Task: Run the code on the github for this paper https://arxiv.org/abs/2201.11113 using a smaller dataset

```
Time used for quantization: 0:00:18.707922


Evaluting the original model to get its accuracy

100%|██████████████████████████████████████████| 16/16 [00:05<00:00,  2.81it/s]
Top-1 accuracy of resnet18 is 0.6411300585390685.
Top-5 accuracy of resnet18 is 0.9048103843217103.

 Evaluting the quantized model to get its accuracy

100%|██████████████████████████████████████████| 16/16 [00:05<00:00,  2.86it/s]
Top-1 accuracy of quantized resnet18 is 0.650801730720285.
Top-5 accuracy of quantized resnet18 is 0.9002290659200815.

Time used for evaluation: 0:00:05.619428

Sparsity: Org: 0.0, Quant: 0.3124
(gpfq) sdirisala@dsmlp-jupyter-sdirisala:~/private/DSC180A/Quantized_Neural_Nets/src$ █
```

I accomplished the task by using the ImageWoof dataset, which is a smaller subset of the larger ImageNet dataset with 10 classes of dog breeds and 160-pixel images. Given the limited disk space, this was the best option to be able to run the GPFQ algorithm for quantization.

One result in my task that I found interesting was that the quantized model has a similar accuracy to the original ResNet18 model. Going through the process of running the code gave me a more hands-on understanding of the paper, and it helped me get a more tangible idea of what the paper claimed.

The main challenge of this task was to run the code from the GitHub repo using a dataset that the code was not intended to be run on. For this, I had to go into the codebase, understand the different components of the quantization system, and make the necessary changes to run inference using the quantized model on only a subset of the larger ImageNet dataset. I had to make some major changes to ensure that the label ids in the smaller dataset matched those in the larger one.

One choice I made was to use a more up-to-date version of PyTorch because certain package components used in the codebase did not exist in the version specified in the GitHub repo. Another choice was to create a reverse mapping of the smaller dataset's label ids to the class number. I had to reverse the mapping either for the smaller or the larger dataset. I chose the smaller one to reduce time complexity. I did not want the code iterating through the whole ImageNet dataset's label mappings on every package import.