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Cross-layer Information Refining Network for Single Image Super-Resolution

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Outline

Introduction

Proposed Method

Experimental Results

Introduction

- *How do we obtain low resolution image?*

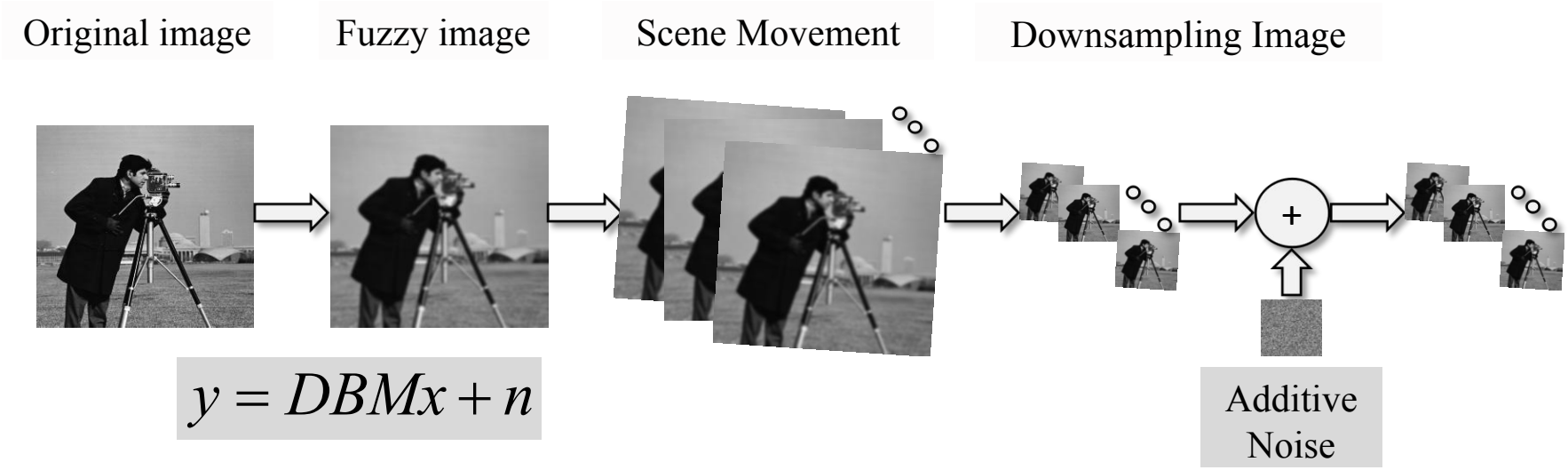
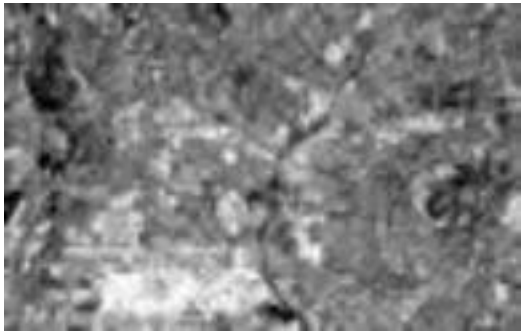
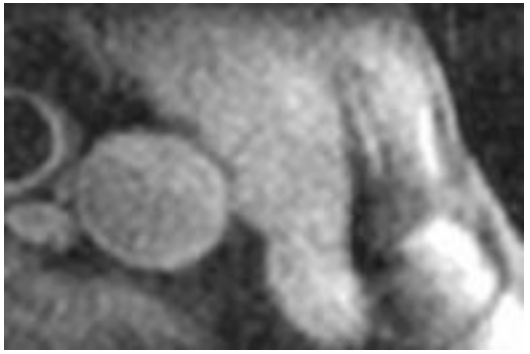


Image super-resolution is an is an inherently ill-posed problem since an LR image can be down-sampled from multiple HR image.

Introduction

- *Single Image Super Resolution:* ***Applications***

General Images	Remote Sensing	Medical Image
		
		

more...

