Deep Discrete Flow

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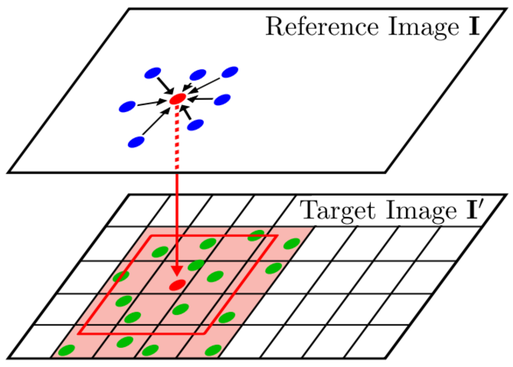
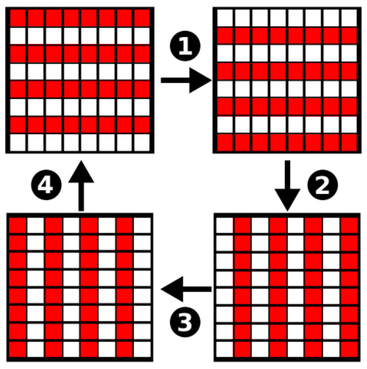
Discrete Flow

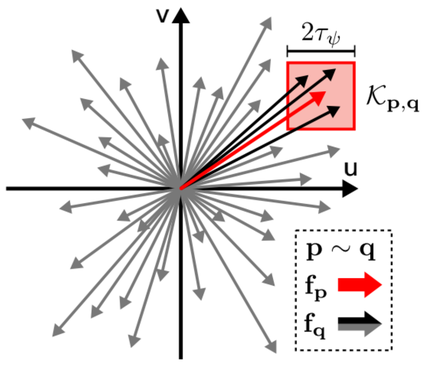
Diverse Flow Proposals



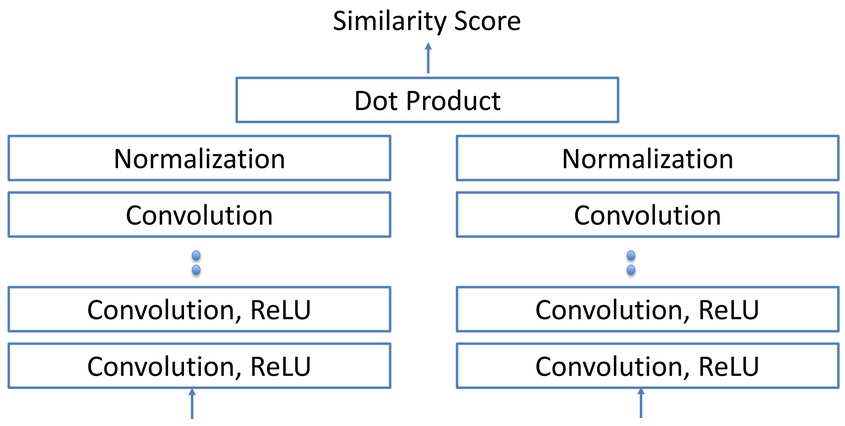
BCD Optimization



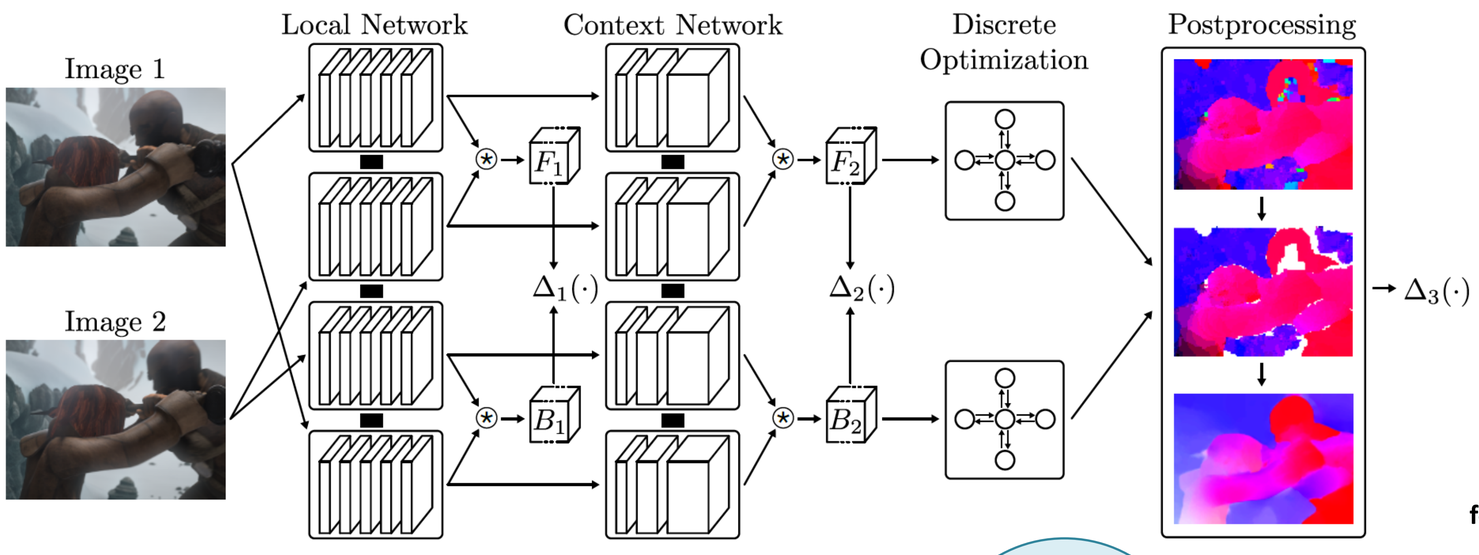
Truncated Penalty



Siamese Networks

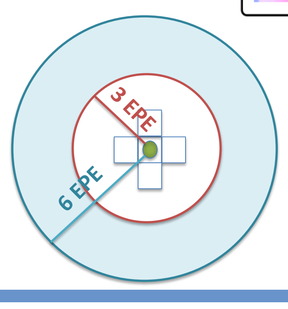


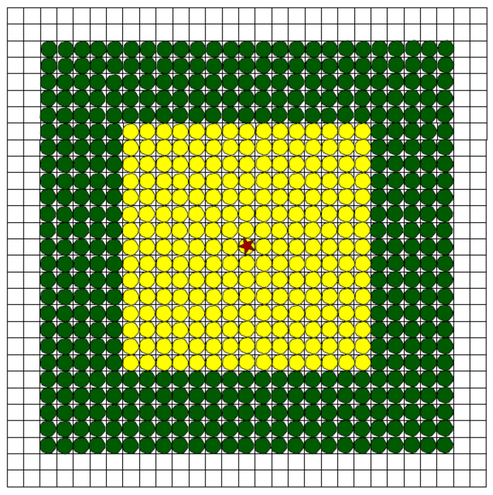
Feature Learning Using Dilated Convolutions

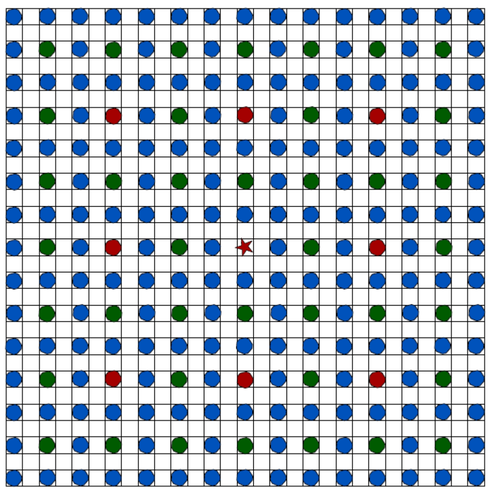


$$\Delta_1(s_-, s_+) = \Delta_2(s_-, s_+) = \max(0, m + s_- - s_+)$$

$$\Delta_3 = [\|\mathbf{f} - \hat{\mathbf{f}}\|_2 > 3\,\mathrm{Px}]$$







```
for i = 1 to #dilations do
    Dilated Convolution with dilations[i]
    if i < #dilations then
        Batch Normalization, ReLU
```

```
Sub-sampling with dilations[1]
for i = 1 to #dilations do
    if i == #dilations then
        stride = 1
    else
        stride = dilations[i+1] / dilations[i]
    Convolution with stride
if i < #dilations then
    Batch Normalization, ReLU
```

