CNN Analysis Writeup:

Of the CNN models I trained on the Tiny ImageNet dataset, the VGG-19, had both the highest accuracy at 56.63% and the shortest training duration of approximately 896 seconds (14.9 minutes). I only trained the models for a single epoch, because it was taking a very long time to train them using the Google Collab free version. So, my intuition is that the VGG-19 had the highest accuracy due to its relatively simple architecture, which may have resulted in better feature extraction for the Tiny ImageNet dataset within that single epoch. The Resnet50 and InceptionV4 models had lower accuracies than the VGG-19 of 20.59% and 6.13% respectively. These models also took longer to train, with Resnet50 taking approximately 1257 seconds (20.95 minutes) and Inception taking about 1823 seconds (30.4 minutes). My guess is that the lower accuracy and longer training times could be attributed to their architectural complexity and the fact that I only allowed them to train for a single epoch. These would potentially outperform the VGG-19 if more computing resources were available to train over more epochs within a reasonable time frame. Of the small models, the Resnet18 had the highest accuracy, at 61.84%, followed by the VGG-11 with 57.33%, and the InceptionV3 with 32%. Interestingly, the smaller models (VGG 11, Resnet 18, and InceptionV3) all outperformed the larger models in terms of accuracy. I think this is likely because I only trained each model for a single epoch and larger models require more time to train. So, by limiting the training time, they are not converging to their optimal performance, whereas the smaller models are able to reach decent accuracies much quicker.