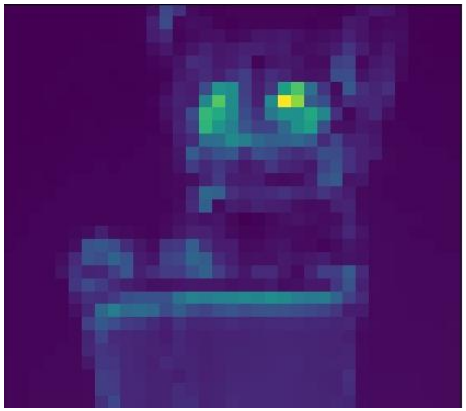
Method

- *Feature maps at different depths*

Original image

Low-level feature map

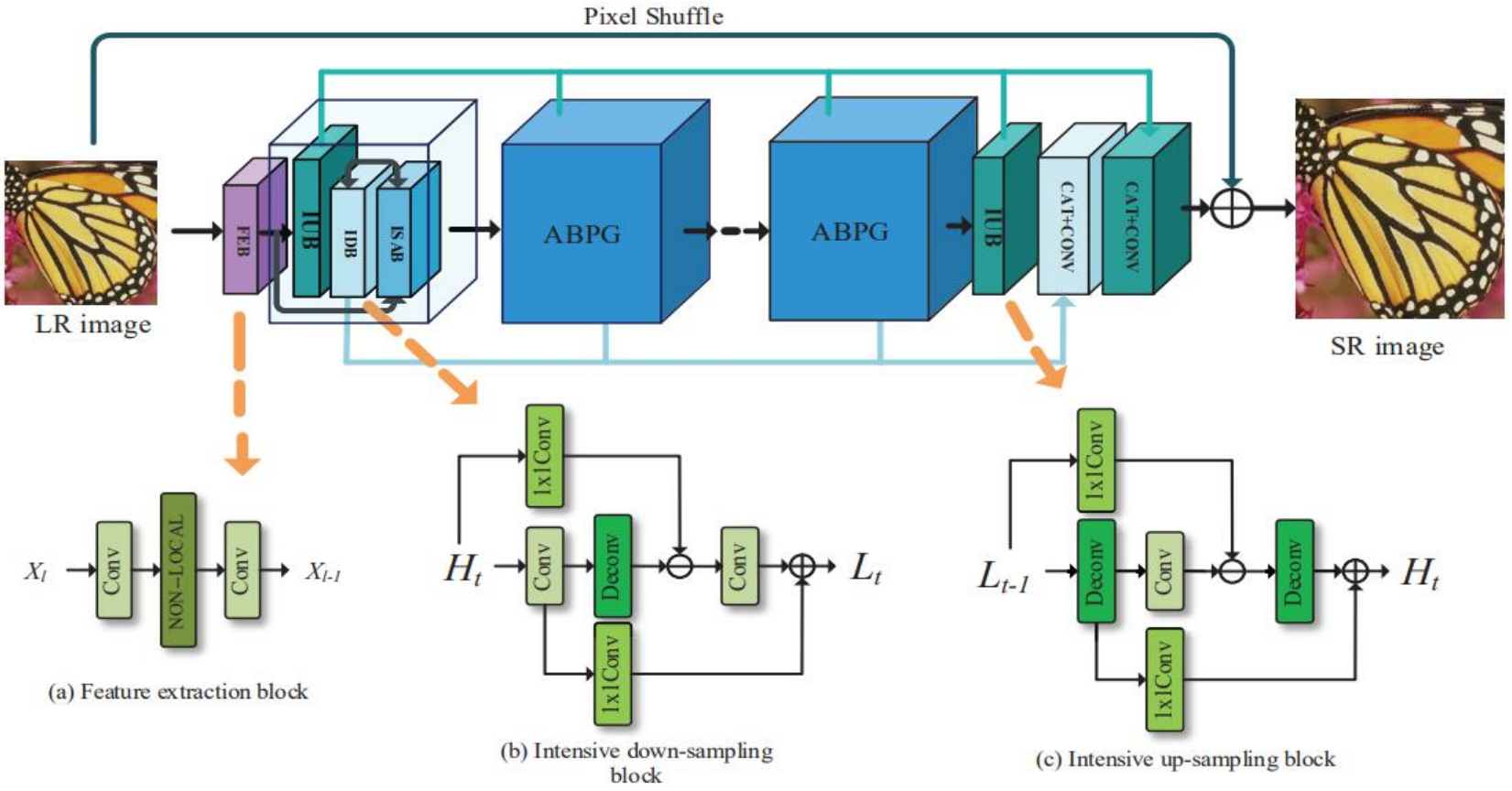
Deep-level feature map



As the depth of the network increases, the features extracted from the feature map are more inclined to semantic information rather than texture detail information.

