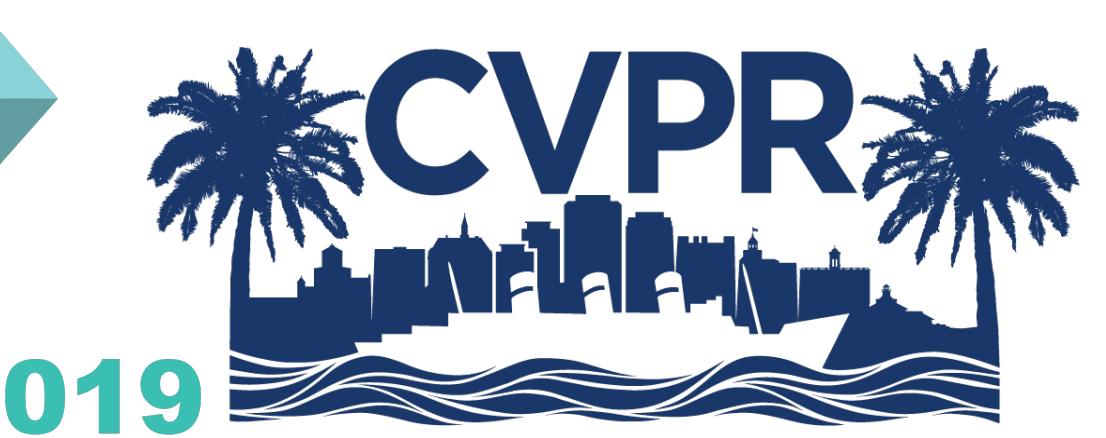




Encoder-Decoder Residual Network for Real Super-resolution

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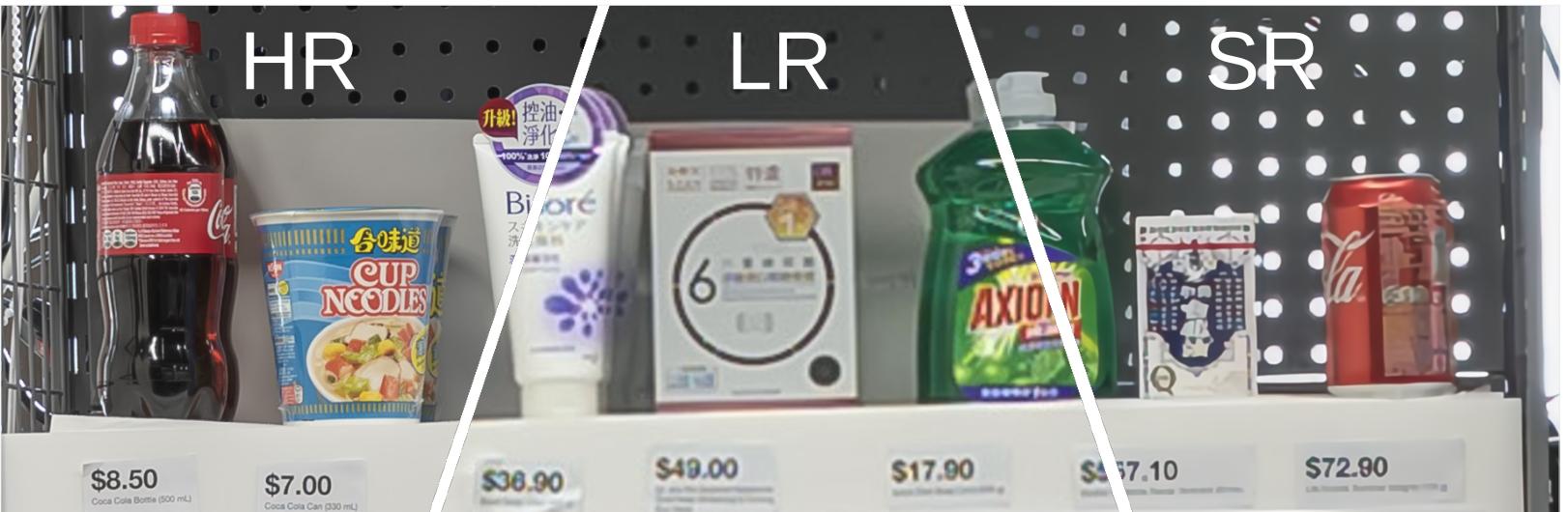
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LONG BEACH
CALIFORNIA
June 16-20, 2019

Motivation

- It is challenging to super-resolve real low-resolution images



Contribution

- Proposed **Encoder-Decoder Residual Network (EDRN)**
- Investigated the effect of Batch Normalization for real SR
- Won **Top5 SSIM & 9th PSNR** in NTIRE2019 real SR challenge (/36 team)

Encoder-Decoder Residual Network (EDRN)

