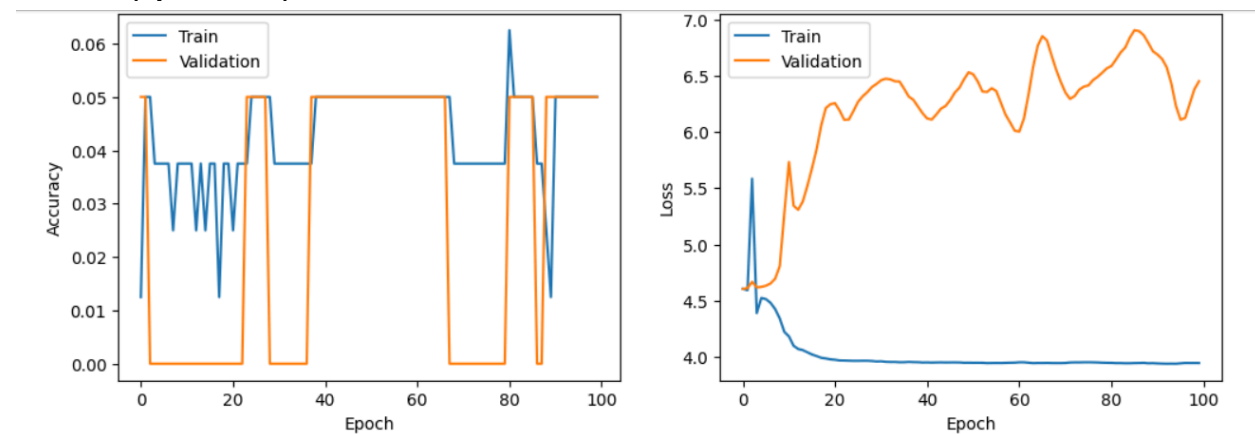


The results from each of the experiments are illustrated first and then the explanation is given later.

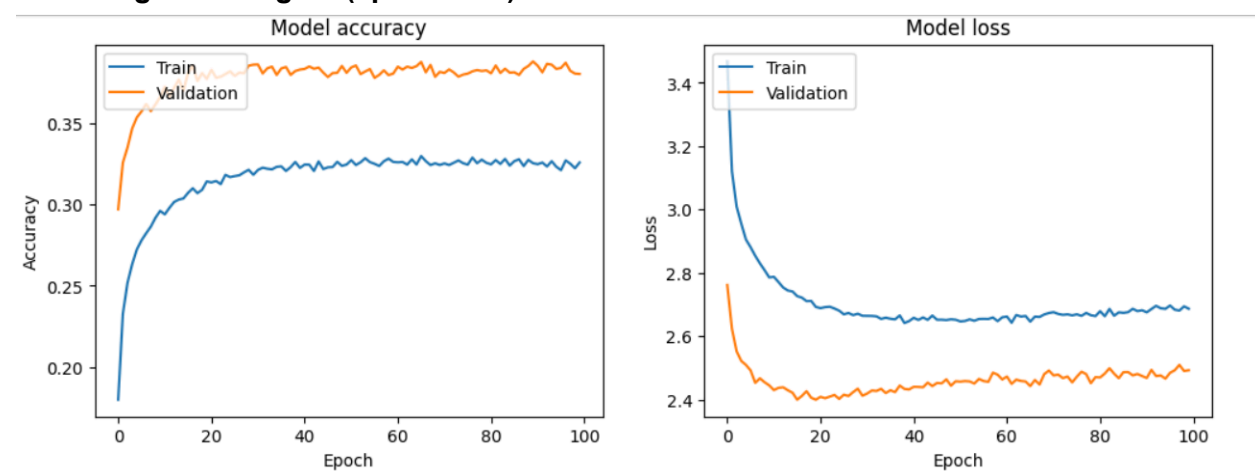
Part 1 A

Scratch:(epoch 100)