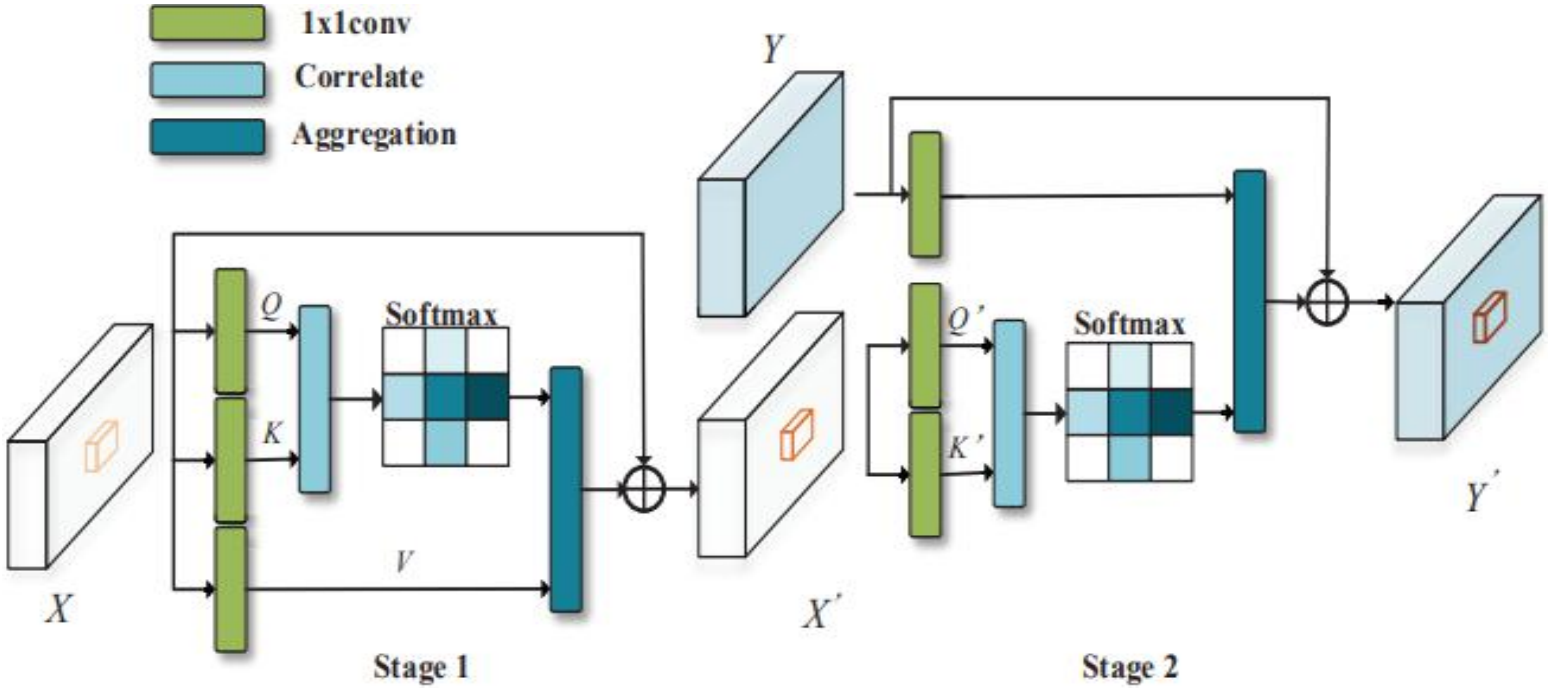
Method

- *The architecture of CIRN*



Method

- *Details of interlaced spatial attention block（ISAB）*

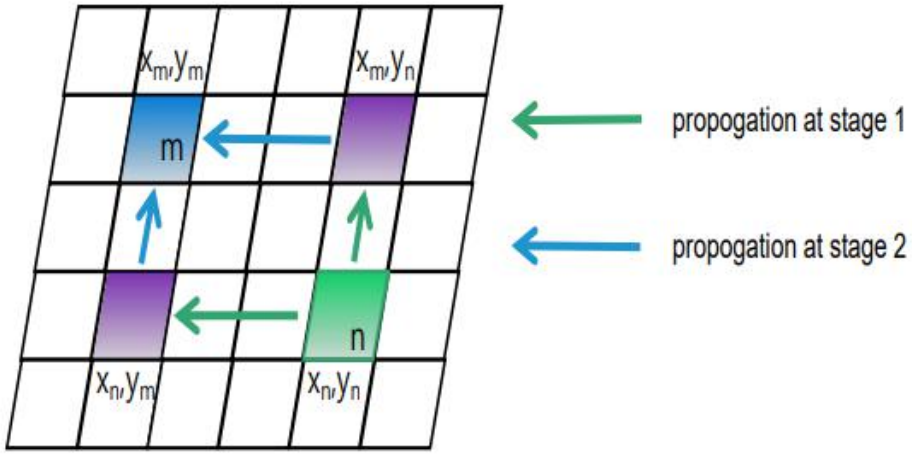


$$X' = \sum_{I=1}^{H+W-1} softmax(K_m Q_m) V_m + X_m$$

ISAB is designed for capture the correlation of feature maps in different layers，which can integrate semantic and feature-level information.

Method

