Title:	Application of Machine Learning and Deep Learning in Bioacoustics
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Abstract:	Today, the field of artificial intelligence is making major progress in almost all its stan- dard sub-areas, and its breakthrough advancement has excellent application in a variety of domains. It has applications in biomedical imaging, drug discovery, surveillance and mon- itoring, speech recognition, autonomous vehicles, etc. This has been possible because of the accumulation of volumes of data which are the building blocks of these advancements. The environment around us is rich in acoustic information. One such piece of infor- mation is based on the vocalizations of animals, also known as bioacoustics. This includes not only the vocalizations of animals such as birds and mammals but also the sounds that insects can produce. Depending upon the research purposes, bioacoustic data can be gen- erated by deploying a recorder in the fields, but these field recordings may or may not contain the specific target, and hence, it requires a large number of bioacoustic recordings for proper analysis. However, it will still require much human labor to extract the specific target out of this massive data if done manually. Even after retrieving the target, we still rely on the manual procedure to obtain onsets/offsets, features of the acoustic signals, or any other relevant applications. Through this thesis research, we have first developed an understanding of machine learning and deep learning. We have explored its application to reduce this labor and vig- orous process by building a model that can automatically detect the region of interest from the field recordings and can extract them for further analysis. We also explore an automated method where the extracted target recordings can be automatically analyzed to extract var- ious features for research purposes.
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