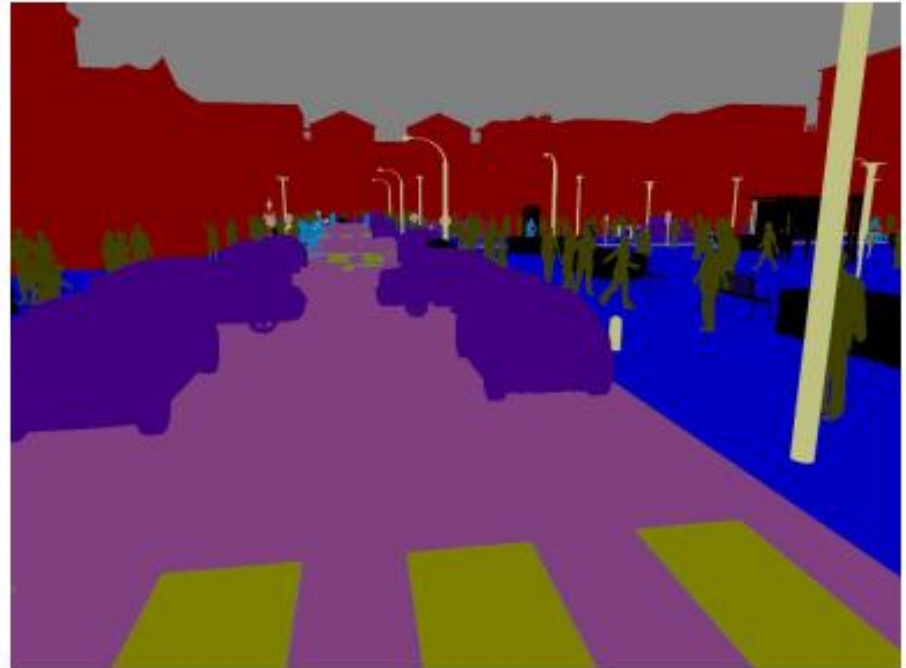


Demonstrating State-of-the-Art Real-Time Semantic Segmentation



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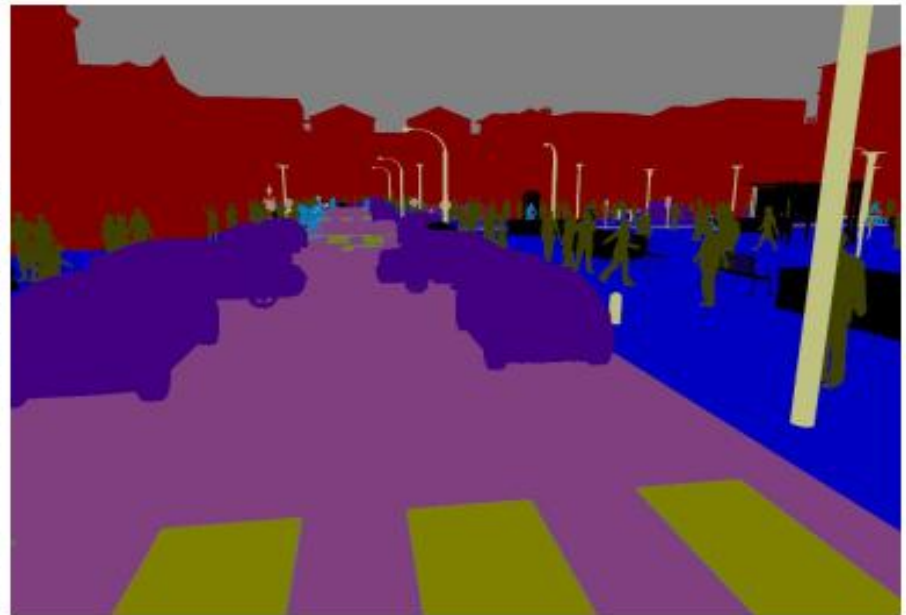
Jihao Andreas Lin, Yannik Klein



■ Sky ■ Building ■ Road ■ Sidewalk ■ Fence ■ Vegetation ■ Pole ■ Car ■ Sign ■ Pedestrian ■ Cyclist

