Deep Retinex Decomposition for Low-Light Enhancement

Chen Wei *, Wenjing Wang *, Wenhan Yang, Jiaying Liu (*Equal contribution)

Institute of Computer Science and Technology, Peking University, Beijing, China

STRUCT @PKU

Spatial and Temporal Restoration, Understanding and Compression Team

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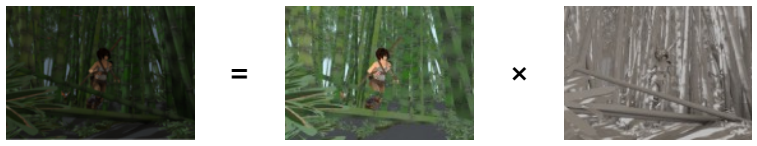
Introduction

MOTIVATION

- Insufficient lighting significantly degrades the visibility of images.
- Existing deep-based methods do not take the nature of low-light pictures into account.

THE RETINEX THEORY

- Images can be decomposed into reflectance and illumination.



For low-light images:

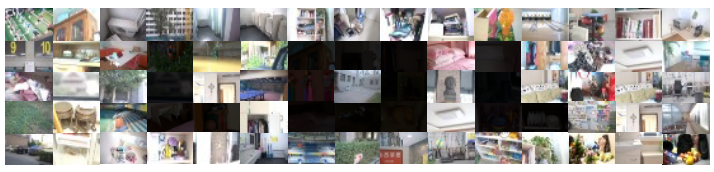
Noise is left on ***R***
R needs to be de-noised

I is smooth
I needs to be brighten up

Dataset

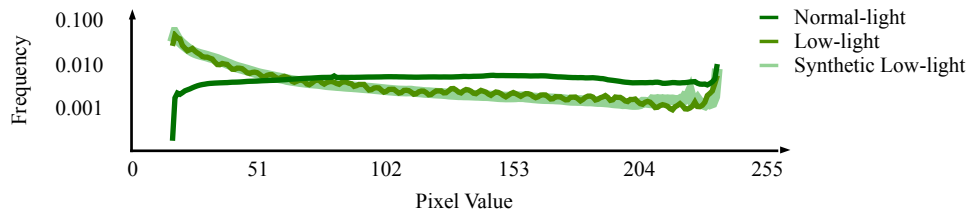
DATASET CAPTURED IN REAL SCENES

- **LO**w **L**ight paired dataset (**LOL**), with 500 low/normal-light pairs.

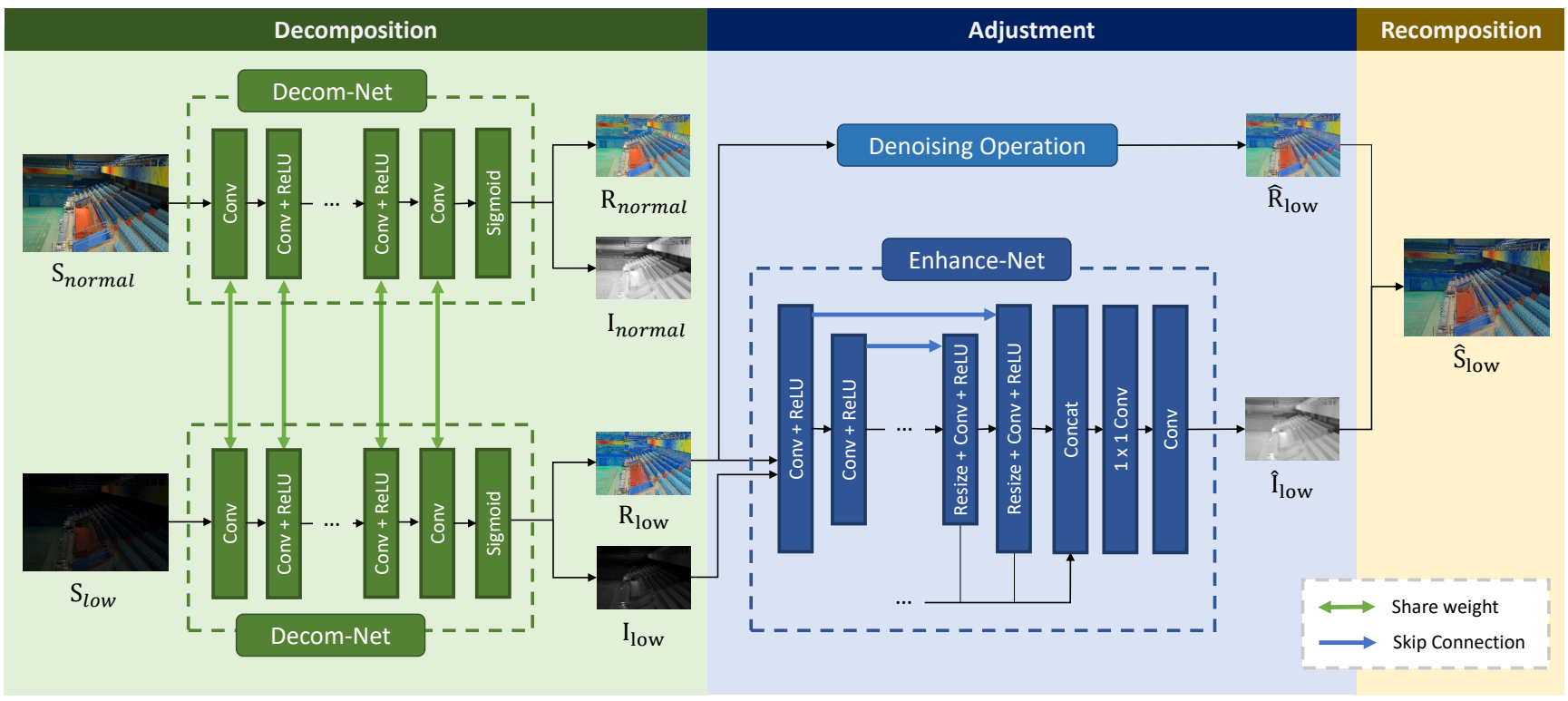


SYNTHETIC IMAGE PAIRS FROM RAW

- We generate image pairs according to the illumination distribution of low-light images.



Retinex-Net for Low-Light Enhancement



STRUCTURE-AWARE SMOOTHNESS LOSS

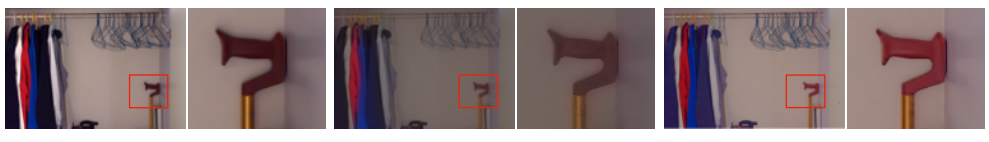
- To make the loss aware of the image structure, original TV function is weighted with the gradient of reflectance map: $||\nabla I \times exp(-\lambda_g \nabla R)||_1$.

Experimental Results

RESULTS FOR ENHANCEMENT

Input SRIE NPE LIME DeHz Ours

RESULTS FOR JOINT ENHANCEMENT AND DE-NOISE



LIME JED Ours

FOR MORE DETAILS & DATASETS LINKS

The QR code or https://daooshee.github.io/BMVC2018website/

Interested in our team STRUCT? Navigate to: http://www.icst.pku.edu.cn/struct/