

112-2 Computer Vision HW4 Report

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Result

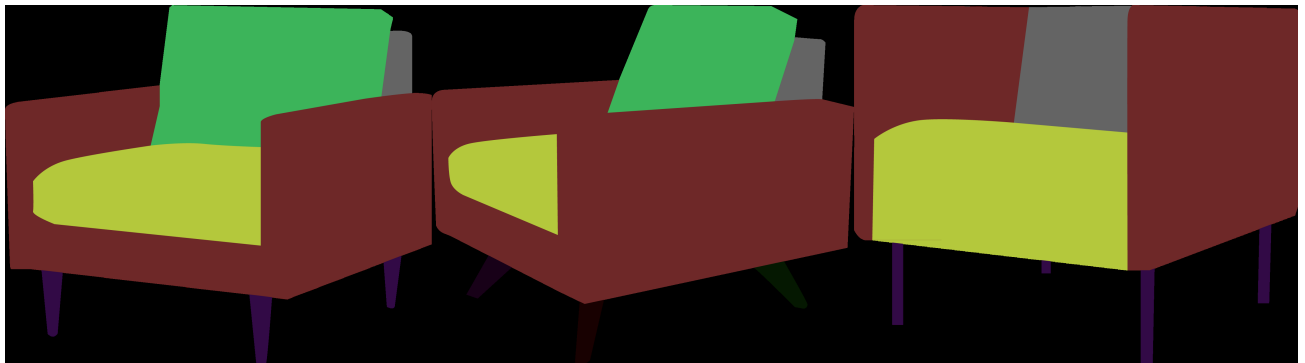
Description

- In this assignment, I trained 3 different models to do the semantic segmentation task on the dataset.
 1. Using the `deeplabv3_resnet50` model as the pretrained model, using transfer learning to train the model on 50 epochs.
 2. Using the `deeplabv3_resnet50` model as the model architecture, train the model from scratch on 50 epochs.
 3. Build a new CNN model by myself, train the model from scratch on 100 epochs. (The model architecture is shown in the `src/model.py` file.)

3 images of Validation results at different epochs.

