CSE 382M Final Project Proposal

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Our final project mainly deals with pictures of different types of birds. We choose to deal with this kind of data since both of us are interested in birds and in image processing. The main goal of our project is to test how well different ways of classification models works on our dataset of birds. The kind of classification models we are going to test include SVM with kernel functions and the newly learning neural networks, especially the CNN network. For SVM, we are going to try different kernels, including polynomial kernel and Gaussian kernel. We’ll also test SVM with sigmoid kernel’s performance on our bird image classification task if we have plenty of time. For neural network, we will mainly test the performance of the CNN network on our bird image classification task. We choose CNN to be our focus on neural network since there’s many previous examples of using CNN for image classification and image processing.

Here we are going to describe the data set we are going to work with in detail. Our dataset of bird images are a collection of 25 common types of birds from India. The collection contains around 22k images of these 25 types of birds. Also, the images are subdivided into 25 smaller sets with each smaller set corresponding to a unique type of bird. One advantage of this data set is that the amount of images for each type of birds are approximate the same, and this number is between 920 to 930. Also, we only need to deal with a classification task of 25 categories here. Thus it is easier for us to make progress with this data set using different types of classification models.

Here we are also going to explain in detail how do we examine the performance of different classification models. For each smaller data set of a single type of bird, we use 75% of image in it and add it to the general training set, for the rest 25% image in each smaller data sets, we join them to form a general testing set. Notice that here both training and testing set are labeled. Then we train all classification models, including the SVM with different kernels and the CNN neural network, over the same general training set and test them over the same general testing set. We’ll then compare their classification performance through standards like the f1 score and the precision and the recall for each category of birds.

Website for our dataset and another reference website:

https://www.kaggle.com/datasets/arjunbasandrai/25-indian-bird-species-with-226k-images

<https://www.kaggle.com/code/gpiosenka/mobilenetv3-small-model-f1score-9>

<https://en.wikipedia.org/wiki/Precision_and_recall>