

CS 6476 Project 6

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Parts 4 & 5: mIoU of different models

Add each of the following (keeping the changes as you move to the next row):

| | Training mIoU | Validation mIoU |
|---|---------------|-----------------|
| Simple Segmentation Net (no pretrained weights) | 0.2123 | 0.0292 |
| + ImageNet-Pretrained backbone | 0.4653 | 0.4938 |
| + Data augmentation | 0.5333 | 0.5524 |
| ImageNet-Pretrained PSPNet w/ Data Aug. without PPM | 0.5704 | 0.5958 |
| + PSPNet with PPM | 0.5821 | 0.6249 |
| + PSPNet with auxiliary loss | 0.5884 | 0.6203 |

Parts 4 & 5: Per class IoUs

Report your model's IoU for the 11 Camvid classes (you can find the order they are listed in at [dataset_lists/camvid-11/camvid-11_names.txt](#)):

| Class Index | Class name | Simple Segmentation Net Class IoU | PSPNet Class IoU |
|-------------|-------------|-----------------------------------|------------------|
| 0 | Building | 0.8983 | 0.9402 |
| 1 | Tree | 0.9089 | 0.9678 |
| 2 | Sky | 0.9175 | 0.9657 |
| 3 | Car | 0.7695 | 0.9383 |
| 4 | SignSymbol | 0.0000 | 0.0000 |
| 5 | Road | 0.9449 | 0.9682 |
| 6 | Pedestrian | 0.2943 | 0.7239 |
| 7 | Fence | 0.7328 | 0.8605 |
| 8 | Column_Pole | 0.0014 | 0.0014 |
| 9 | Sidewalk | 0.8222 | 0.9358 |
| 10 | Bicyclist | 0.5333 | 0.5826 |

Parts 4 & 5: Most difficult classes

[Which classes have the lowest mIoU? Why might they be the most difficult?

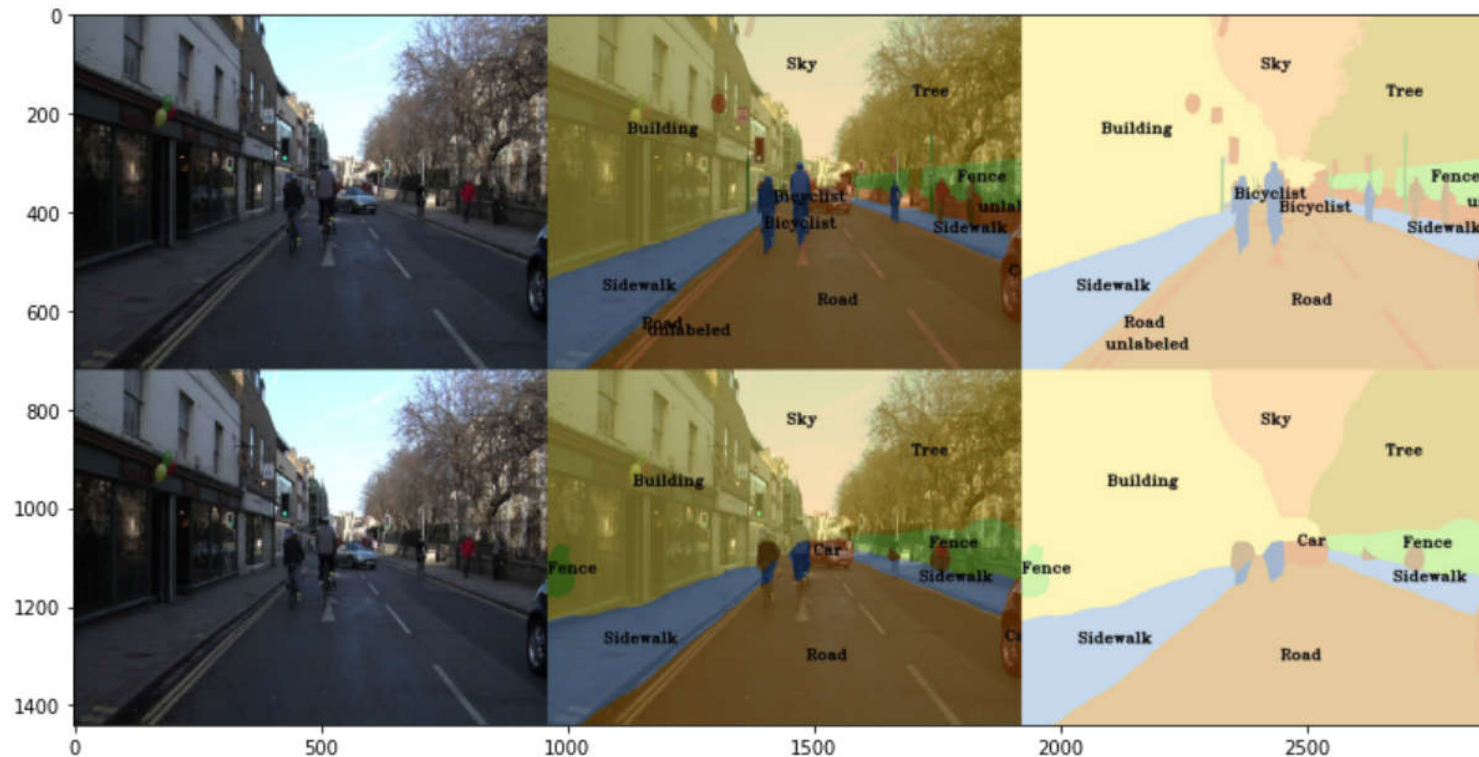
Provide an example RGB image from Camvid that illustrates your point]

SignSymbol. Because its shape, size, color are not uniform and most of the sign symbols are full of details which are difficult to recognize, there is no reliable basis for judgment. For example, the red symbols circled in the picture below are signsymbols, but we can't determine whether they are signsymbols or other objects by their shapes and colors, because they come in a variety of colors and shapes.



