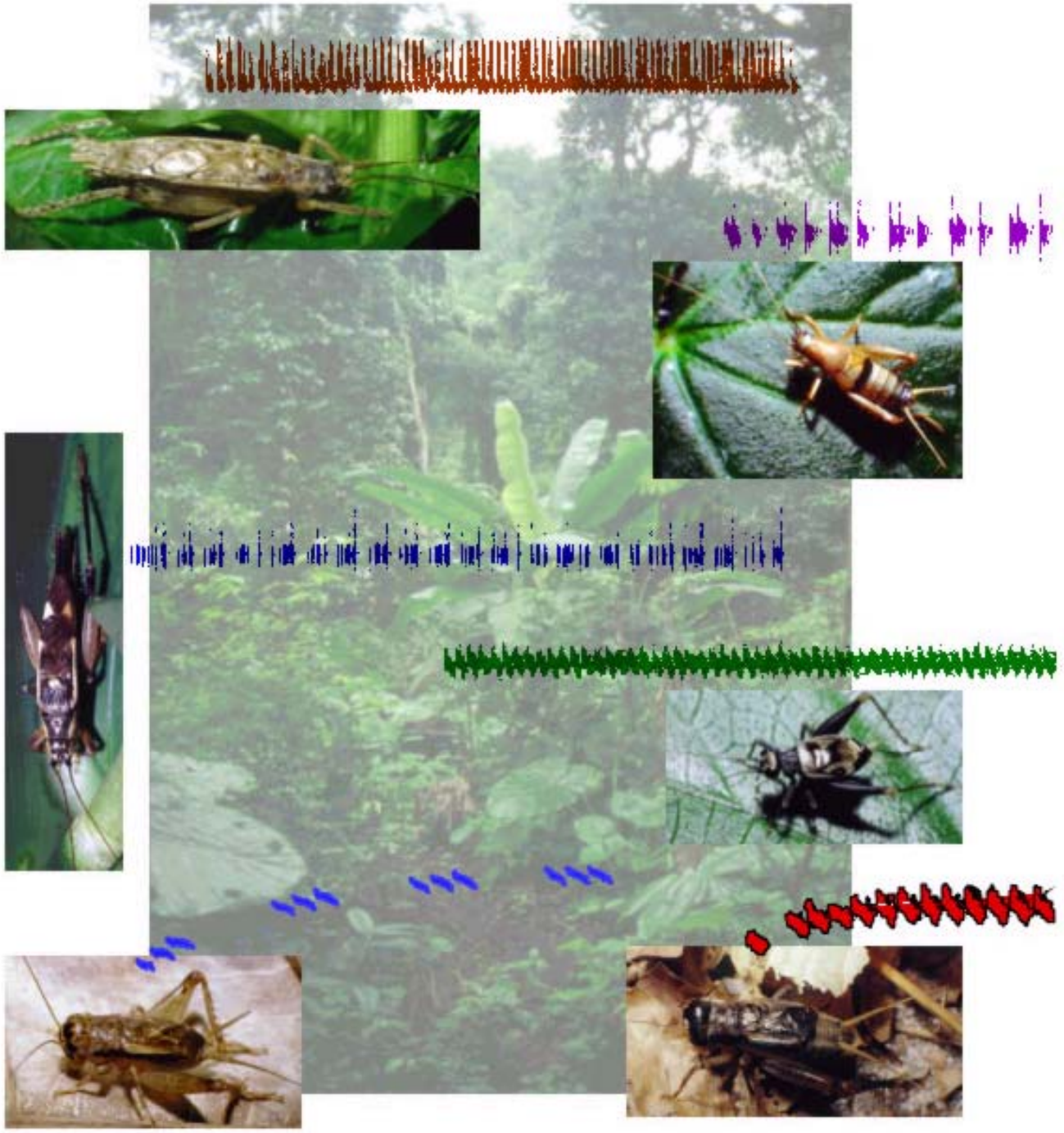
