Convolutional Neural Network Architecture for Image Segmentation Containing Translucent Overlapped Objects

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TABLE I: Proposed network structure.

Layer Number	Layer Name	Layer Type	Layer Description
1	$'inputImage'$	Image Input	$360 \times 480 \times 3$ images with 'zerocenter' normalization
2	$'conv1\_1'$	Convolution	64 $3 \times 3 \times 3$ convolutions with stride [1 1] and padding [1 1 1 1]
3	$'bn\_conv1\_1'$	Batch Normalization	Batch normalization
4	$'relu1\_1'$	ReLU	ReLU
5	$'conv1\_2'$	Convolution	64 $3 \times 3 \times 64$ convolutions with stride [1 1] and padding [1 1 1 1]
6	$'bn\_conv1\_2'$	Batch Normalization	Batch normalization
7	$'relu1\_2'$	ReLU	ReLU
8	$'pool1'$	Max Pooling	2×2 max pooling with stride [2 2] and padding [0 0 0 0]
9	$'conv2\_1'$	Convolution	128 $3 \times 3 \times 64$ convolutions with stride [1 1] and padding [1 1 1 1]
10	$'bn\_conv2\_1'$	Batch Normalization	Batch normalization
11	$'relu2\_1'$	ReLU	ReLU
12	$'conv2\_2'$	Convolution	128 $3 \times 3 \times 128$ convolutions with stride [1 1] and padding [1 1 1 1]
13	$'bn\_conv2\_2'$	Batch Normalization	Batch normalization
14	$'relu2\_2'$	ReLU	ReLU
15	$'pool2'$	Max Pooling	2×2 max pooling with stride [2 2] and padding [0 0 0 0]
16	$'decoder2\_unpool'$	Max Unpooling	Max Unpooling
17	$'decoder2\_conv2'$	Convolution	128 $3 \times 3 \times 128$ convolutions with stride [1 1] and padding [1 1 1 1]
18	$'decoder2\_bn\_2'$	Batch Normalization	Batch normalization
19	$'decoder2\_relu\_2'$	ReLU	ReLU
20	$'decoder2\_conv1'$	Convolution	64 $3 \times 3 \times 128$ convolutions with stride [1 1] and padding [1 1 1 1]
21	$'decoder2\_bn\_1'$	Batch Normalization	Batch normalization
22	$'decoder2\_relu\_1'$	ReLU	ReLU
23	$'decoder1\_unpool'$	Max Unpooling	Max Unpooling
24	$'decoder1\_conv2'$	Convolution	64 $3 \times 3 \times 64$ convolutions with stride [1 1] and padding [1 1 1 1]
25	$'decoder1\_bn\_2'$	Batch Normalization	Batch normalization
26	$'decoder1\_relu\_2'$	ReLU	ReLU
27	$'decoder1\_conv1'$	Convolution	4 $3 \times 3 \times 64$ convolutions with stride [1 1] and padding [1 1 1 1]
28	$'decoder1\_bn\_1'$	Batch Normalization	Batch normalization
29	$'decoder1\_relu\_1'$	ReLU	ReLU
30	$'softmax'$	Softmax	softmax
31	$'labels'$	Pixel Classification Layer	Class weighted cross-entropy loss with 'Obj1', 'Obj2', and 2 other classes