Direction-aware Spatial Context Features for Shadow Detection

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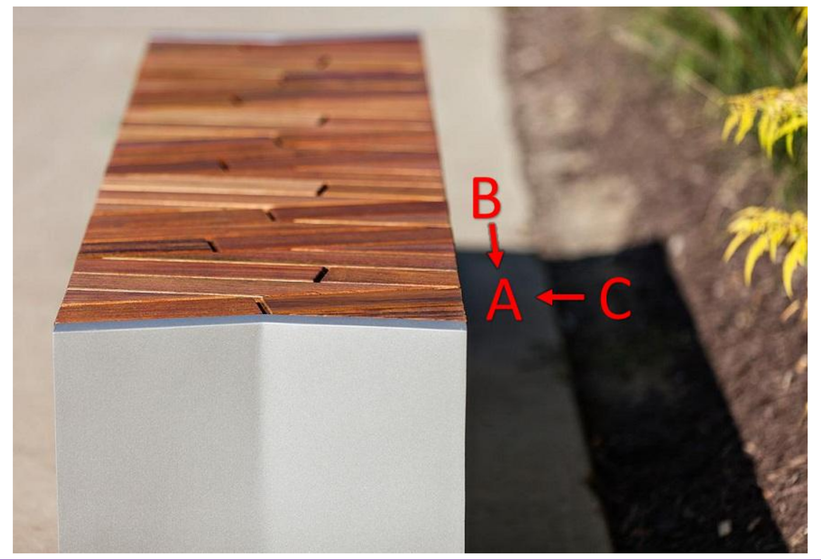
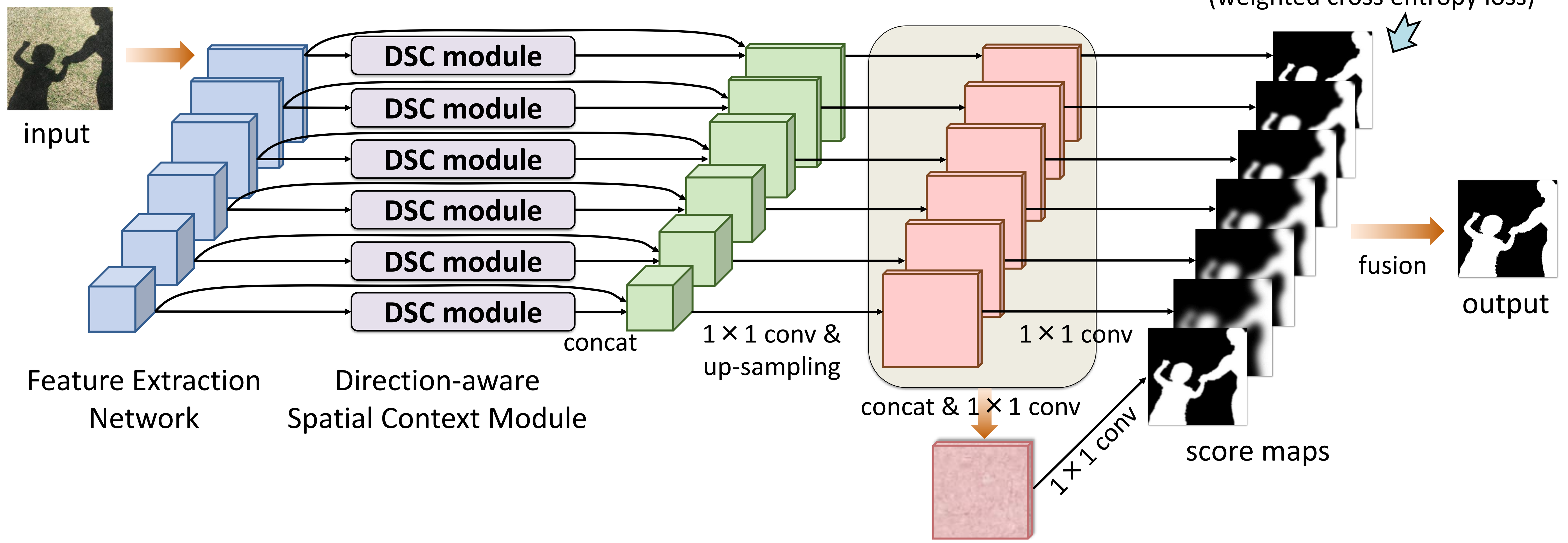
2018 CVPR SALT LAKE CITY • JUNE 18-22

Motivation

Observation: region B would give a stronger indication that A is a shadow compared to region C. This motivates us to analyze the global image context in a ***direction-aware manner*** for shadow detection.