ground truth

1. 0403, 0407, 0409

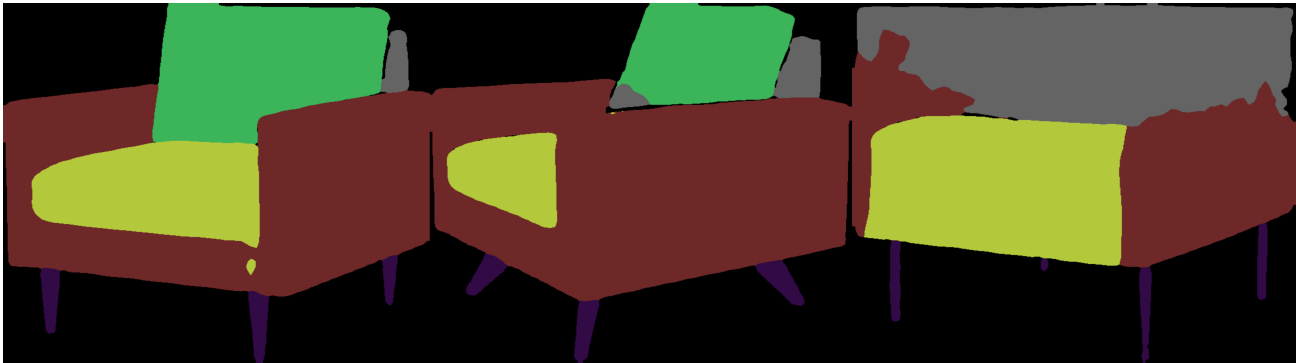


deeplabv3_resnet50_pretrained

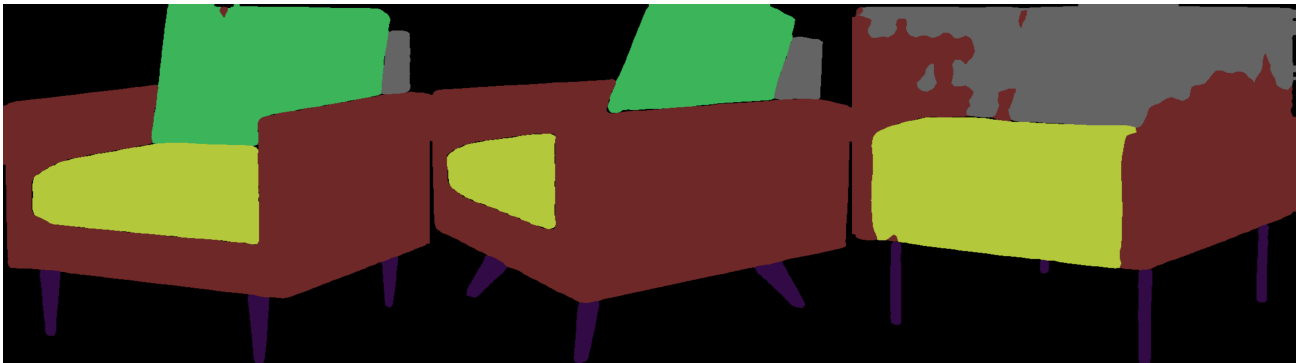
1. epoch 5



2. epoch 20



3. epoch 50

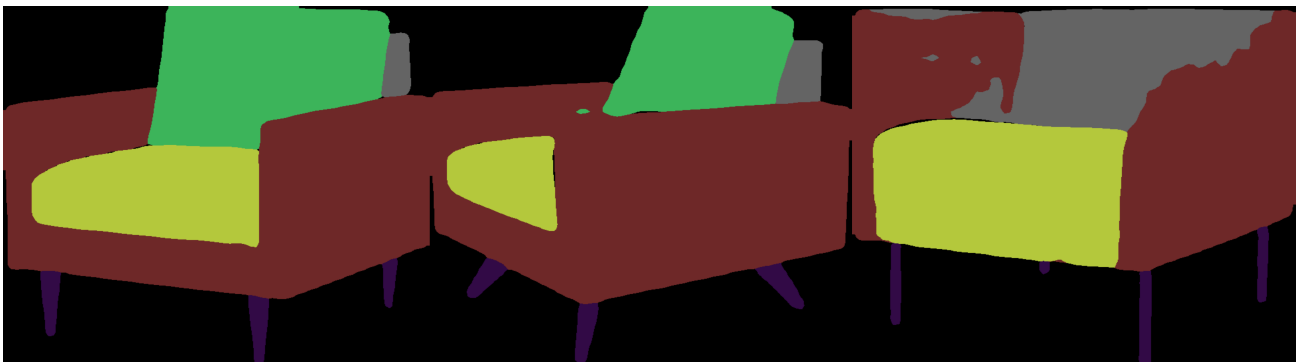


deeplabv3_resnet50_scratch

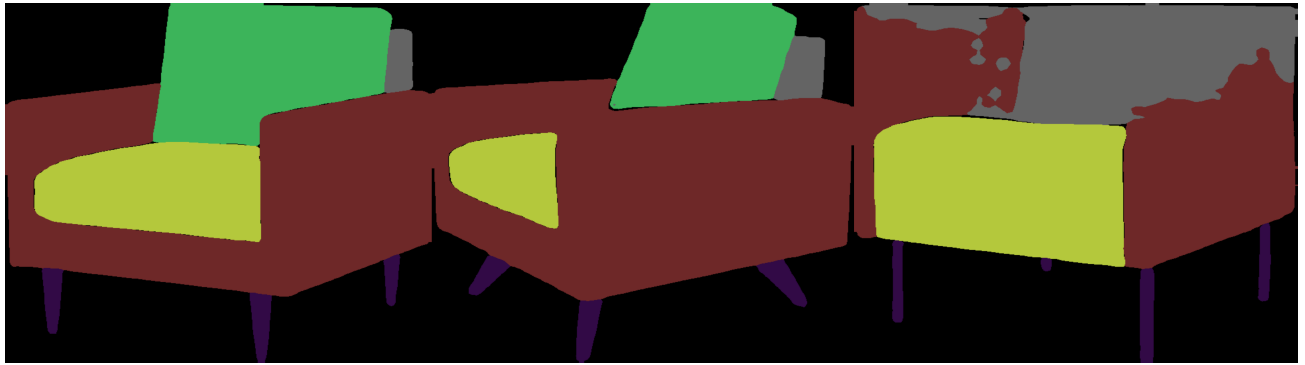
1. epoch 5



2. epoch 20

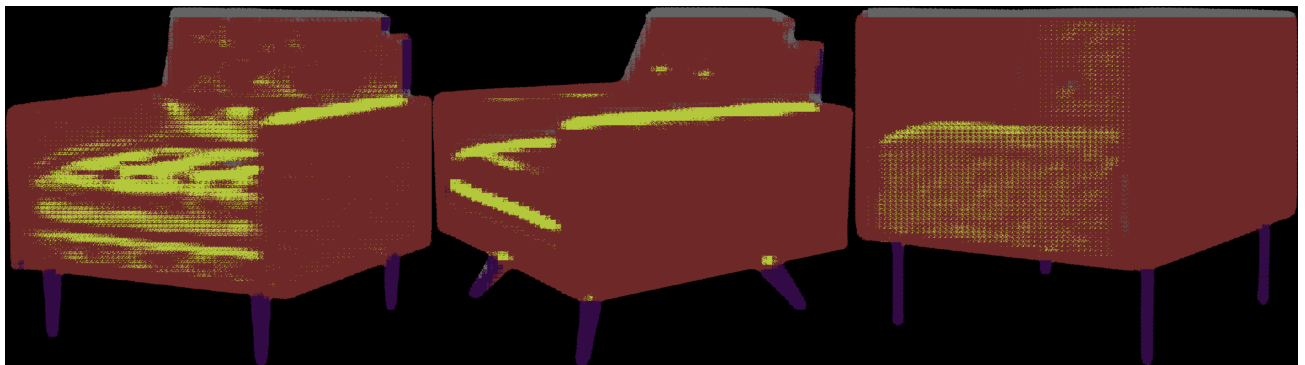


3. epoch 50

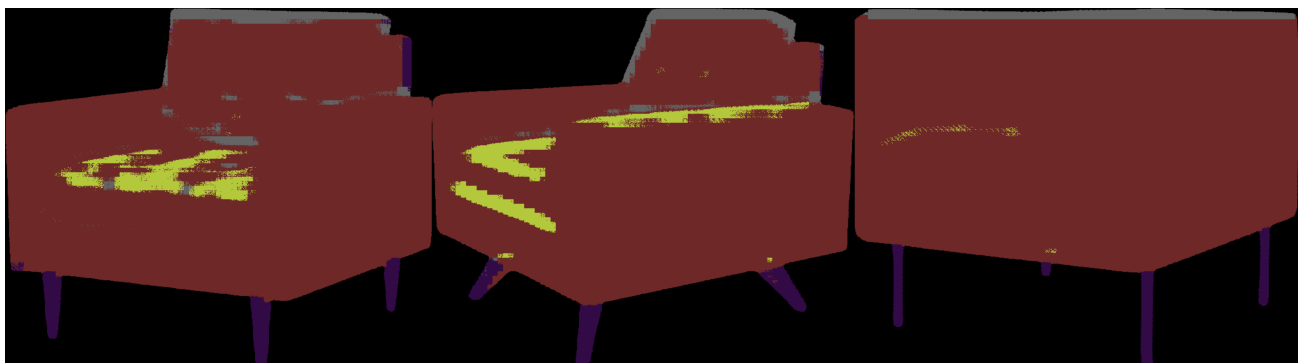


my_model

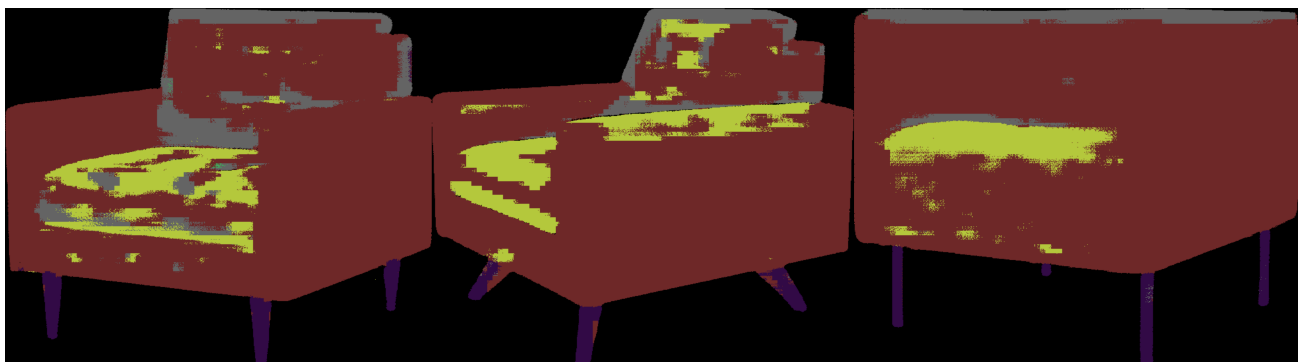
1. epoch 5



2. epoch 20



3. epoch 50



Test results consisting of 10 segmentation images.

- The images are saved in the `datasets/test/predict` folder.

- The images are using `deeplabv3_resnet50` model as the pretrained model, using transfer learning to train the model on 50 epochs.
- You can also check the other prediction results in the `datasets/test/all_prediction` folder.

Implement an IoU function to calculate the IoU value for each segmentation results and the overall mIoU

- The IoU function is implemented in the `inference.py` file. The function name are `calculate_iou` and `calculate_class_iou`.