Semantic Segmentation

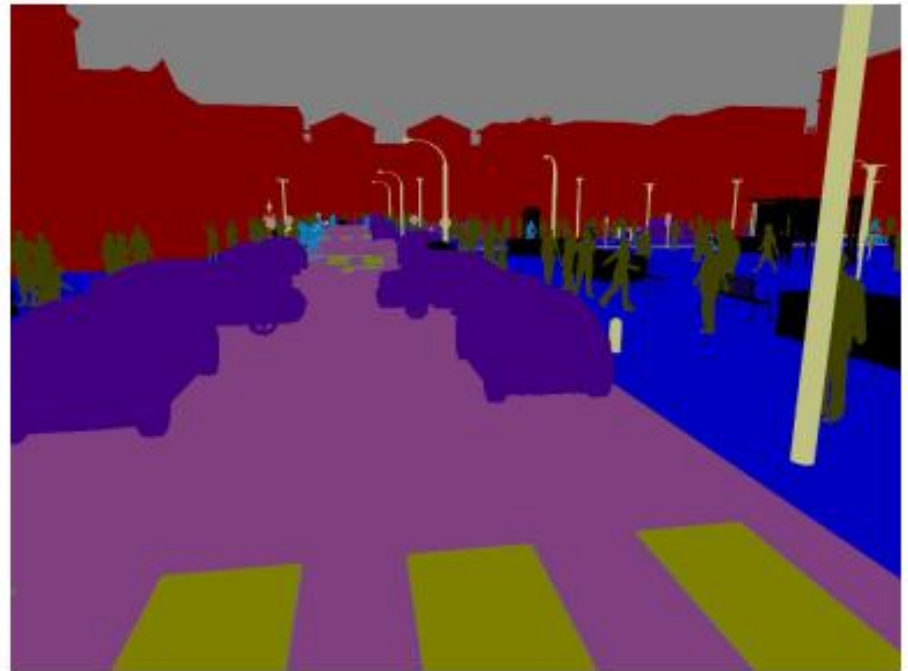
- Assign each pixel in an image a corresponding label.
- Applications: Autonomous Driving, Video Surveillance, Robot Sensing
- Challenge: Respect object boundaries.



■ Sky ■ Building ■ Road ■ Sidewalk ■ Fence ■ Vegetation ■ Pole ■ Car ■ Sign ■ Pedestrian ■ Cyclist

Real-Time Semantic Segmentation

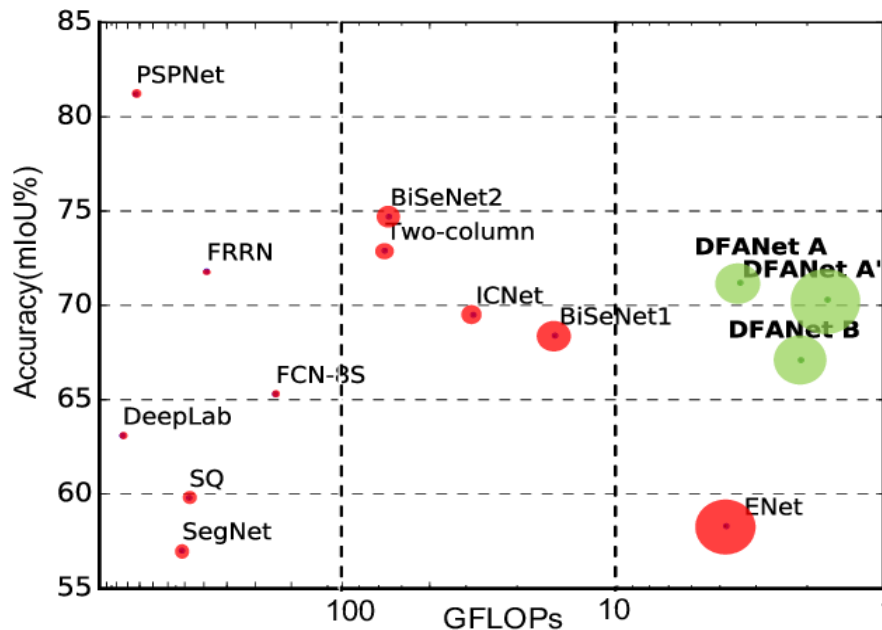
- Perform semantic segmentation in real-time, e.g. for 60 FPS.
- Trade-off between computation time and accuracy.