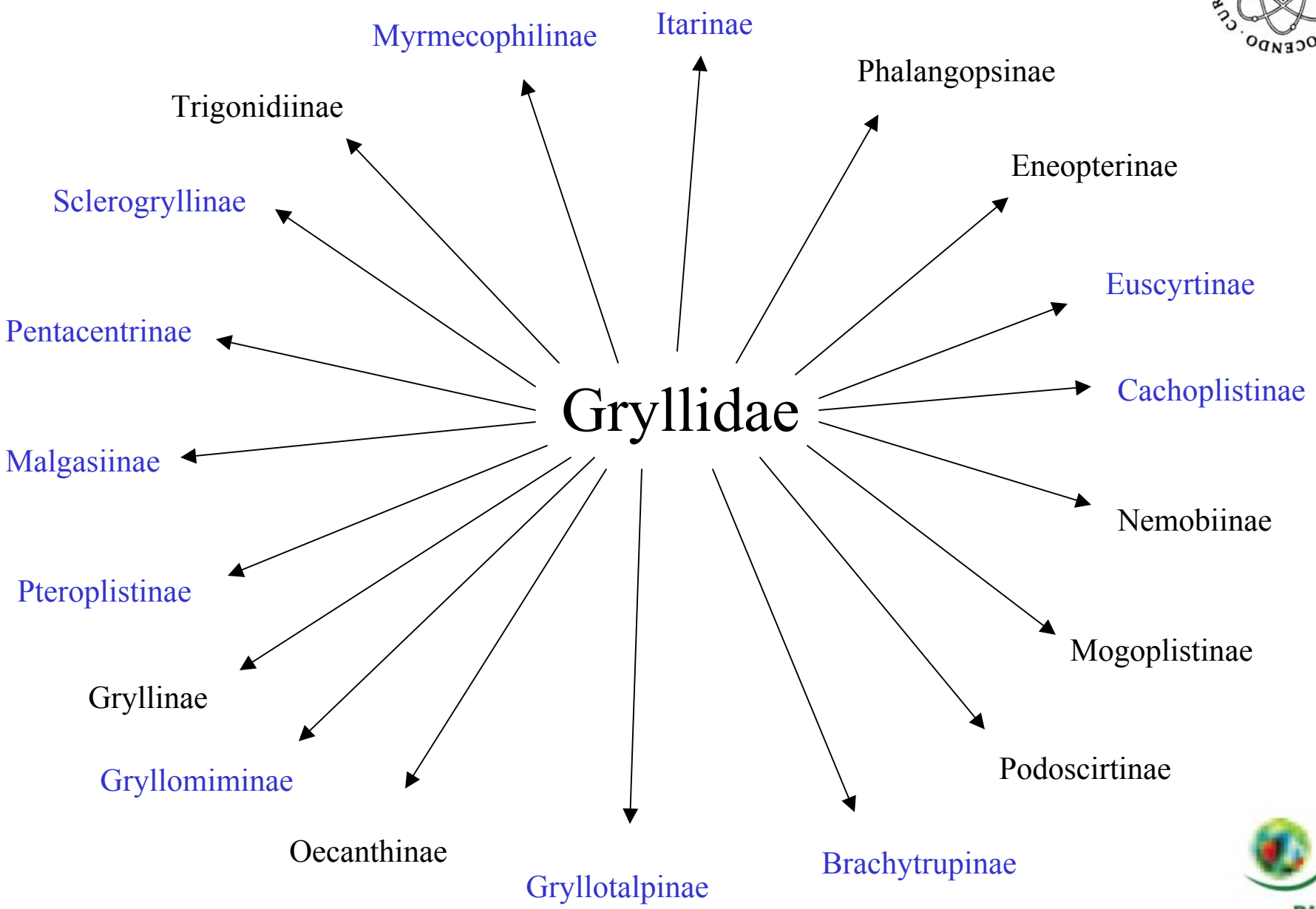
German
Orthoptera
Collections
Online

