Title:	Event Detection in Bioacoustic Datasets using Few Shot Learning
Authors:	Das, Ritam
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Abstract:	Bioacoustic research is pivotal in understanding biodiversity, ecosystem health, and animal communication patterns. Despite its significance, acquiring high-quality bioacous- tic datasets remains challenging due to environmental variability and limited field access. Recorded datasets are often very long, but the signals of interest are short and rare, making manual annotation a time- and labor-intensive task. In recent years, deep learning techniques have shown promise in bioacoustic event de- tection tasks, offering data-efficient methods for analyzing large and sparse volumes of audio recordings. This dissertation investigates applying a deep learning method called Prototypical Networks to a large dataset of meerkat (Suricata suricatta) vocalizations. Pro- totypical Networks have gained attention for their ability to generalize well to unseen sam- ples when exposed to only a few labeled ones. The meerkat dataset is an ideal testbed for bioacoustic event detection as it is sparse and covered with a challenging amount of various noise, but comes with label information for almost 200h of audio. The proposed model builds on the baseline approach provided as part of the DCASE 2023 bioacoustic event detection challenge, a yearly challenge of the bioacoustic research community. Our findings highlight the potential and limitations of Prototypical Networks with data obtained under extreme conditions. This dissertation discusses use cases, best practices, and potential future research paths for designing a robust few-shot event detection model that is able to capture essential features in sparse and noisy data across a spectrum of bioacoustic datasets. Keywords: Bioacoustic Research, Event Detection, Few-shot Learning Prototypical Networks, Meerkat Vocalizations
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