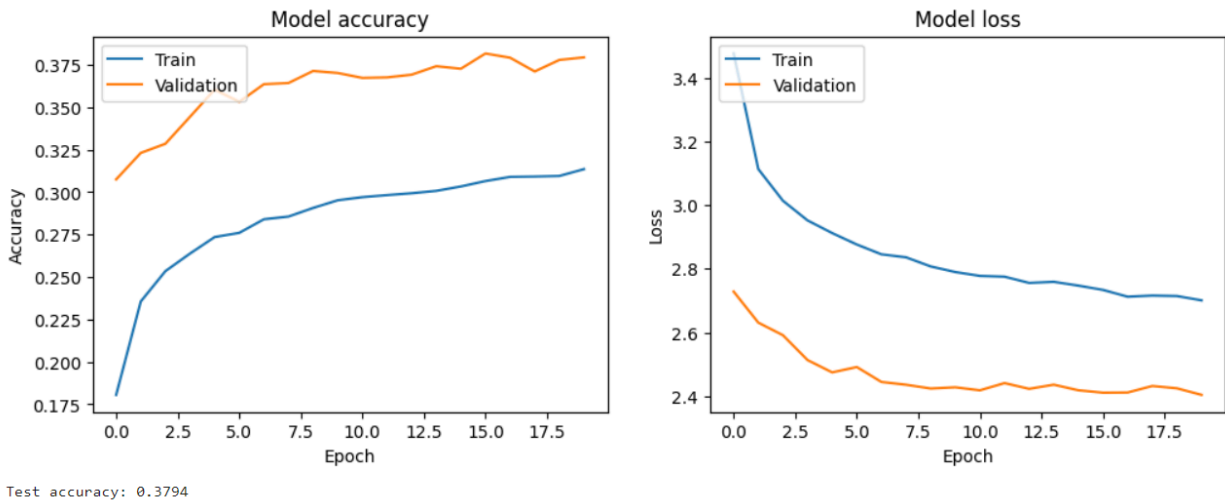
Part 1 B

With ImageNet Weights (epoch=100)

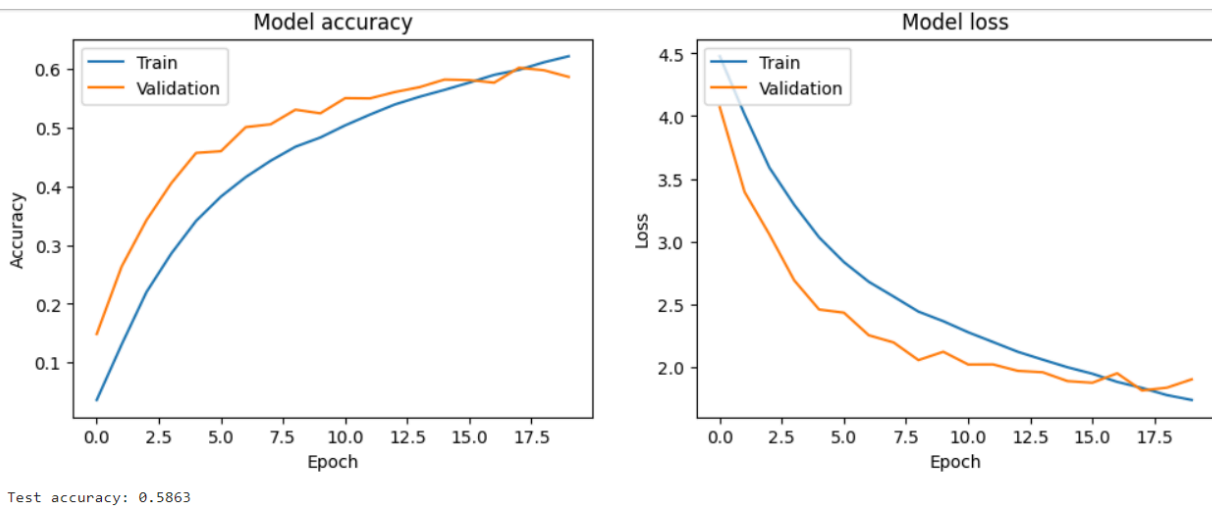


Test accuracy: 0.3805

Part 2: Freezing Convolutional Layers(epoch=20)



Part 3: Freezing Fully Connected Layers (epoch=20)



From the results we can clearly see that the results improve as we carry out the tests from part 1 to part 3. The test accuracy increases, even though we reduced the number of epochs. We observed least accuracy in the first experiment train where we trained our model from scratch. This may be due to the model has to completely train itself to detect low level features. The pretrained weights ensures that the model is trained on a good dataset with over 1000 classes meaning it has a good ability already to detect low level features.

Training from scratch means that we used random weights to train the model. The model took high amount of time to train and also showed poor results due to probably less number of images in the dataset. Training the model with imageNet weights meant that their ability to detect low level features were not affected as the convolutional layers(features) were frozen and only the fully connected layers (classifier) were retrained on our dataset. Also training time

were reduced significantly. To summarize, training from Scratch is mostly suitable for completely new tasks with sufficient data and resources. Freezing Convolutional Layers are suitable when transferring learning from a similar domain like object detection and needing efficient adaptation. Freezing Fully Connected Layers was suitable when the low-level features of the new dataset are significantly different and need to be relearned while keeping the high-level feature processing.