DOrSa

Deutsche
Orthoptheren
Sammlungen
Online



Automated Identification of Bioacoustic Signals



Automated Identification of Bioacoustic Signals

Classify

Gryllus bimaculatus

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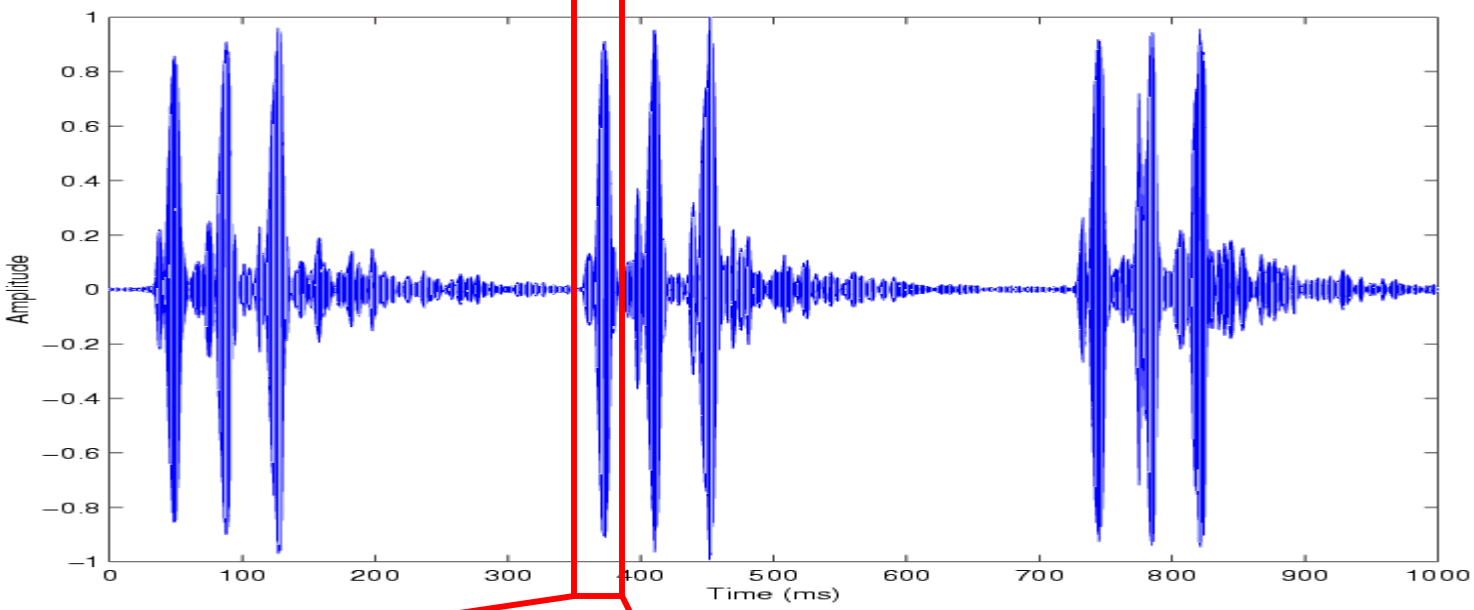
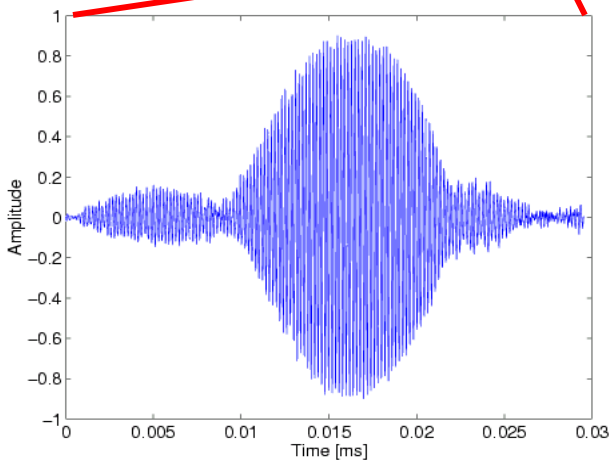
Automated Identification of Bioacoustic Signals

