

System Analysis and Requirements

Objective of the Project

The primary objective of the "Recognizing Bird Sounds" project is to develop a machine learning model that can accurately identify bird species based on their audio recordings. This system aims to provide a reliable and efficient method for bird sound recognition, leveraging advanced audio processing and machine learning techniques.

Existing System

Existing methods for bird sound recognition largely rely on manual listening and expert knowledge to identify bird species from their calls and songs. While there are some automated systems available, they often suffer from limitations such as low accuracy, difficulty in handling noisy environments, and the inability to generalize across diverse bird species and audio conditions. These challenges highlight the need for a more robust and scalable solution.

Proposed System

The proposed system addresses the limitations of existing methods by implementing a comprehensive machine learning pipeline for bird sound recognition. The key components of the proposed system include:

1. Data Acquisition: Collecting a diverse dataset of bird sound recordings from various sources.
2. Data Preprocessing: Converting audio files to a uniform format, applying noise reduction, and normalizing audio signals.
3. Feature Extraction: Using Librosa to extract relevant audio features such as Mel-frequency cepstral coefficients (MFCCs) and chroma features.
4. Model Training and Evaluation: Training machine learning models (e.g., Support Vector Machine, Convolutional Neural Networks) and evaluating their performance using metrics like accuracy, precision, recall, and F1-score.
5. Deployment: Developing a web application using Flask that allows users to upload audio recordings and receive real-time bird species predictions.

System Requirements

Hardware Requirements

- System: 11th Gen Intel(R) Core(TM) i5-1135G7 @ 2.40GHz
- Hard Disk: 218 GB
- RAM: 8.00 GB