ABSTRACT

In The continuous advancement of technology provides numerous benefits to society. One of its advantages is facilitating the fulfillment of various needs, including supporting hobbies, particularly among communities of bird enthusiasts. A desired enhancement for these communities involves the presence of a system capable of detecting the distinct calls of bird species. This capability allows for the easy assessment of the quality of vocalizations during bird competitions. To meet this demand, a system is required that can classify bird species based on the distinctive characteristics of their vocalizations.

This thesis implements Compressive Sensing (CS) using Discrete Cosine Transform (DCT) as a method to sparsify data, followed by employing Orthogonal Matching Pursuit (OMP) for data reconstruction and inverse sparsity using Inverse DCT (IDCT). This method is utilized in the classification process of bird vocalizations using a Convolutional Neural Network (CNN) algorithm based on deep learning. The research integrates CS into the classification of bird sounds, using waveforms as two-dimensional audio signal data.

The best results obtained in this Final Project involve testing and classifying bird vocalizations based on their unique patterns. By utilizing Convolutional Neural Network (CNN), Compressive Sensing (CS), and the Orthogonal Matching Pursuit (OMP) reconstruction method, optimal accuracy of 100% was achieved. The lowest loss value recorded was 0.8552, with a faster computation time of 8 seconds. Furthermore, the use of CS produced the best performance matrix results, achieving a 100% accuracy rate.

Keywords: Bird, Compressive Sensing, Orthogonal Matching Pursuit, Convolutional Neural Network, performance matrix, Bird Sound.