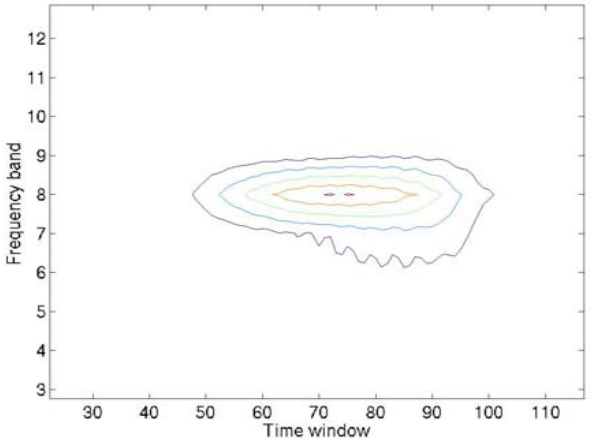
Signal characteristics

Chirp

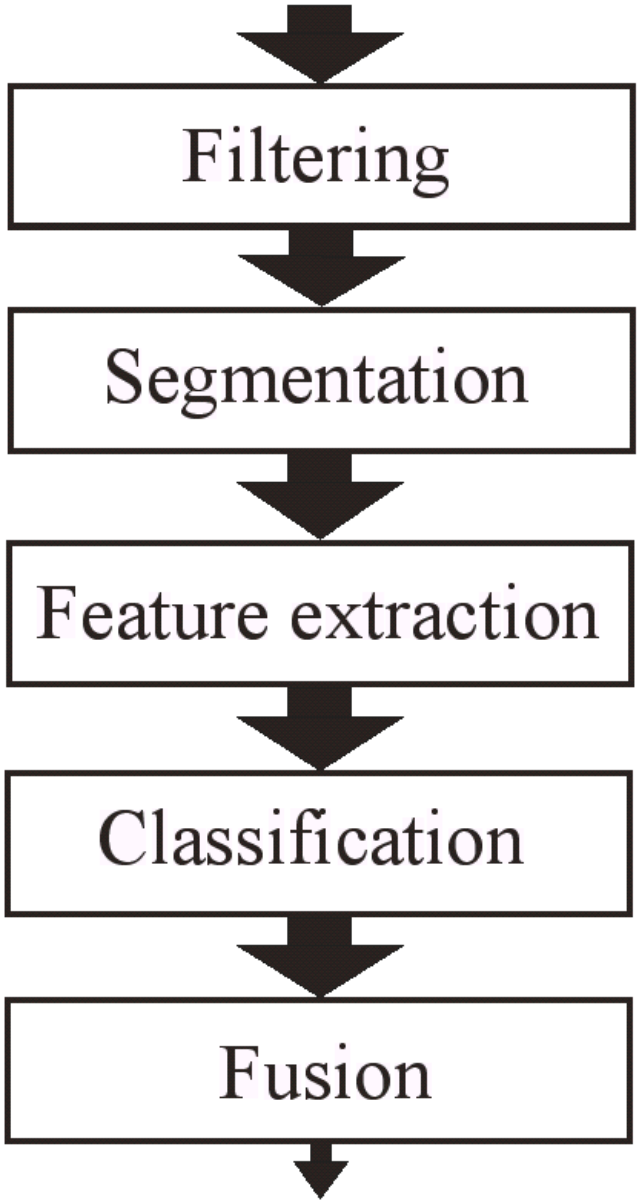


