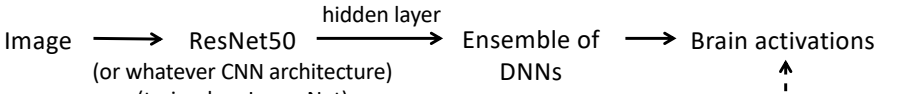
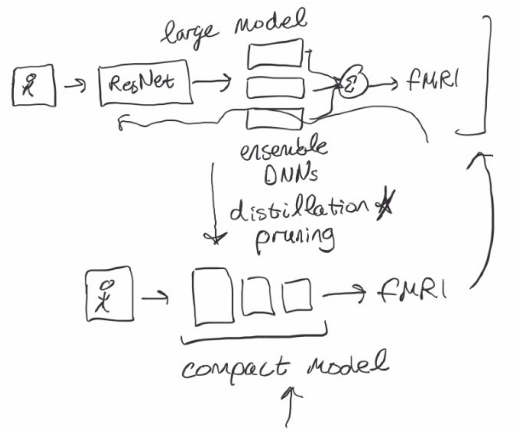
Goal

Improve *decoding/reconstructions* using adaptive stimulus presentation via real-time fMRI neurofeedback (by optimally improving model training)

Only recently have neuroimagers had access to large datasets like NSD that can accommodate data-hungry machine learning techniques (has *any* fMRI GANs paper used pretraining?), and only now do we have a robust framework for using real-time fmri neurofeedback (rt-cloud). Let's combine these two innovations to obtain state-of-the-art reconstructions from fMRI data and showcase the benefit of rt-fmri to improving model training

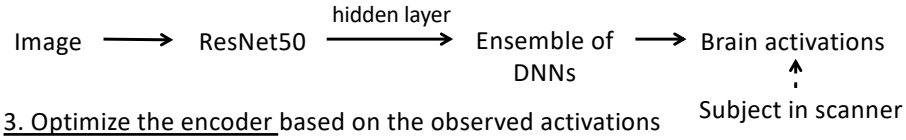
1. Pretrain encoding model going from stimulus to brain activations





In scanner:

2. Calculate error between encoder's activations to actual subject activations



3. Optimize the encoder based on the observed activations

4. Generate most informative next image based on model prediction error (?)

After enough training, try to reconstruct image instead of predict activations:

5. Invert the optimized encoder (& invert the original non-optimized encoder)

See Brain2Pix Guclu paper and Nguyen (2016)

6. Compare reconstructions of optimized model vs. original model