*Object Detection Model Pruning and Architecture Configuration with Weight Interpolation*

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*Abstract*—We introduce a method of pruning model weights for pretraining multiple configurations of a model while only using one set of pretrained weights. This paper discusses multiple methods attempted and the resultant accuracy obtained. A variety of interpolation methods were used and compared against the custom model with no weight interpolation, the custom model with weight interpolation, and the baseline, pretrained model given by the authors of the paper. In this paper, we test our method on an object detection model, DeTr, standing for Detection Transformer. We show a marginal improvement in validation loss with our method compared to no weight interpolation.

Keywords—object detection, model pruning, pretrained weights

# Introduction

Models published in papers often come with pretrained weights that the authors used. To perform experiments with their model, it is as easy as downloading and loading the parameters. Their results can be easily reproduced in this way, but if a reader wants to configure the original model architecture differently and compare results, the pretrained weights cannot be used. This largely wastes computational resources, and with our method, we provide a solution to this problem. When testing a custom architecture of an existing model, the pretrained weights can be downsampled to the required size while maintaining some of the accuracy of the pretrained model. This leads to faster training time and computational cost savings when iterating on different architectures. The way in which it is downsampled is crucial in maintaining coherence of trained weights, and so we test multiple downsampling algorithms that best achieve this goal. Previous work has been done on this topic, but this method downsamples with no objective function being minimized which has yet to be done.

# Previous Work

Most similarly to our method, a team from Cornell devised an approach using low-rank matrix approximation [1]. Our method does not seek to approximate the full-rank weight matrix as they do, but rather use classical methods for interpolation such as nearest, linear, bilinear, etc.

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