Pulse



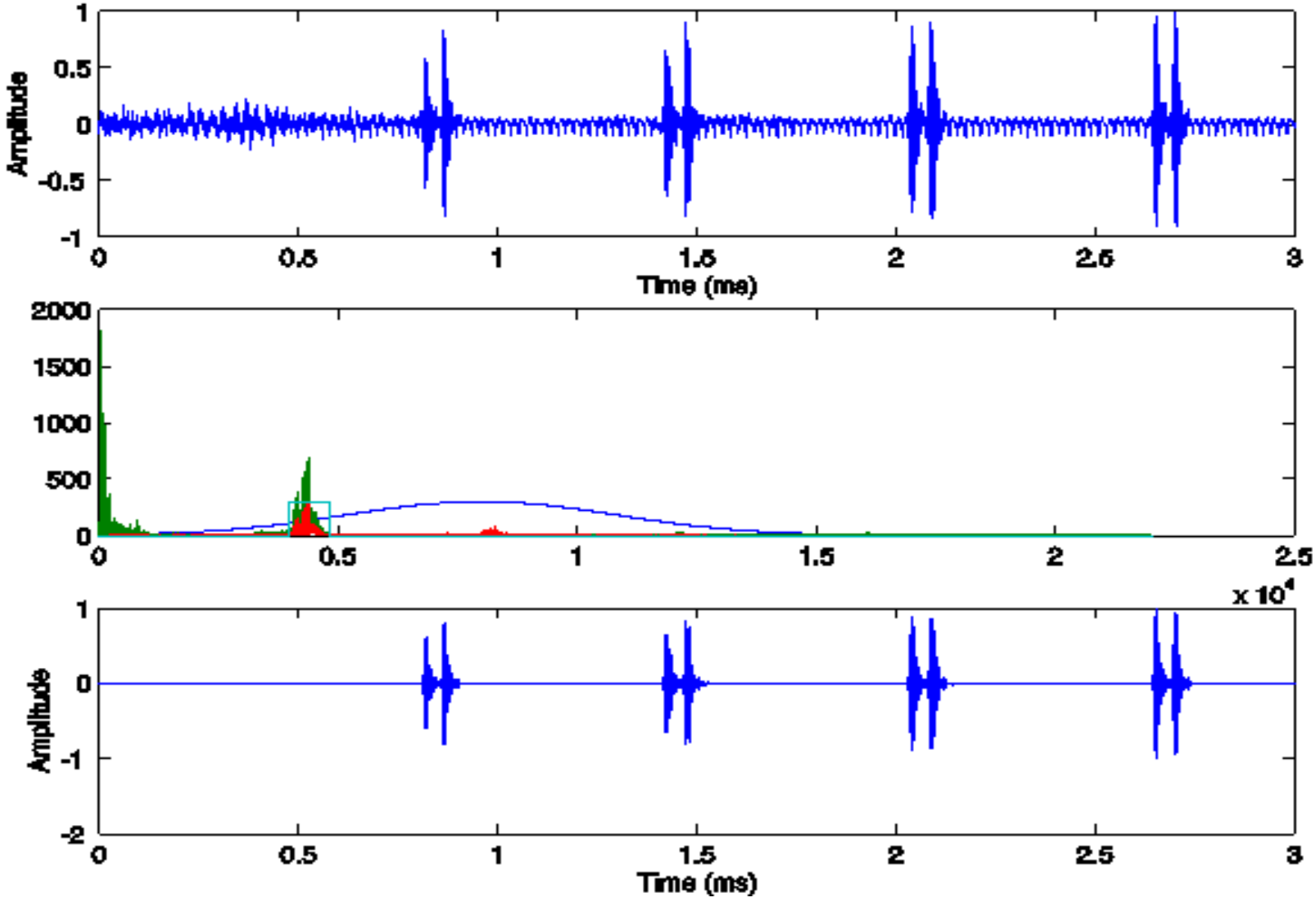


Automated Identification of Bioacoustic Signals