Results and Remaining Problems

Arch.	Layers	Feature Maps	RFS
1	5	64 64 64 64 64	11
2	7	64 64 64 64 64 64 64	15
3	7	64 64 64 128 128 128 64	15
4	9	64 64 64 64 64 64 64 64 64	19
5	9	32 32 32 64 64 64 128 128 128	19

Arch.	Out-Noc
1	24.61 %
2	20.54 %
3	20.69 %
4	19.34 %
5	18.31 %

(a) **MPI Sintel**

Arch.	Out-Noc
1	34.60 %
2	29.71 %
3	29.89 %
4	30.37 %
5	27.36 %

(b) **KITTI**

	DF [11]	Optimized
MPI Sintel	29.97 %	19.16 %
KITTI	34.29 %	22.59 %

(c) **Daisy**

Arch.	Feature Maps	Arch.	Feature Maps	Dilations	RFS
1		11	64 128 256 512	2 4 8 16	+60
2		12	64 128 256	2 4 8	+28
3		13	64 128	2 4	+12
4		14	64 128 256	4 8 16	+56
5	all 64	15	64 128	8 16	+48
6		16	128 128	4 4	+16
7		17	64 64 128 128	2 2 4 4	+24
8		18	64 64 128 128 256 256	2 2 4 4 8 8	+28
9		19	128 128 256 256	8 8 16 16	+48

Arch.	Out-Noc
1	30.16 %
2	25.82 %
3	24.67 %
4	29.40 %
5	28.54 %
6	25.11 %
7	26.78 %
8	31.63 %
9	40.12 %

Arch.	Out-Noc
11	24.28 %
12	20.28 %
13	21.39 %
14	25.29 %
15	24.89 %
16	21.13 %
17	22.93 %
18	24.68 %
19	34.43 %

