

# Abstract

The "Recognizing Bird Sounds" project aims to develop a machine learning model capable of accurately identifying bird species based on their audio recordings. This project involves the collection and preprocessing of bird sound recordings, followed by feature extraction using audio processing libraries such as Librosa. The extracted features are then used to train and evaluate machine learning models, with a focus on Support Vector Machine (SVM) and Convolutional Neural Networks (CNNs) implemented through TensorFlow and Keras.

The system is designed to process audio data by converting it into a uniform format, reducing noise, and normalizing the audio signals. Key features such as Mel-frequency cepstral coefficients (MFCCs) and chroma features are extracted to capture the essential characteristics of bird sounds. The machine learning models are trained and fine-tuned using a dataset of bird sounds, with performance evaluated through metrics like accuracy, precision, recall, and F1-score.

A web application is developed using Flask, allowing users to upload audio recordings and receive real-time predictions of the bird species present in the recordings. The application leverages the trained models to provide accurate and timely results, making it a useful tool for bird enthusiasts, researchers, and conservationists.

Through this project, we demonstrate the potential of machine learning techniques in enhancing the accuracy and efficiency of bird sound recognition, contributing to the broader field of wildlife monitoring and biodiversity conservation.

**Keywords:** Bird sound recognition, Machine learning, Support Vector Machine, Convolutional Neural Networks, Librosa, TensorFlow, Keras, Feature extraction, Flask web application.