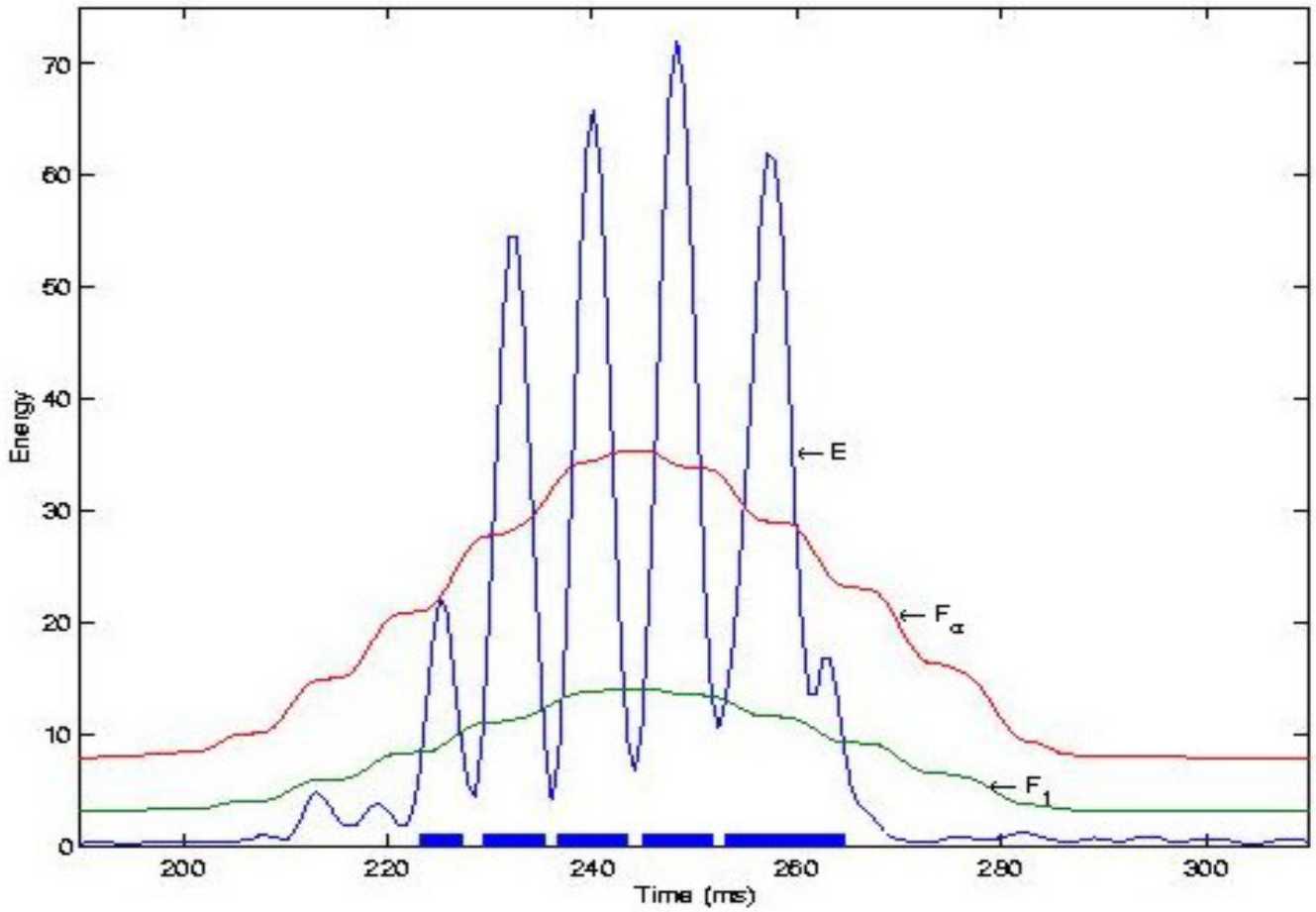
Automated Identification of Bioacoustic Signals

