

1. A Fast and Accurate Super-Resolution Network Using Progressive Residual Learning

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Authors: Liu, Hong (1); Lu, Zhisheng (1); Shi, Wei (1); Tu, Juanhui (2)

Author affiliation: (1) Peking University, Shenzhen Graduate School, Key Laboratory of Machine Perception, China; (2) Tencent Media Lab

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Abstract: Single-image super-resolution (SISR) task has witnessed great strides in the past few years with the development of deep learning. However, most existing studies concentrate on exploiting much deeper super-resolution networks, which are not friendly to the constrained computation resources. In this work, a lightweight network using progressive residual learning for SISR (PRLSR) is proposed to address this issue. Specifically, a progressive residual block (PRB) is designed to progressively downsample deep features for reducing the redundancy and obtaining refined features. Simultaneously, a high-frequency preserving module is proposed to lower the detail loss caused by resolution reduction in PRB. Furthermore, a residual learning-based architecture with learnable weights is utilized to extract multilevel features and adaptively adjust the contribution of residual mapping and identity mapping in residual structure to accelerate convergence. Experimental results on four benchmarks show that our PRLSR achieves superior performance over state-of-the-art methods with a significantly decreased computational cost. © 2020 IEEE.

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