Network Architecture

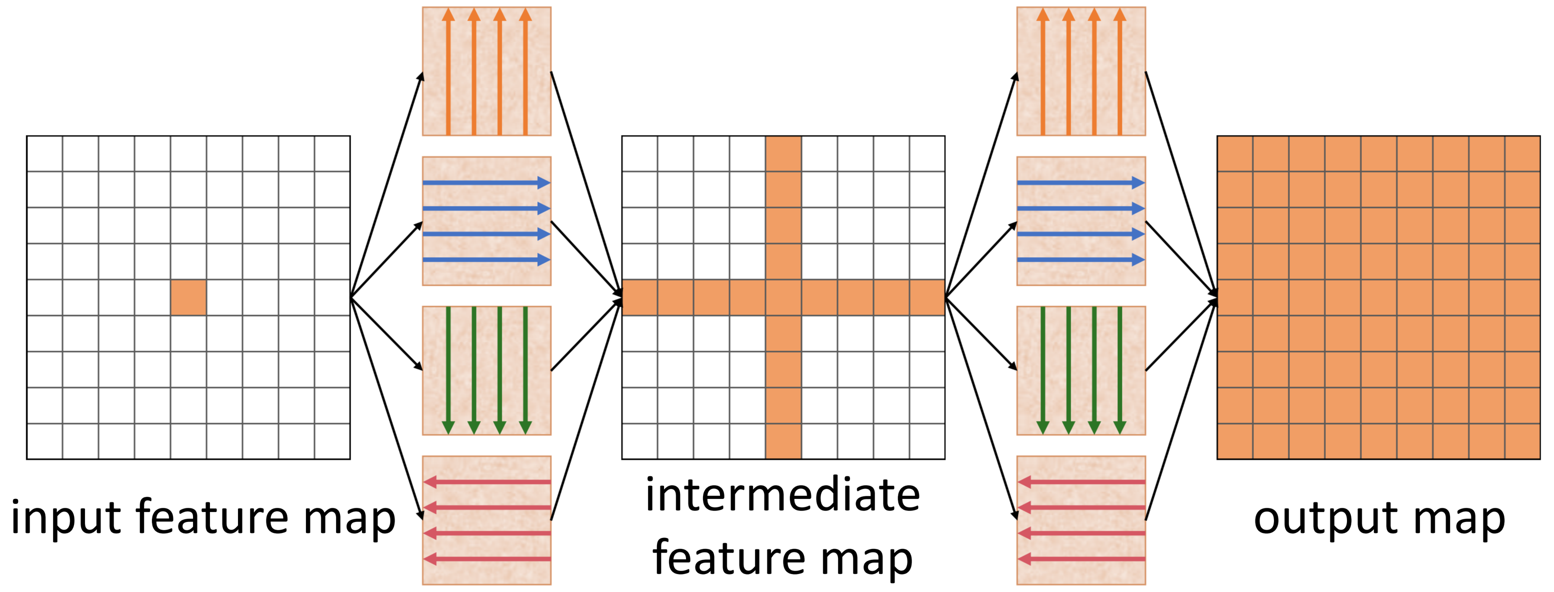


Spatial RNN

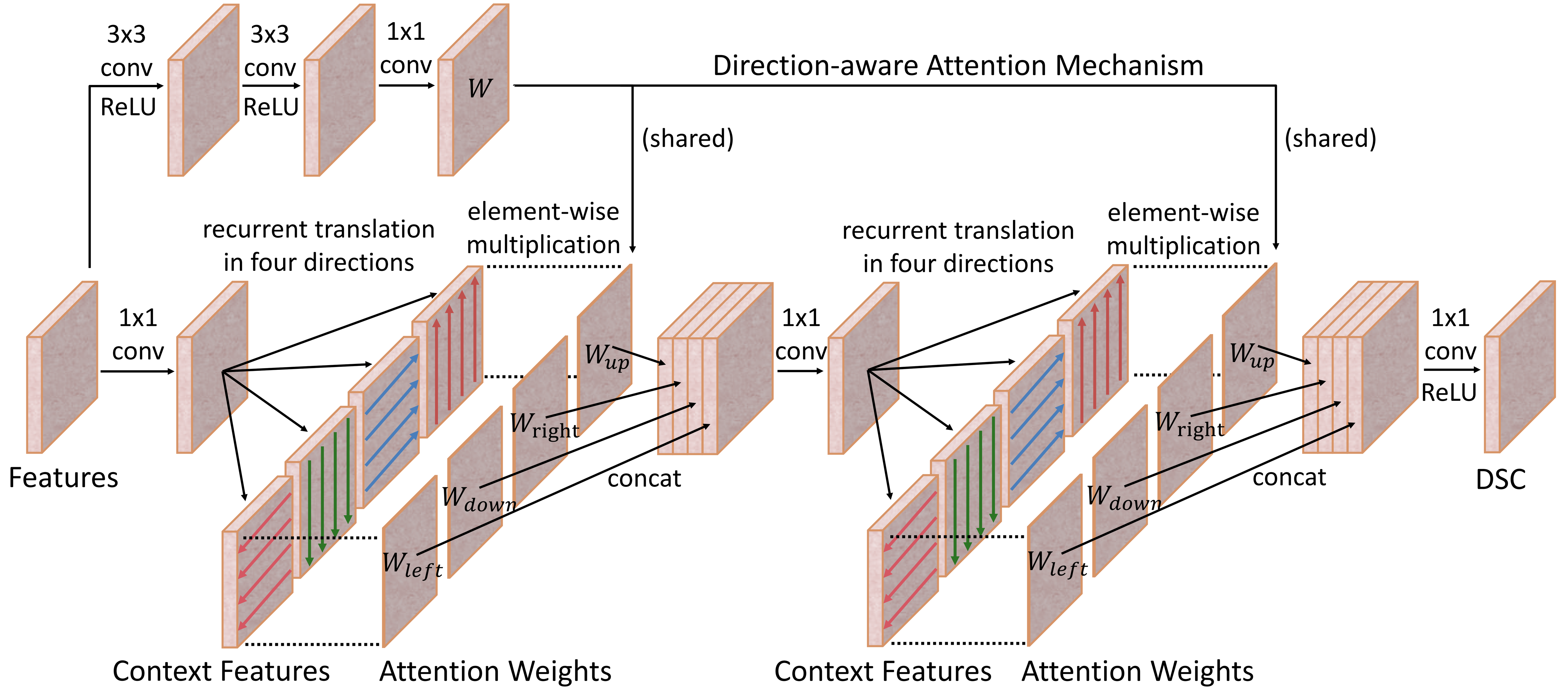
- Apply four independent data translations (RNN) to aggregate local spatial context along each principal direction (left, right, up, and down):

$$h_{i,j} = \max(\, \alpha_{\text{right}}\, h_{i,j-1} + h_{i,j}\ ,\ 0\,)$$

- Repeat the whole process to make each pixel obtain necessary global spatial context.