1. Signal Filtering



Automated Identification of Bioacoustic Signals

2. Signal segmentation



3. Features

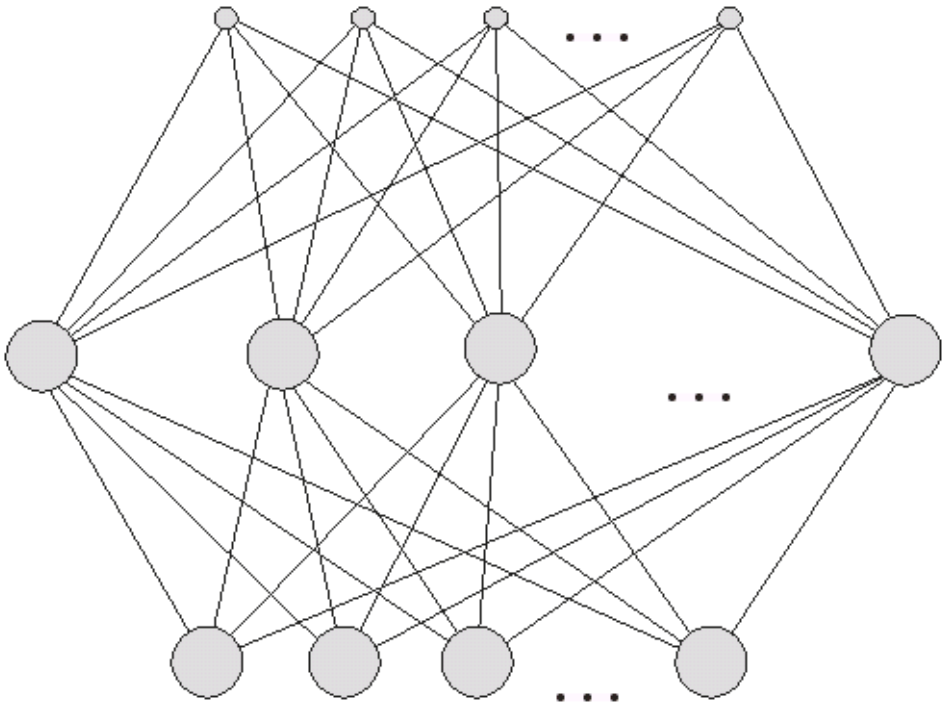
- Pulse distance
- Pulse length
- Pulse frequency
- Energy contour of pulses
- Frequency contour of pulses
- Density of pulse distances

4. Classification by neural networks

- Radial-basis function networks (RBF)
- Multilayer perceptrons (MLP)
- Fuzzy-k-nearest-neighbour classifiers (Fuzzy-KNN)

4. Classification by RBF-networks

pulse lengths pulse frequencies pulse distances



classification result

5. Fusion

Classifier fusion is applied to combine:
- classifier outputs of different feature types
- classifier outputs over time

Methods

- **Multiple decision templates (MDT/CDT)**
- Decision templates (DT)
- Naive Bayes (NB)
- Behaviour Knowledge Space (BKS)
- Probabilistic Product
- **Averaging**
- Ranking
- Majority voting

