TTA - joint fine-tuning of segmentation and reconstruction

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Datasets

Healthy Training Curves Example:
On the importance of pre-trained model and loading weights properly
Different subset cross evaluation + aspect ratio impact

TODO: the experiment on different lr of freezed encoder model part has disappeared, fix it

- Datasets

Models here are trained on the Pascal VOC segmentation dataset. The segmentation model is class-agnostic, trained on images cropped around ground truth objects.

There are two datasets subsets, called A and B. Those were created by sorting the classes according to the number of training examples. When ranked from 1 to 20, even classes are put to subset A, odd to subset B.

A = ['person', 'car', 'cat', 'bottle', 'tvmonitor', 'train', 'pottedplant', 'boat', 'horse', 'sheep']

B = ['dog', 'chair', 'bird', 'aeroplane', 'bicycle', 'diningtable', 'motorbike', 'sofa', 'bus', 'cow']
Healthy Training Curves Example:

**val/rec_loss**
- unet2_pascal_B_SEG+REC_lr_5e-05_BCE+IoU_inp_384
- unet2_pascal_A_SEG+REC_lr_5e-05_BCE+IoU_inp_384

**val/IoU**
- unet2_pascal_B_SEG+REC_lr_5e-05_BCE+IoU_inp_384
- unet2_pascal_A_SEG+REC_lr_5e-05_BCE+IoU_inp_384

**val/BCE**
- unet2_pascal_B_SEG+REC_lr_5e-05_BCE+IoU_inp_384
- unet2_pascal_A_SEG+REC_lr_5e-05_BCE+IoU_inp_384

**val/ims/in2**
- unet2_pascal_B_SEG+REC_lr_5e-05_BCE+IoU_inp_384
- unet2_pascal_A_SEG+REC_lr_5e-05_BCE+IoU_inp_384
On the importance of pre-trained model and loading weights properly

When we do not load the positional encoding:

When we change patch size and thus need to train patch embedding vs loading pre-trained weights:

![Graphs showing val/min_loss, val/BCE, and val/IoU for different models.](image-url)
Experimenting with different learning rates when altering patch size - doesn't really help:
When there was a mistake in facebook-pretrained to our model weight name matching and the positional encoding didn't get loaded - the weights of the positional encoding were set to require_grad=False so not trained.
Different subset cross evaluation + aspect ratio impact
val/B/map

- sweep_aspect2_pascal_B_SEG+REC_ps_16_p_ar
- sweep_aspect2_pascal_B_SEG+REC_ps_16
- sweep_aspect2_pascal_A_SEG+REC_ps_16_p_ar
- sweep_aspect2_pascal_A_SEG+REC_ps_16

Run set 4
https://wandb.ai/klara/TTA-finetune/reports/TTA-joint-fintuneing-of-segmentation-and-reconstruction--VmlldzozNzIxMDc0