- *Details of interlaced spatial attention block（ISAB）*



$$Y_m = f_x(S_1, X_n, Y_n) + f_y(S_2, X_n, Y_m) + f_y(S_1, X_n, Y_n) + f_x(S_2, X_m, Y_n)$$

Thanks to interlaced operation, every position m can aggregate information from the whole feature map.

Experiments

- *The effect of ISAB*

X Y Y'

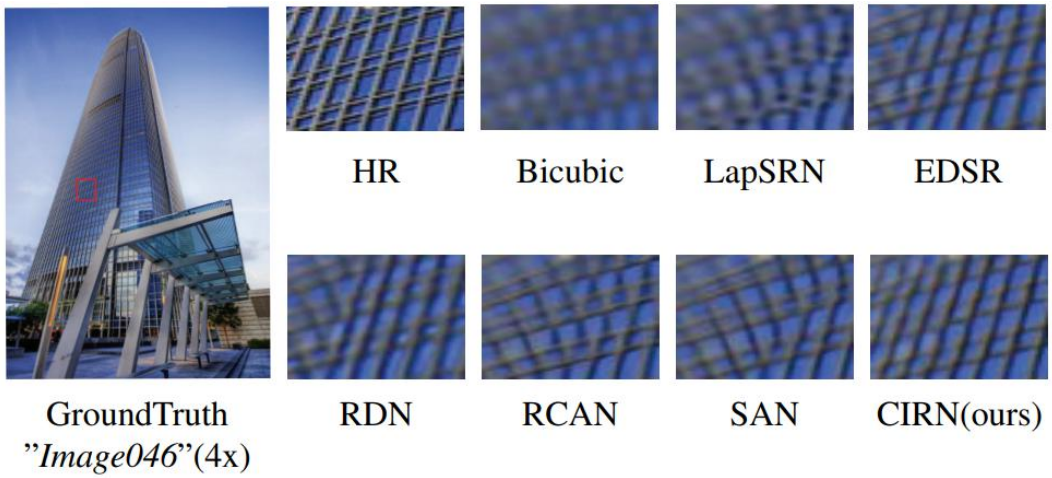
Visualization of the proposed ISAB's input and output,

