

PWC-Net: CNNs for Optical Flow Using Pyramid, Warping, and Cost Volume

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Usage

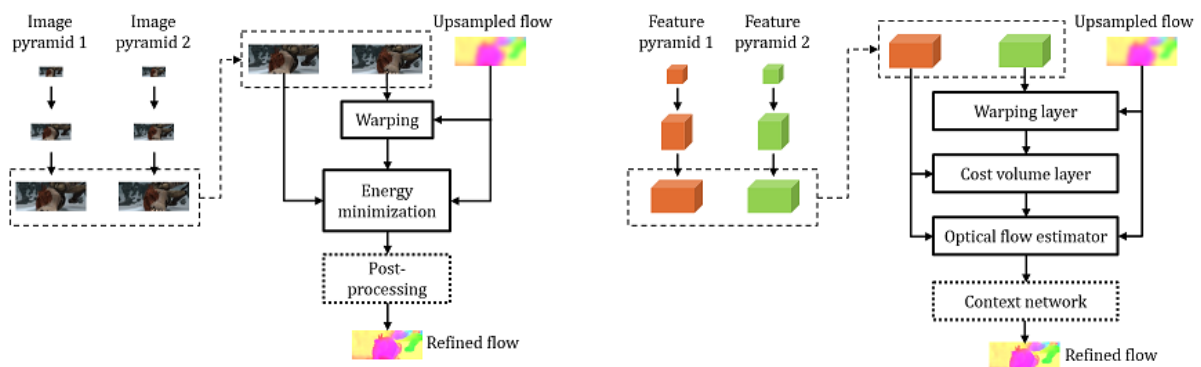
For Caffe users, please refer to Caffe/README.md.

For PyTorch users, please refer to PyTorch/README.md

The PyTorch implementation almost matches the Caffe implementation (average EPE on the final pass of the Sintel training set: 2.31 by Pytorch and 2.29 by Caffe).

Network Architecture

PWC-Net fuses several classic optical flow estimation techniques, including image pyramid, warping, and cost volume, in an end-to-end trainable deep neural networks for achieving state-of-the-art results.



Paper & Citation

Deqing Sun, Xiaodong Yang, Ming-Yu Liu, and Jan Kautz. "PWC-Net: CNNs for Optical Flow Using Pyramid, Warping, and Cost Volume." CVPR 2018 or arXiv:1709.02371

Updated and extended version: “Models Matter, So Does Training: An Empirical Study of CNNs for Optical Flow Estimation.” arXiv:1809.05571

Project page link

Talk at robust vision challenge workshop

Talk at CVPR 2018 conference

If you use PWC-Net, please cite the following paper:

```
1 @InProceedings{Sun2018PWC-Net,
2   author    = {Deqing Sun and Xiaodong Yang and Ming-Yu Liu and Jan
3     Kautz},
4   title     = {{PWC-Net}: {CNNs} for Optical Flow Using Pyramid,
5     Warping, and Cost Volume},
6   booktitle = {CVPR},
7   year      = {2018},
8 }
```

or the arXiv paper

```
1 @article{sun2017pwc,
2   author={Sun, Deqing and Yang, Xiaodong and Liu, Ming-Yu and Kautz,
3     Jan},
4   title={{PWC-Net}: {CNNs} for Optical Flow Using Pyramid, Warping, and
5     Cost Volume},
6   journal={arXiv preprint arXiv:1709.02371},
7   year={2017}
8 }
```

or the updated and extended version

```
1 @article{Sun2018:Model:Training:Flow,
2   author={Sun, Deqing and Yang, Xiaodong and Liu, Ming-Yu and Kautz,
3     Jan},
4   title={Models Matter, So Does Training: An Empirical Study of CNNs
5     for Optical Flow Estimation},
6   journal={IEEE Transactions on Pattern Analysis and Machine
7     Intelligence (TPAMI)},
8   note = {to appear}
9 }
```

For multi-frame flow, please also cite

```
1 @inproceedings{ren2018fusion,
2   title={A Fusion Approach for Multi-Frame Optical Flow Estimation},
3   author={Ren, Zhile and Gallo, Orazio and Sun, Deqing and Yang, Ming-
4     Hsuan and Sudderth, Erik B and Kautz, Jan},
5   booktitle={Proceedings of the IEEE Winter Conference on Applications
6     of Computer Vision (WACV)},
7 }
```

```
5   year={2019}  
6 }
```

Related Work from NVIDIA

flownet2-pytorch

Learning Rigidity in Dynamic Scenes with a Moving Camera for 3D Motion Field Estimation (ECCV 2018)

Contact

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