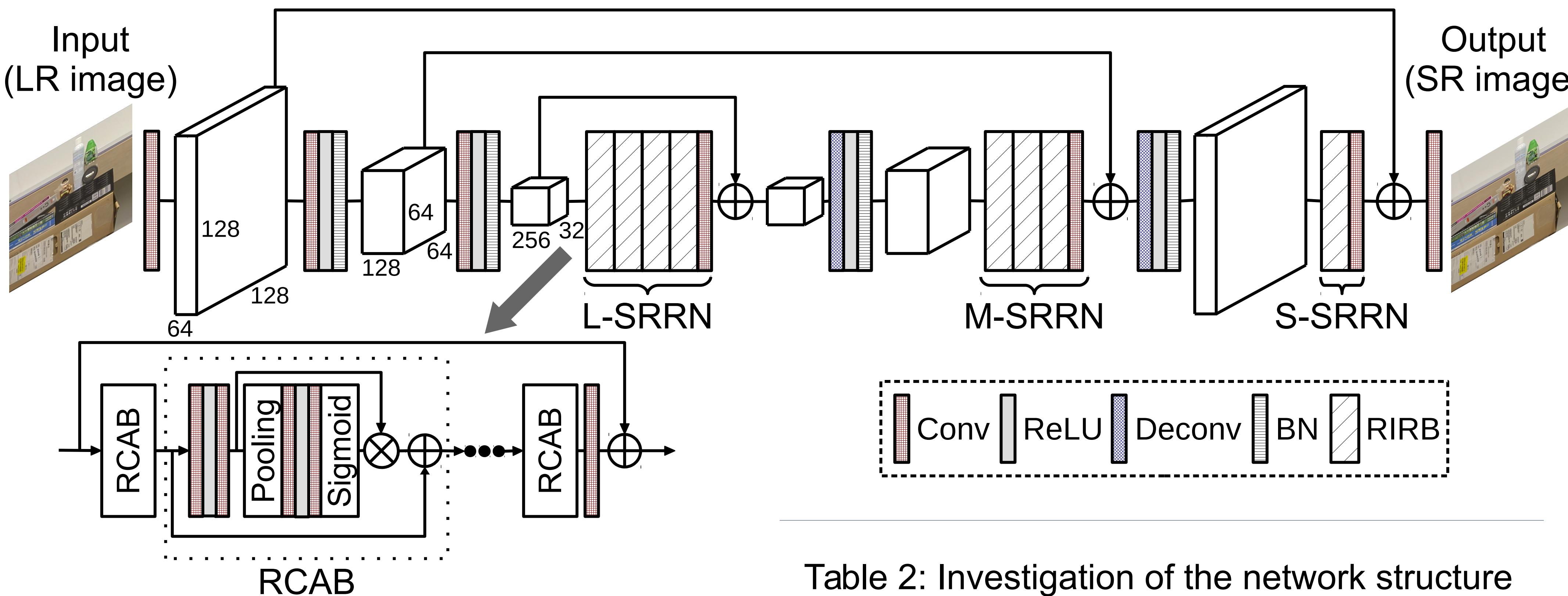


Figure 1: Overview of EDRN and the structure of Residual in Residual Block (RIRB).

Table 1: Investigation of the BN usage

	PSNR (dB)	Runtime (s)
BN (all)	29.96	8.43
BN (part)	29.98	8.13
Without BN	29.66	7.98

Table 2: Investigation of the network structure

Down/Up	Coarse-to-fine	PSNR (dB)	Runtime (s)
1	✓	29.92	12.40
2	✓	29.93	8.13
3	✓	29.70	7.25
0	✗	29.51	18.48
1	✗	29.89	7.74
2	✗	29.92	5.55
3	✗	28.97	4.52

Quantitative Results

Table 3: Benchmark results on validation dataset

Method	PSNR (dB)
RED30 [NIPS2016, pp.2802-2810]	29.13
EDSR [cvPRW2017, pp.1132-1140]	29.21
RCAN [ECCV2018, pp.294-310]	29.49
EDRN (ours)	29.98
EDRN+ (ours)	30.10

Qualitative Results



Table 4: NTIRE Real SR Challenge final ranking

Team	PSNR (dB)	SSIM
SuperRior	29.00	0.84
SuperSR	28.97	0.84
BMIPL_UNIST_DW	28.93	0.84
David_MM_AI	28.93	0.83
LuluVision	28.88	0.84
TeamInception	28.88	0.83
LiveMe_AILab	28.87	0.83
rainbow	28.81	0.83
IVIP-LAB (ours)	28.79	0.84
Future	28.76	0.83
YZSR	28.73	0.83
HIT-UltraVision	28.72	0.83
Meteor	28.63	0.83
ECNU	28.61	0.83
AiDDle	28.60	0.83
BOE-IOT-AIBD	28.54	0.83
xuxu123	28.53	0.83
VIPSL	28.52	0.83
AP_FStone	28.48	0.83
ZXHresearch@fudan	28.46	0.83
⋮	⋮	⋮

Further information

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