The voice of the monk parakeet

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Contents

1 Questions

- Is there a difference in the individual signature that can be detected with SPCC, DTW and MFCC?
- How recognisable are individuals? How to best visualise this?
- Which call types have individual signature? What could drive a potential difference?
- Does the signal decay within recordings or throughout a month?
- Is the signal as stable as the contact call?
- Is there a signal across call types?

2 Methods

2.0.1 SPCC, DTW and MFCC

Spectrographic cross correlation (SPCC) compares two calls by sliding the spectrograms over each other. Pixels of similar value cancel out each other. At the point of maximal cancelation the difference is computed and gives a pair-wise distance.

Dynamic time warping uses the fundamental frequency and warps the signal to achieve maximal overlap. For this method we used Luscinia which also removed most of the background noise. The result is also a pair-wise distance.

Mel frequency cepstral coefficients should be able to detect more universal features of a call. We used the mean value and standard deviation per trace to summarise each call. We then computed the euclidean distance in this multidimensioal space to have a result similar to the other two methods.

3 Results

3.1 Individual signal

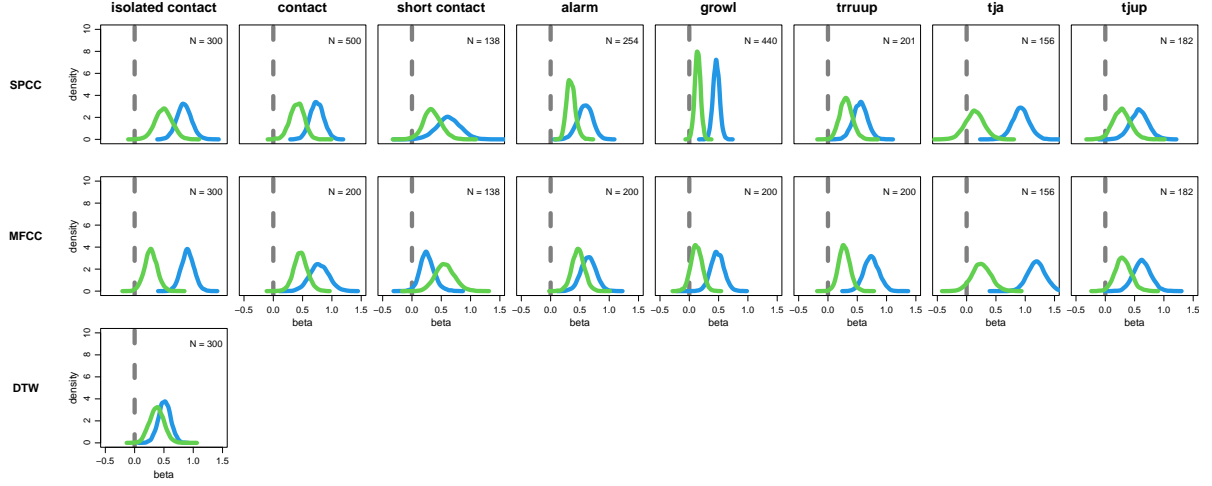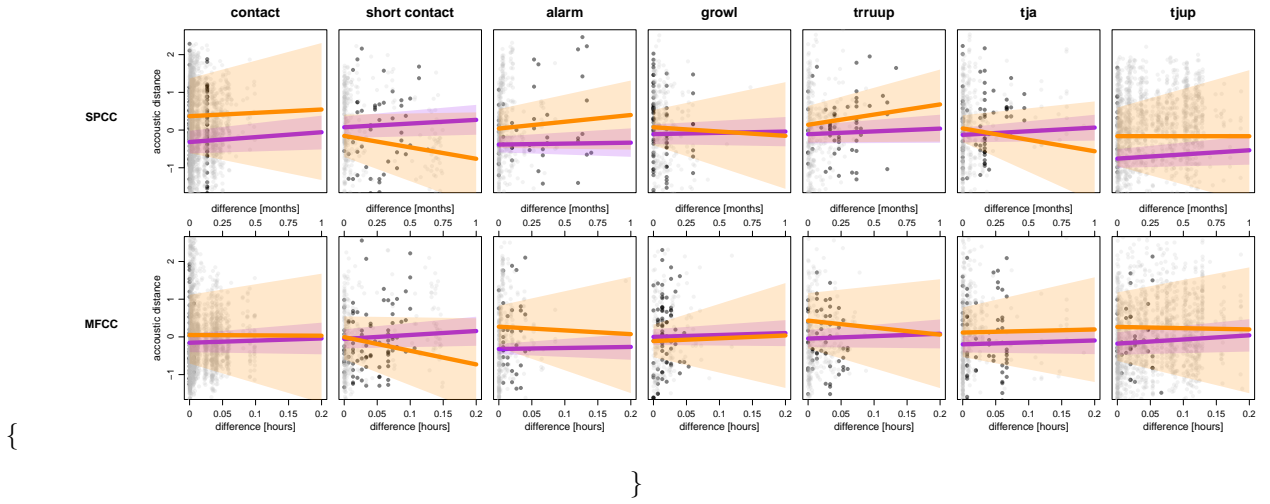## 3.2 Decay over time

\begin{figure}

Figure 1: Posterior densities for xx call types accross three methods. Blue is recording signal, green is individual signal.

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\caption{Increase in acoustic distance for xx call types accross three methods. Light grey dots and purple line (shade) are the raw data and model estimate (89% PI) respectively within a recording (in hours). Dark grey dots and orange line (shade) are the raw data and model estimate (89% PI) respectively across months.}
\end{figure}