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## Fast End-to-End Trainable Guided Filter

[Project] [Paper] [arXiv] [Demo] [Home]

Official implementation of **Fast End-to-End Trainable Guided Filter**.

**Faster, Better** and **Lighter** for pixel-wise image prediction.

### Overview



**DeepGuidedFilter** is the author's implementation of:

### Fast End-to-End Trainable Guided Filter

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With our method, FCNs can run **10-100** times faster w/o performance drop.

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### Get Started

#### Prepare Environment [Python>=3.6]

1. Download source code from GitHub. `“sh git clone https://github.com/wuhuikai/DeepGuidedFilter  
cd DeepGuidedFilter && git checkout release “`
2. Install dependencies. `“sh conda install opencv=3.4 conda install pytorch=1.1 torchvision=0.2  
cudatoolkit=9.0 -c pytorch  
pip install -r requirements.txt “`

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3. **(Optional)** Install dependencies for MonoDepth. “sh cd ComputerVision/MonoDepth

```
pip install -r requirements.txt ### Ready to **GO** ! #### Image Processingsh
cd ImageProcessing/DeepGuidedFilteringNetwork
```

```
python predict.py -task auto_ps
-img_path ../../images/auto_ps.jpg
-save_folder .
-model deep_guided_filter_advanced
-low_size 64
-gpu 0
```

```
1 See [Here](ImageProcessing/DeepGuidedFilteringNetwork/#predict) or `
  python predict.py -h` for more details.
2 #### Semantic Segmentation with Deeplab-Resnet
3 1. Enter the directory.
4     ``sh
5     cd ComputerVision/Deeplab-Resnet
6     ``
7 2. Download the pretrained model [[Google Drive](https://drive.google.
  com/open?id=1YXZoZIZNR1ACewiUBp4UDvo_P65cCooK) | [BaiduYunPan] (https
  ://pan.baidu.com/s/1dEnpcGfchlZA_fVGdve0ig)].
8 3. Run it now !
9     ``sh
10    python predict_dgf.py --img_path ../../images/segmentation.jpg --
  snapshots [MODEL_PATH]
11    ``
12 Note:
13 1. Result is in `../../images`.
14 2. Run `python predict_dgf.py -h` for more details.
15 #### Saliency Detection with DSS
16 1. Enter the directory.
17     ``sh
18     cd ComputerVision/Saliency_DSS
19     ``
20 2. Download the pretrained model [[Google Drive](https://drive.google.
  com/open?id=1ZxbAAJw9BxCKj2e2QsBmCnjWLF1CGLf1) | [BaiduYunPan] (https
  ://pan.baidu.com/s/1pgOMh3V50lRa6slbIW_SKQ)].
21 3. Try it now !
22     ``sh
23     python predict.py --im_path ../../images/saliency.jpg \
24                       --netG [MODEL_PATH] \
25                       --thres 161 \
26                       --dgf --nn_dgf \
27                       --post_sigmoid --cuda
28     ``
29 Note:
30 1. Result is in `../../images`.
31 2. See [Here](ComputerVision/Saliency_DSS/#try_on_an_image) or `python
```

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    predict.py -h` for more details.
32 ##### Monocular Depth Estimation
33 1. Enter the directory.
34     ``sh
35     cd ComputerVision/MonoDepth
36     ``
37 2. **Download** and **Unzip** Pretrained Model [[Google Drive](https://
    drive.google.com/file/d/1dKDYRtZPahoFJZ5ZJNilgHEvT6gG4SC6/view?usp=
    sharing) | [BaiduYunPan](https://pan.baidu.com/s/1-
    GkMaRAVym8UEmQ6ia5cHw)]
38 2. Run on an Image
39     ``sh
40     python monodepth_simple.py --image_path ../../images/depth.jpg --
    checkpoint_path [MODEL_PATH] --guided_filter
41     ``
42 Note:
43 1. Result is in `../../images`.
44 2. See [Here](ComputerVision/MonoDepth/#try_it_on_an_image) or `python
    monodepth_simple.py -h` for more details.
45
46 ## Guided Filtering Layer
47 ##### Install Released Version
48 * PyTorch Version
49     ``sh
50     pip install guided-filter-pytorch
51     ``
52 * Tensorflow Version
53     ``sh
54     pip install guided-filter-tf
55     ``
56 ##### Usage
57 * PyTorch Version
58     ``python
59     from guided_filter_pytorch.guided_filter import FastGuidedFilter
60
61     hr_y = FastGuidedFilter(r, eps)(lr_x, lr_y, hr_x)
62     ``
63     ``python
64     from guided_filter_pytorch.guided_filter import GuidedFilter
65
66     hr_y = GuidedFilter(r, eps)(hr_x, init_hr_y)
67     ``
68     ``
69     from guided_filter_pytorch.guided_filter import ConvGuidedFilter
70
71     hr_y = ConvGuidedFilter(r, norm)(lr_x, lr_y, hr_x)
72     ``
73 * Tensorflow Version
74     ``python
75     from guided_filter_tf.guided_filter import fast_guided_filter
76     ``

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```
77     hr_y = fast_guided_filter(lr_x, lr_y, hr_x, r, eps, nhwc)
78     ``
79     ```python
80     from guided_filter_tf.guided_filter import guided_filter
81
82     hr_y = guided_filter(hr_x, init_hr_y, r, eps, nhwc)
83     ``
84 ## Training from scratch
85 ### Prepare Training Environment
86 ```sh
87 git checkout master
88
89 conda install opencv=3.4
90 conda install pytorch=1.1 torchvision=0.2 cudatoolkit=9.0 -c pytorch
91
92 pip uninstall Pillow
93 pip install -r requirements.txt
94
95 # (Optional) For MonoDepth
96 pip install -r ComputerVision/MonoDepth/requirements.txt
```

## Start to Train

- Image Processing
- Semantic Segmentation with Deeplab-Resnet
- Saliency Detection with DSS
- Monocular Depth Estimation

## Citation

```
1 @inproceedings{wu2017fast,
2   title       = {Fast End-to-End Trainable Guided Filter},
3   author      = {Wu, Huikai and Zheng, Shuai and Zhang, Junge and Huang,
4                 Kaiqi},
5   booktitle   = {CVPR},
6   year        = {2018}
7 }
```