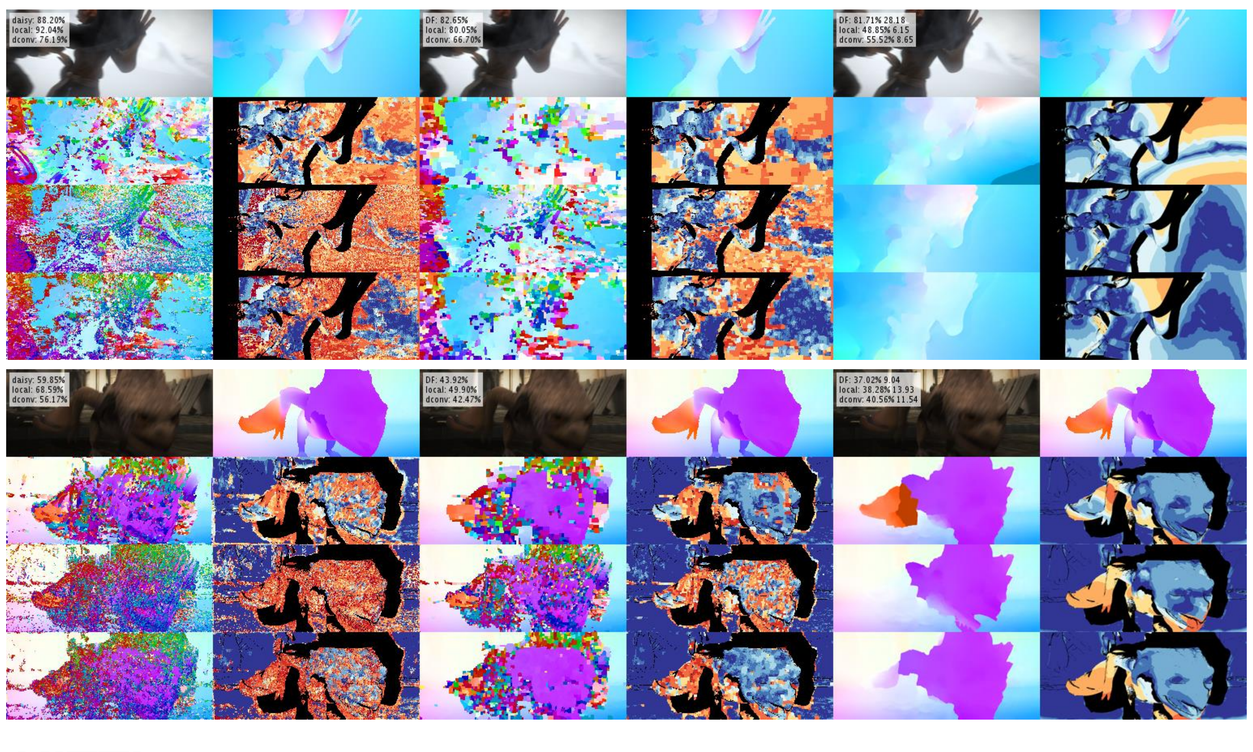
(b) **KITTI**

Arch.	Out-Noc
1	16.32 %
2	14.51 %
3	15.65 %
4	15.27 %
5	15.66 %
6	15.10 %
7	15.68 %
8	15.50 %
9	20.04 %

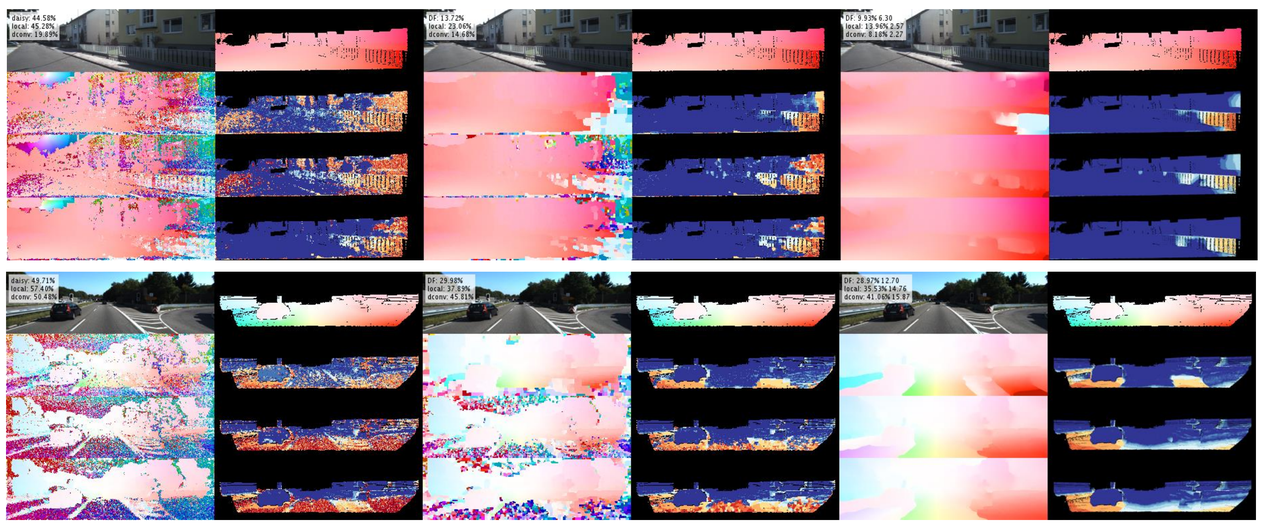
Arch.	Out-Noc
11	11.92 %
12	12.19 %
13	14.32 %
14	12.53 %
15	13.34 %
16	13.59 %
17	13.69 %
18	13.01 %
19	14.55 %

(a) **MPI Sintel**

MPI Sintel



KITTI



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J. Zbontar, Y. LeCun. Stereo Matching by Training a Convolutional Neural Network to Compare Image Patches, JMLR 2016.

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