Machine Vision

Multi-Object Traffic Segmentation

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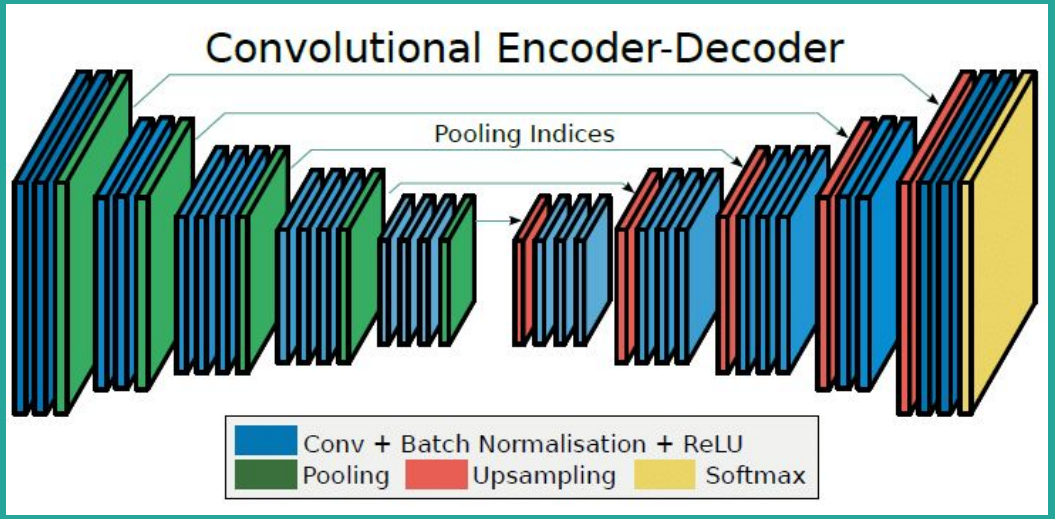
Project

- **Image Segmentation**
- **Traffic Environment**
- **Multi Object Segmentation**

Task



Multi Object Traffic Segmentation NN

Project

- **Python**
- **OpenCV**
- **Linux**
- **Anaconda**
- **Packages and libraries**

Input

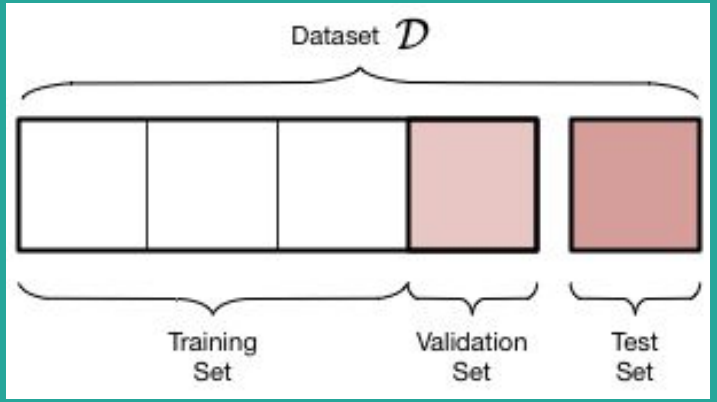
- **Images**
- **Traffic**
- **Folder**

Output

- **Segmentation**
- **Mask**
- **Classes**

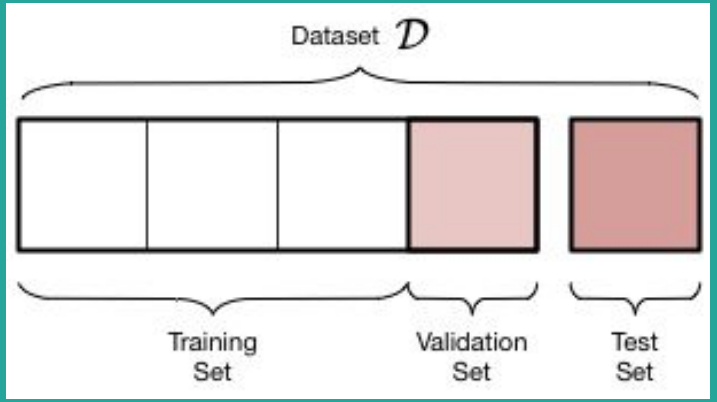
NN - Dataset

- **Cityscapes**
- **50 cities**
- **Conditions**
- **Split**
  - **Training: 2975**
  - **Validation: 500**
  - **Test: 1525**



NN - Dataset

- Classes
  - Traffic Light
  - Traffic Sign
  - Person
  - Rider
  - Car
  - Truck
  - Bus
  - Train
  - Motorcycle
  - Bicycle

