Chapter 3

High SNR recordings

Goal

1. Review previous work

2. Develop a novel feature representation to improve current classification performance

Outcome

1. The proposed enhanced feature representation can achieve a better classification performance compared with most previous studies.

2. Cepstral features are effective for classifying frog calls, but very sensitive to the background noise

Motivation

Design a novel cepstral feature representation with both good classification performance and excellent **anti-noise ability**?

Chapter 4

High and low SNR recordings

Goal

Use wavelet packet decomposition to design a novel feature representation

Outcome

1. Wavelet-based cepstral features are effective for classifying frog calls, and robust to background noise
2. These features can be used for both low SNR and high recordings

Motivation

So far almost all recordings used are high SNR. Low SNR recordings have **multiple simultaneously vocalising frog species**, how to design a suitable classification framework?

Chapter 5

Low SNR recordings

Goal

Use multiple-instance multiple-label (MIML) learning to classify frog calls in low SNR recordings

Outcome

MIML learning can effectively classify frog calls in low SNR recordings. However, the classification performance is highly effected by the event detection results

Motivation

To improve the classification performance, we can do (1) use supervised learning to perform event detection. But we do not have much annotated acoustic data, (2) **use multiple-label learning.**

Chapter 6

Low SNR recordings

Goal

Use multiple-label (ML) learning to classify frog calls

Outcome

ML learning can improve the classification performance of MIML learning, and frog calling activity of three months are monitored