CSC-8637(Deep Learning)

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Bird Classification

Data Processing: Extracted the bird_CUB_200_2011 image dataset into a local directory in the collab notebook. Divided the data into train and test images with the help of images.txt, train_test_split.txt, and image_class_labels.txt files. Create an ImageDataGenerator object for data augmentation and performed a validation split. Used an input shape of [224.224,3].

Modeling: Transfer learning was employed using various pre-trained models such as InceptionV3, Xception, and Resnet. Xception and InceptionV3 had almost similar accuracies.

Hyperparameters: The Adam optimizer was employed with a learning rate of 0.0001 due to its versatility. For the activation function, Rectified Linear Unit (ReLU) was chosen because it adds non-linearity to the network without consuming excessive computational resources. While fine-tuning, self-adjusting learning rate was used with the help of LearningRateScheduler. Also, the base model layers were made trainable and non-trainable. The model performed better when layers were not frozen. To allow for the learning of sufficient features and their storage in memory, a batch size of 32 was selected. Different optimizers like RMSprop, adam, and SGD were tried and adam performed the best. Also, different batch sizes and image input sizes were tried.

Accuracy: 0.637, F1 Score:0.636, Precision Score: 0.673, Recall Score: 0.637

Confusion Matrix - InceptionV3 Model