

BIRDS CLASSIFICATION USING DEEP LEARNING

In this report, the birds' classification using deep learning techniques for categorizing 200 different bird species, including the data processing and hyperparameters used will be discussed.

The image dataset is split into three parts 5400 training data, 594 validation data, and 5794 test data based on the condition given in the attached file within the main file. The images were preprocessed to resize them to a (224,224,3) size, and data augmentation using an image generator was applied to increase the diversity of the training data. For this, the parameter like *shear range*, and *zoom range* were set to 0.2 whereas the value 0.2 is used for *height shift range* and *width shift range* with the fill mode as '*nearest*'. This was done to prevent overfitting and improve the generalization of the model. Moreover, the image generator helped to process the data with limited RAM capacity.

The base model is built using the convolutional neural network (CNN) of Inception V3 architecture, and the whole model is trained with the data. The last layer of the model was modified to have 200 output units, one for each bird species. The model was then trained using the Adam optimizer with a learning rate of 0.00001 for 250 epochs. The best model is selected from the checkpoints before it starts overfitting

To achieve better results, hyperparameter tuning was performed on the model. The hyperparameters tuned were learning rate and batch size. The best hyperparameters were found using the trial and error method. The final hyperparameters used were a learning rate of 0.00001 and a batch size of 32.

In conclusion, the deep learning task of classifying 200 bird species was successfully achieved by pre-processing the data, using Inception V3 CNN model, and hyperparameter tuning. The final model achieved an accuracy of 71% on the test data, which indicates that the model can effectively classify the images of different bird species. Additionally, aggregated values for recall, precision, and f1score were found to be 0.73,0.72, and 0.72 respectively using the weighted average.

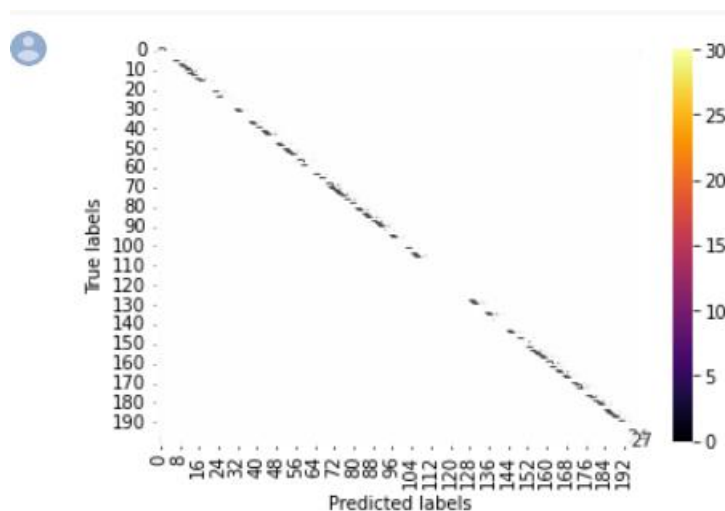


Figure 1 Heat Map of Confusion matrix