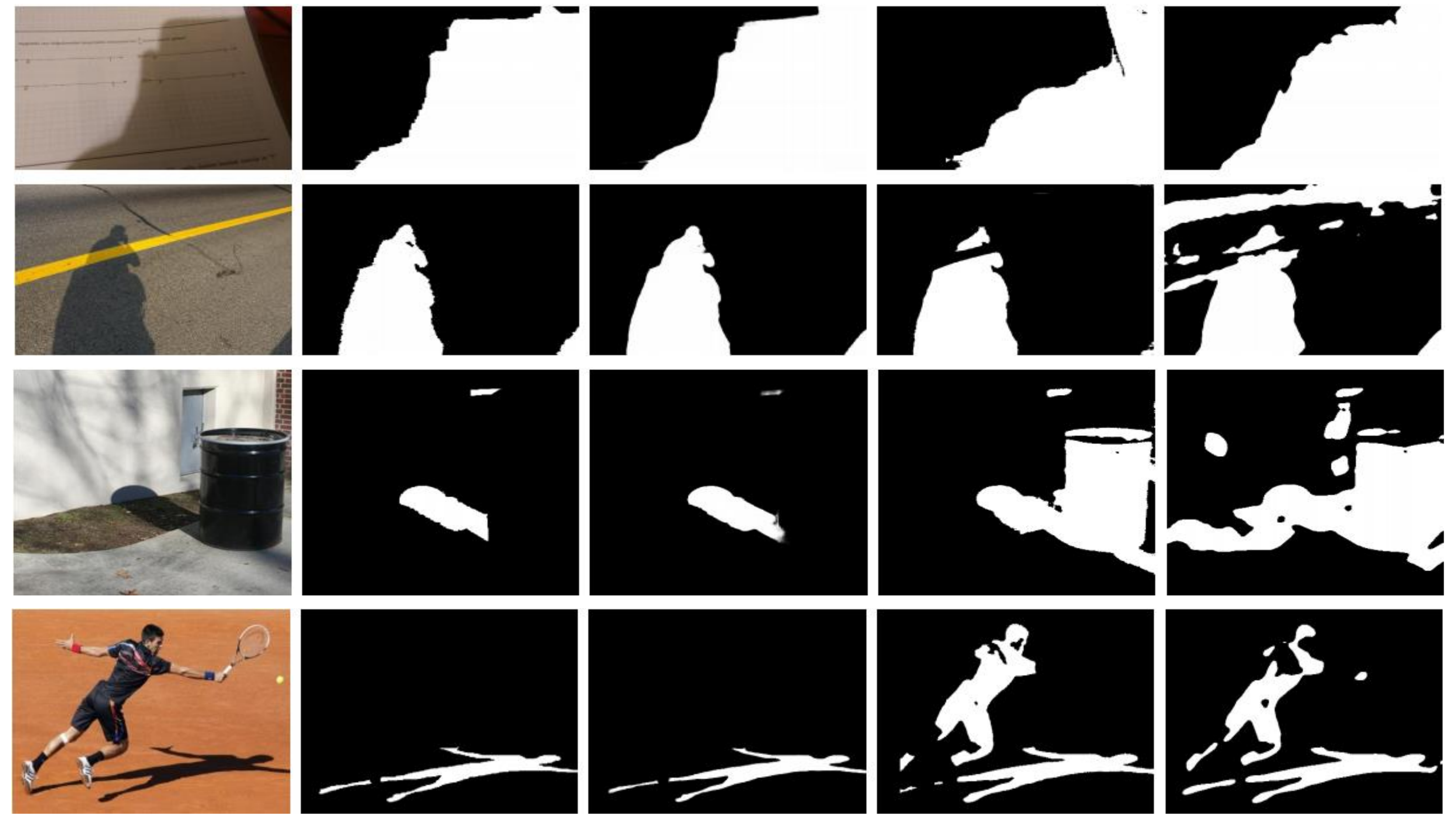


DSC Module



Experimental Results

method	SBU accuracy	SBU BER	UCF accuracy	UCF BER
DSC (ours)	**0.97**	**5.59**	**0.95**	**8.10**
scGAN	0.90	9.10	0.87	11.50
stacked-CNN	0.88	11.00	0.85	13.00
patched-CNN	0.88	11.56	-	-
Unary-Pairwise	0.86	25.03	-	-
SRM	0.96	7.25	0.94	9.81
Amulet	0.93	15.13	0.92	15.17
PSPNet	0.95	8.57	0.93	11.75



inputs ground truths DSC (ours) scGAN stacked-CNN

The work is supported by the National Basic Program of China, 973 Program (Project no. 2015CB351706), the Research Grants Council of the Hong Kong Special Administrative Region (Project no. CUHK 14225616), the Shenzhen Science and Technology Program (No. JCYJ20170413162617606), the CUHK strategic recruitment fund, and the Innovation and Technology Fund of Hong Kong (Project no. ITS/304/16).