Network	Set5		Set14	
	PSNR	SSIM	PSNR	SSIM
CIRN w/o ISAB(x4)	32.52	0.892	28.75	0.784
CIRN	32.70	0.901	28.98	0.790
CIRN w/o ISAB(x8)	27.08	0.776	25.02	0.645
CIRN	27.37	0.787	25.32	0.652

The ablation experiments of ISAB.

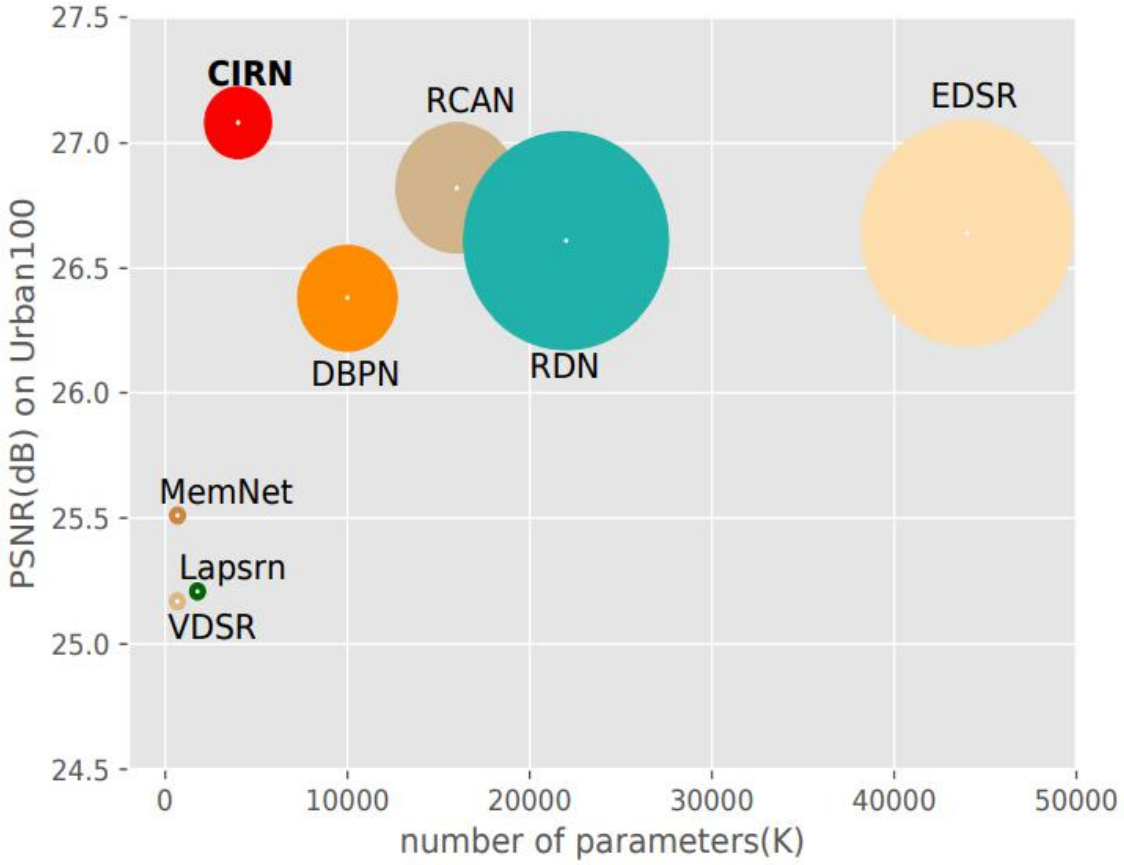
Experiments

- *Subjective quality*



Experiments

- *Performance and number of parameters*



Due to the interlaced operation, our method achieve better performance with less parameters, which is benefit for application.

Thank You!

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