■ Sky ■ Building ■ Road ■ Sidewalk ■ Fence ■ Vegetation ■ Pole ■ Car ■ Sign ■ Pedestrian ■ Cyclist

Deep Feature Aggregation Network (DFANet)

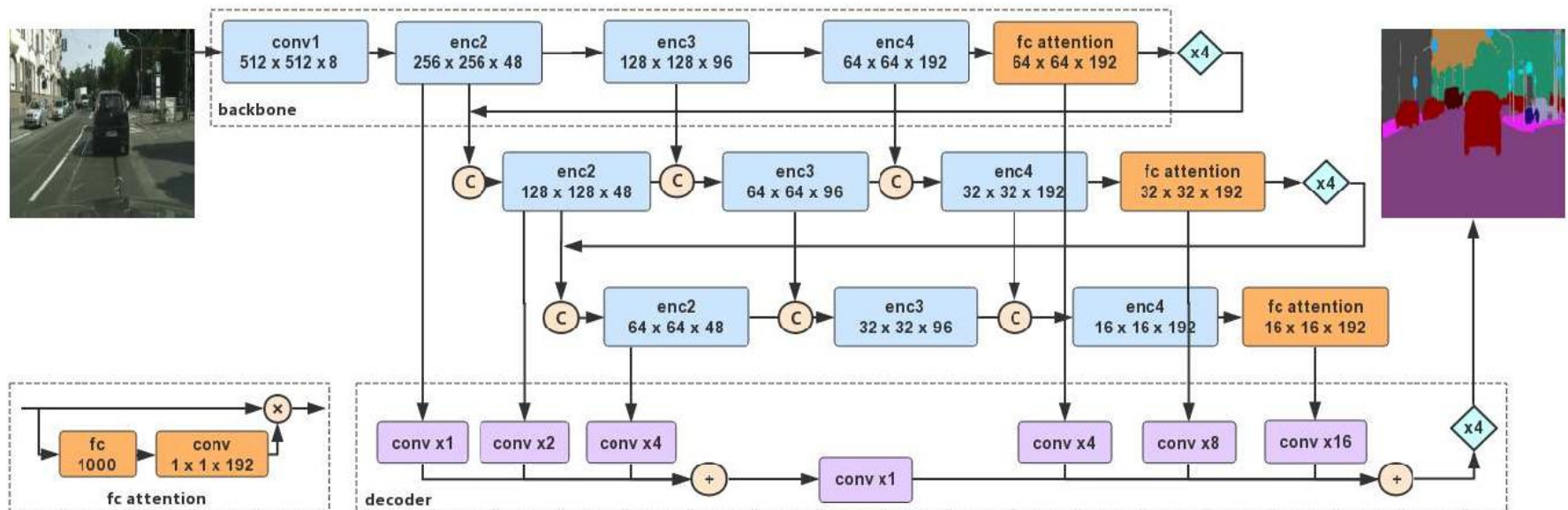
- *Deep Feature Aggregation for Real-Time Semantic Segmentation*
- *IEEE Conference on Computer Vision and Pattern Recognition 2019*
- Promises to handle trade-off better than other common approaches.



Problem: No working, publicly available implementation exists for reproducing results.

Deep Feature Aggregation Network (DFANet)

- Network has an encoder-decoder structure.
- Focus on re-using features from multiple (earlier) stages, i.e. lower level features (e.g. edges or object parts).
- Predominantly uses depthwise separable convolutions (for efficiency).



Project Outline

1. Familiarize with DFANet, PyTorch,...
2. Implement backbone (lightweight Inception module called Xception) and pretrain on ImageNet.
3. Implement DFANet, transfer learning using pretrained backbone.
4. Integrate into real-time interactive live stream demonstrator for visualization of results.

Results

- Achieved 64% mIoU on the training data (comparable to paper results).
- Works in real-time demonstrator.

j-a-lin / DFANet_PyTorch

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Code Issues 3 Pull requests 0 Projects 0 Security Insights

Unofficial implementation of Deep Feature Aggregation Networks for real-time semantic segmentation.

62 commits 1 branch 0 releases 2 contributors

Branch: master New pull request Find File Clone or download

Jihao Andreas Lin eval		Latest commit 724ea05 on 18 Jun
datasets	debugging	2 months ago
eval	eval	2 months ago
metric	metric import	2 months ago
model	load state dict	2 months ago
utils	metric ignore index fix	2 months ago

Example Output (Train)



Example Output (Val)



Example Output (Test)

