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

**Accession number:** 20203309040590  
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**Source title:** ICASSP, IEEE International Conference on Acoustics, Speech and Signal Processing - Proceedings  
**Abbreviated source title:** ICASSP IEEE Int Conf Acoust Speech Signal Process Proc  
**Volume:** 2020-May  
**Part number:** 1 of 1  
**Issue title:** 2020 IEEE International Conference on Acoustics, Speech, and Signal Processing, ICASSP 2020 - Proceedings  
**Issue date:** May 2020  
**Publication year:** 2020  
**Pages:** 1818-1822  
**Article number:** 9053890  
**Language:** English  
**ISSN:** 15206149  
**CODEN:** IPRODJ  
**ISBN-13:** 9781509066315  
**Document type:** Conference article (CA)  
**Conference name:** 2020 IEEE International Conference on Acoustics, Speech, and Signal Processing, ICASSP 2020  
**Conference date:** May 4, 2020 - May 8, 2020  
**Conference location:** Barcelona, Spain  
**Conference code:** 161907  
**Sponsor:** The Institute of Electrical and Electronics Engineers, Signal Processing Society  
**Publisher:** Institute of Electrical and Electronics Engineers Inc., United States  

**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.

**Number of references:** 27  
**DOI:** 10.1109/ICASSP40776.2020.9053890  
**Funding Details:** Number: 61673030, U1613209, Acronym: NSFC, Sponsor: National Natural Science Foundation of China; Number: -, Acronym: NSFC, Sponsor: National Natural Science Foundation of China;  
**Funding text:** This work is supported by National Natural Science Foundation of China (NSFC U1613209, No.61673030).  
**Compendex references:** YES  
**Database:** Compendex  
**Compilation and indexing terms, Copyright 2020 Elsevier Inc.**