- I implement those function by first extract each class mask from the ground truth and the prediction, then calculate the intersection and union of the mask, and finally calculate the IoU value.
- The result of the IoU value for each segmentation results and the overall mIoU are shown in the following table.

Class	0401	0402	0403	0404	0405	0406	0407	0408	0409	0410
background	0.9691	0.9521	0.9710	0.9654	0.9461	0.9646	0.9329	0.9513	0.9516	0.9550
椅子底 (黃色)	0.9608	0.9918	0.9803	0.9785	0.9782	0.9770	0.9619	0.9698	0.9572	0.9779
扶手 (咖啡色)	0.9612	0.9741	0.9842	0.9826	0.9747	0.9717	0.9872	0.9529	0.6129	0.9722
椅腳 (黑色)	0.9058	0.9483	0.9228	0.9345	0.9258	0.9128	0.0000	0.8925	0.8869	0.9183
椅墊 (綠色)	nan	nan	0.9823	nan	nan	nan	0.9777	nan	nan	nan
椅背 (灰色)	0.9863	0.9866	0.9311	0.9681	0.9805	0.9807	0.9488	0.5011	0.3519	0.9824
Mean IOU	0.9535	0.9752	0.9601	0.9659	0.9648	0.9606	0.9689	0.8291	0.7022	0.9627

- This result is using the `deeplabv3_resnet50` model as the pretrained model, using transfer learning to train the model on 50 epochs.