Abstract

Investigating Methods of Birdsong Recognition on Mobile Devices

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Conservation groups regularly survey bird populations in order to gauge the effects of human activity on species populations such as deforestation and global warming. There has also been a steady increase in amateur ornithology [1] over recent years. One problem that both these groups encounter is attempting to classify species without being able to physically see the animal. Therefore, they must rely on classification through audio which can be relatively error prone, especially for amateurs.

This paper examines the ability of audio classification approaches developed for music applications to classify birdsong and their performance. These approaches include audio-fingerprinting (sometimes referred to as audio identification) and audio-matching. It was discovered that these approaches were not sufficiently accurate to be useful in real world applications, although they did outperform a random baseline.

This led to the adoption of an approach previously used for speech-to-text applications. This involved generating a spectrogram for the incoming audio and running inference on a CNN, trained on other spectrograms of birdsong.

It was discovered that this approach greatly outperformed the musical approaches and led to the development of an Android application that was intended to provide the capability to users in the field. However, this approach showed itself to be relatively weak at differentiating between birdsong produced by similar sounding bird species and also demonstrated signs of overfitting due to the size of the dataset available.