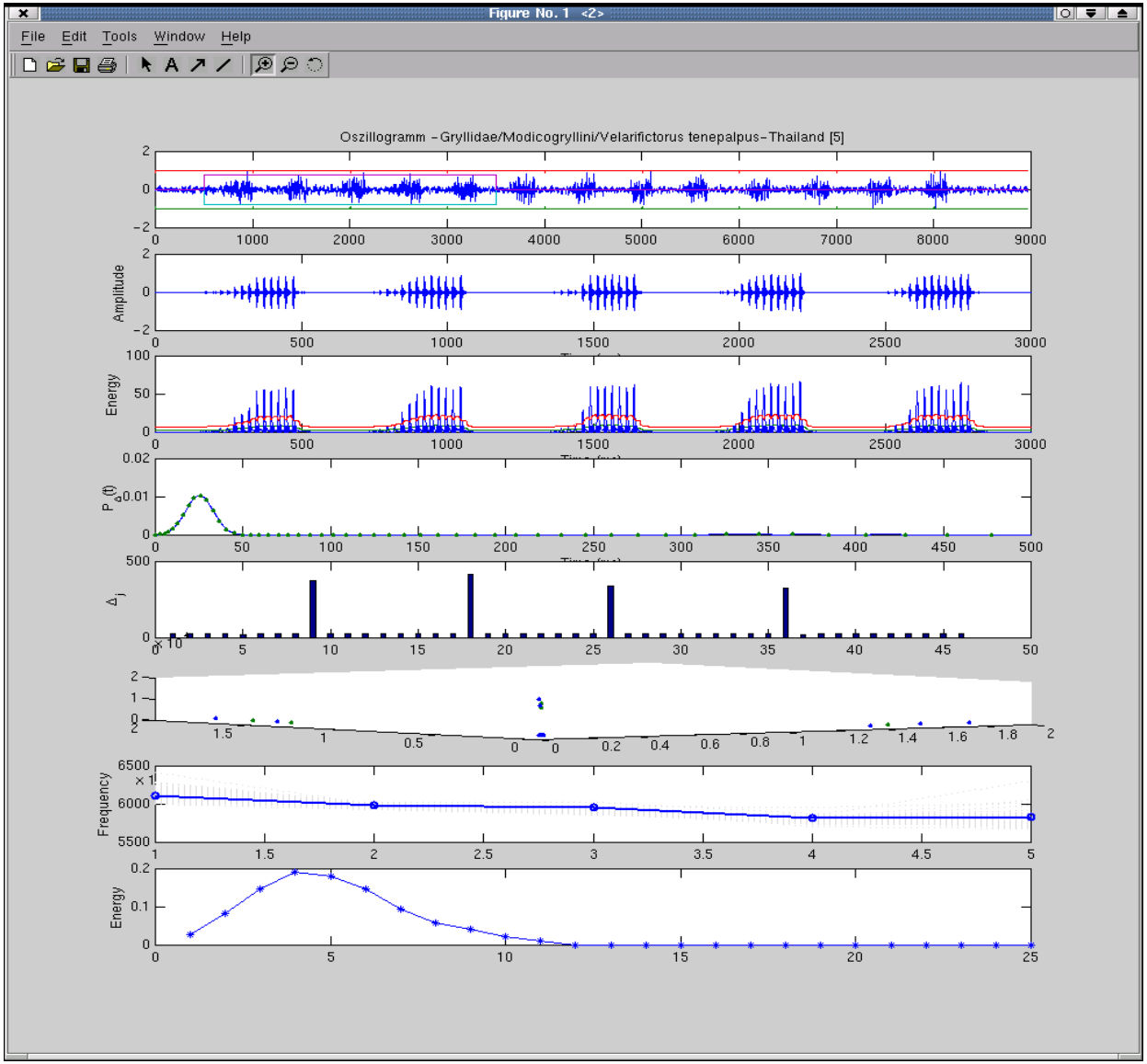
Data set, Results

30 different cricket species from Thailand and Ecuador,
recordings from 137 different animals,
3 to 6 recordings per species

algorithm	MDT1	MDT2	MDT3	CDT1	CDT2	CDT3
error (%)	7.01	6.72	6.72	7.01	6.57	7.30

Automated Identification of Bioacoustic Signals

The Software Package



The software for the feature extraction is implemented in Matlab utilizing the signal processing toolbox.

The classifiers an the classifier fusion software is written in C/C++ which guaranties high performance and high flexibility.

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Automated Identification of Bioacoustic Signals

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Klaus Riede

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Karl-Heinz Lampe

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Publications

- C. Dietrich, F. Schwenker, G. Palm,
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- C. Dietrich, F. Schwenker, G. Palm,
  Classification of Time Series Utilizing Temporal and Decision Fusion, Multiple Classifier Systems 2001, 378-387, Springer
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  Decision Templates for the Classification of Time Series, Pattern Recognition, to appar