Chapter 3

High SNR recordings

1. Review previous work

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

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

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

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

Chapter 4

High and low SNR recordings

Use wavelet packet decomposition to design a novel feature representation

→ Wavelet-based cepstral features are effectively for classifying frog calls, and robust to the background noise

Low SNR recordings have **multiple simultaneously vocalising frog species**, how to design a suitable classification framework address?

Chapter 5

Low SNR recordings

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

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

To improve the classification performance, we can do (1) seek to 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

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

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