

# A computational framework for automated detection and feature extraction of chicks' vocalisations.

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Animal vocalisations are pivotal for intraspecies communication and serve as indicators of welfare and social interactions. In the early days of life, poultry chicks' (*Gallus gallus*) vocalisations are crucial for hen-chick relation, offering insights into chicks' affective states and welfare. However, there is a dearth of automated vocalisation detection and recognition systems. While previous studies have identified different classes of chick calls linked to internal states, existing classification models lack systematic validation and are subject to human bias.

To address this gap, we are developing a computational framework for automated detection and feature extraction of chicks' vocalisations. Six signal processing algorithms were tested for call onset detection. The High Frequency Content (HFC) algorithm performed best with an F1 measure of 0.85. Additionally, our method for computing call offsets, combining first-order difference of energy with local minimum detection, outperformed other methods with an F1 measure of 0.94. Lastly, we designed a pipeline for the automatic extraction of audio features that have been proven to be crucial for call type classification. The extracted features encompass the call duration, F0 statistics, energy ratios of harmonics, root mean square (RMS), spectral centroid, and waveform envelope statistics.

Our computational approach utilises signal processing algorithms to automatically detect calls and extracts acoustic features to identify vocal signatures of chicks. Ongoing research will determine if distinct categories or a continuous spectrum more aptly characterise chicks' vocal production. These findings offer insights into chicks' vocal repertoire and welfare, with potential applications in behavioural studies and animal welfare assessment.

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Yes

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Junior Simposia on Comparative Cognition

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Yes

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