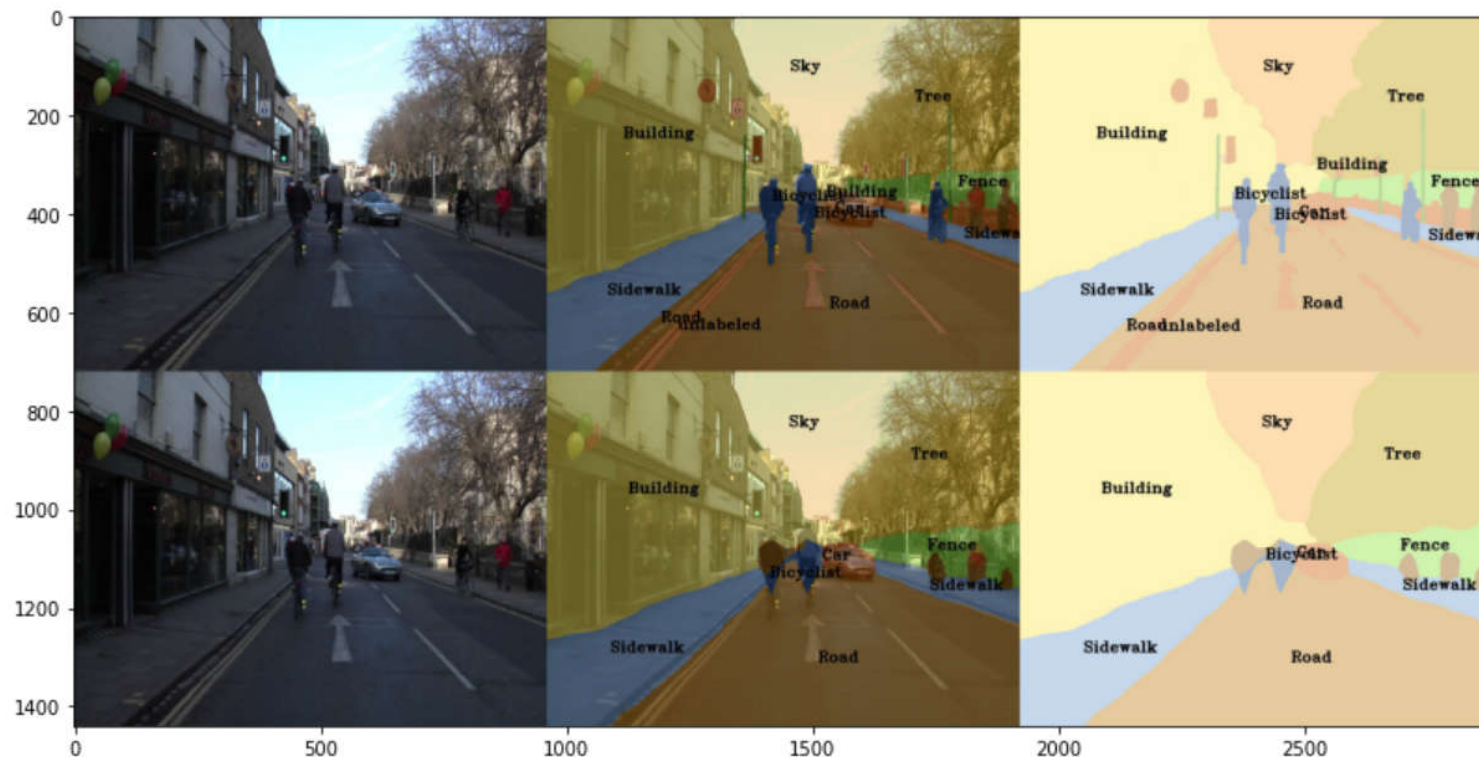
Part 4: Simple segmentation net qualitative results

[Paste a figure of the generated semantic segmentation from Colab. It should be a 2x3 grid, with ground truth on the top row, and your predictions on the bottom row.]



Part 5: PSPNet qualitative results

[Paste a figure of the generated semantic segmentation from Colab. It should be a 2x3 grid, with ground truth on the top row, and your predictions on the bottom row.]



Part 6: Transfer Learning

Report your model's IoU for the Kitti Dataset.

| | mIoU | mAcc/ | allAcc |
|--------------|--------|--------|--------|
| Train result | 0.9362 | 0.9664 | 0.9803 |
| Val result | 0.9365 | 0.9618 | 0.9806 |

| Class Index | Class name | iou | accuracy |
|-------------|------------|--------|----------|
| 0 | Road | 0.8962 | 0.9325 |
| 1 | Not_Road | 0.9767 | 0.9911 |

Part 6: Transfer Learning

Compare the training loss generated when training on Kitti dataset and Camvid dataset. Which decreases at a faster rate? If Camvid or Kitti training loss decreases at a faster rate than the other, why do you think this happened? Or, if the loss decreases at a similar rate, why do you think that is so?

Kitti decreases at a faster rate. Because Kitti uses a Pretrained model to do the transfer learning. Transfer learning can save resources and improve efficiency when training new models, so the loss decreases faster.