

## Bird Call Recognition using a Convolutional Neural Network

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Birds are an important indicator of biodiversity in an eco-system as well as identified as a crucial indicator of health of an environment. They are susceptible to environmental changes therefore; it is significant to investigate and monitor bird species. Birds have different sounds (which are called 'birds calls') that are melodious to the human ear. Therefore, bird call identification and classification remains as very interesting and important area because it requires expert naturalists to manually identify bird type according to the bird call. Furthermore, birds have different types of voices. Such as calling, singing and mimicking representing different acoustic characteristics and this research suggests a novel pre-trained neural network model using verbosity, number of epochs, frequency and batch size of bird calls in identification of bird type and analysis how these factors will affect to the accuracy of bird call prediction. This research introduces a novel and a scientific method which can be used in bird explorations and helps ecologist to be aware of environmental changes. But there are some challenges when doing bird call classification such as background noises, different types of bird voices, inter-species variance and multi-label classification problem. This study use as pre-trained Neural Network (CNN) Model with bird recordings acquired by the Xeno-canto bird sharing database. Spectrograms are generated for every bird call and background noises were filtered. The key fact of bird species identification is the extraction of features of bird vocalizations. And neural network model has a strong self-learning and signal extraction ability, and it can automatically acquire and combine characteristic information from the bird recordings. Mel-Frequency cepstrum(MFC), Finite Impulse Response (FIR) filter and Fast Fourier Transform(FFT) techniques were performed on each and every spectrogram and after creation of Mel-spectrogram data were split into train process and train the dataset using Keras and Librosa libraries. The proposed methodology predicts the birds' name analyzing the bird call with 90% of accuracy. This is of great significance to the identification of birds with small sample size.

**Keywords:** Convolutional Neural Network; Mel-Frequency Cepstrum; Fast Fourier Transform; Finite Impulse Response