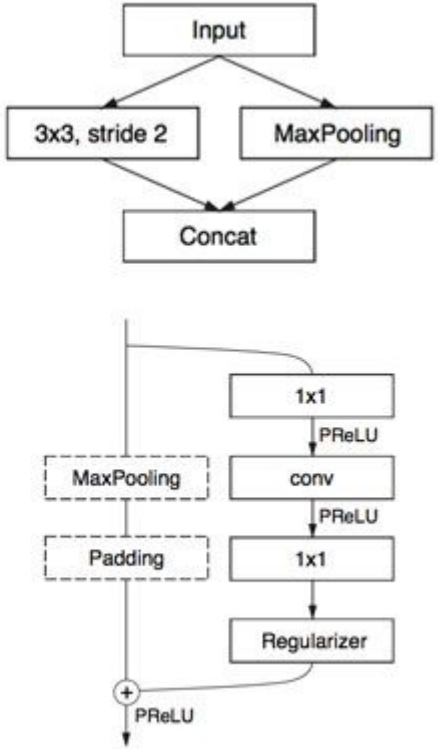


- 10.86 GiB

NN - Model

- **ENet**
- **Pretrained**
- **Camvid**
- **SUN**

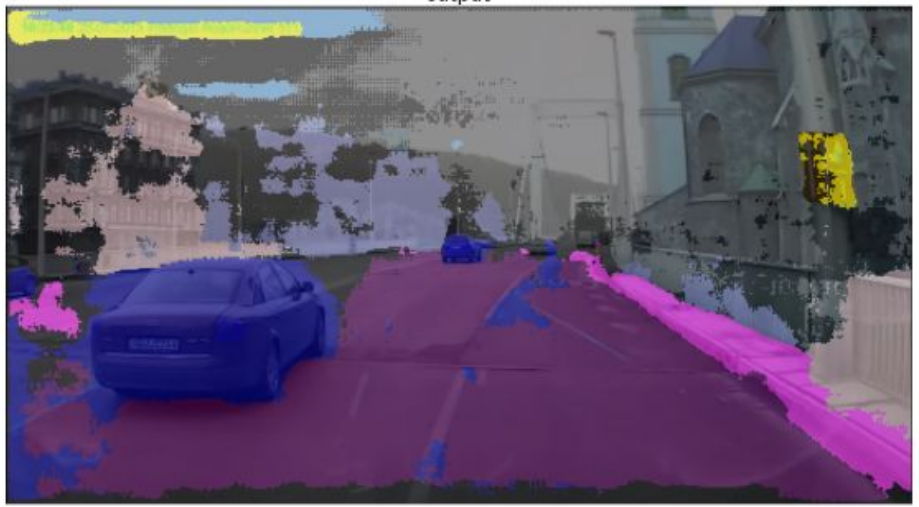
Name	Type	Output size
initial		16 × 256 × 256
bottleneck1.0	downsampling	64 × 128 × 128
4× bottleneck1.x		64 × 128 × 128
bottleneck2.0	downsampling	128 × 64 × 64
bottleneck2.1		128 × 64 × 64
bottleneck2.2	dilated 2	128 × 64 × 64
bottleneck2.3	asymmetric 5	128 × 64 × 64
bottleneck2.4	dilated 4	128 × 64 × 64
bottleneck2.5		128 × 64 × 64
bottleneck2.6	dilated 8	128 × 64 × 64
bottleneck2.7	asymmetric 5	128 × 64 × 64
bottleneck2.8	dilated 16	128 × 64 × 64
Repeat section 2, without bottleneck2.0		
bottleneck4.0	upsampling	64 × 128 × 128
bottleneck4.1		64 × 128 × 128
bottleneck4.2		64 × 128 × 128
bottleneck5.0	upsampling	16 × 256 × 256
bottleneck5.1		16 × 256 × 256
fullconv		$C \times 512 \times 512$



Visualization

input

output



Conclusion

- **Sometimes very accurate**
- **Fast training**
- **Video**
- **Real-time**
- **2016**
- **Mask R-CNN, YOLO**

```
ENet model suceffuly loaded.
ENet output took 0.3906 seconds
ENet output took 0.3220 seconds
ENet output took 0.3705 seconds
ENet output took 0.3782 seconds
ENet output took 0.3258 seconds
ENet output took 0.3165 seconds
ENet output took 0.3264 seconds
ENet output took 0.3324 seconds
ENet output took 0.3473 seconds
ENet output took 0.3384 seconds
ENet output took 0.3213 seconds
```

Thank you !