

Video-Based Drone vs Bird Classification Using Feature Extraction and Ensemble Techniques

Bharathi Shankar (21PD04)

Krithika L (21PD19)

ACADEMIC GUIDE

Dr. G. Poonthalir

Associate Professor

SYNOPSIS

This project leverages the trajectories of "Drone" and "Bird" to extract key features, subsequently employing these features for classification. The unique motion patterns exhibited by these entities serve as a pivotal aspect of the classification process, enabling the accurate differentiation between "Drone" and "Bird" classes.

In this "Drone vs Bird" classification task, the process begins with video input, which is segmented into individual frames. These frames serve as the basis for subsequent analysis. Feature extraction techniques are applied to each frame, capturing relevant information such as angle, curvature, velocity, and acceleration. The extracted features from all frames are organized into a CSV format, creating a structured dataset.

To ensure a balanced dataset, data balancing techniques are employed, for addressing any class imbalance between "Drone" and "Bird" instances we have used SMOTE Analysis. Principal Component Analysis (PCA) is then utilized to reduce the dimensionality of the dataset, converting the extracted features into a more compact representation. Finally, a Support Vector Machine (SVM) with a non-linear kernel function is employed for classification, trained on the balanced dataset. This model is evaluated using standard metrics to determine its effectiveness in distinguishing between "Drone" and "Bird" with the goal of achieving a high classification accuracy. In order to achieve better classification we have constructed an Ensemble Model which consists of several models for i.e. random forest, adaboost, linear svm and polynomial svm.

