Paper overview

Paper

Title: RegularFace: Deep Face Recognition via Exclusive Regularization

Authors: Kai Zhao, Jingyi Xu, Ming-Ming Cheng.

Link: http://openaccess.thecvf.com/content$_C VPR_2$019$/papers/Zhao_{R}egularFace_{D}eep_{F}ace_{R}ecognition_{v}i$

Tags: Neural Network, computer vision, face regognition.

Code: https://github.com/GuoShi28/CBDNet

Year: 2019

Summary

What:

Current denoising deep convolutional neural networks remain limited on noisy real-world photographs. The main reason is that they are trained on AWGN model that is different from the complicated real-world noise model.

Author proposed a convolutional blind denoising network (CBDNet) that is trained on both synthetic noised images and on real-world exampels.

The result of the model was provided on two datasets of real noisy photograph (Nam and DND) and showed superiority over the state-of-the-art denoisers in terms of quantitative metrics and perceptual quality.
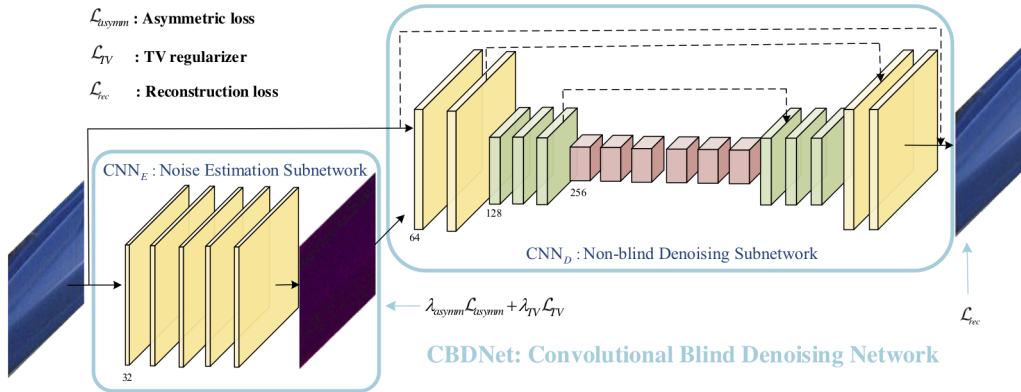
How:

To train make model applicable with real-world photograps author trained it on both synthetic images based on signal dependent noise model and on real-world noise images.

For synthetic noise genration was used such model:

$$y = JPEG(f(DM(L + n(L))))$$

Where: L is the irradiance image of raw pixels, $n(L) = n_s(L) + n_c$, f - stands for the camera response function (CRF), DM - represents the demosaicing function
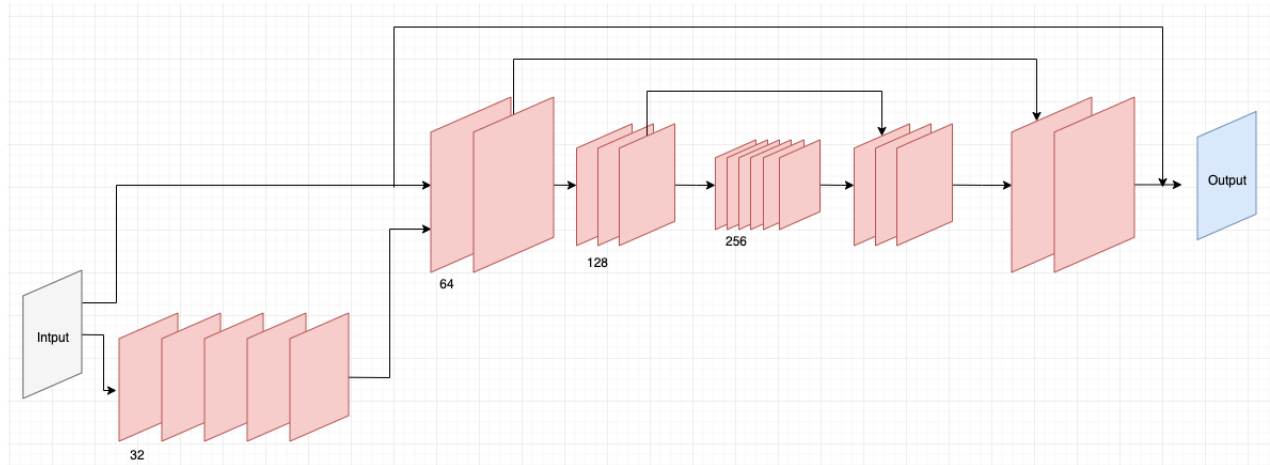
Network architecture:

$\mathcal{L}_{asymm}$: **Asymmetric loss**

$\mathcal{L}_{TV}$: **TV regularizer**

$\mathcal{L}_{rec}$: **Reconstruction loss**

CNN_E : Noise Estimation Subnetwork

CNN_D : Non-blind Denoising Subnetwork

$\lambda_{asymm}\mathcal{L}_{asymm} + \lambda_{TV}\mathcal{L}_{TV}$

$\mathcal{L}_{rec}$

CBDNet: Convolutional Blind Denoising Network

Result:

DND results comparing table:

Method	Blind/Non-blind	PSNR	SSIM
NI [2]	Blind	31.52	0.9466
CDnCNN-B [61]	Blind	37.49	0.9272
TWSC [58]	Blind	37.52	0.9292
MCWNNM [59]	Blind	37.91	0.9322
BM3D [12]	Non-blind	39.84	0.9657
NC [29]	Blind	40.41	0.9731
WNNM [17]	Non-blind	41.04	0.9768
CBDNet	Blind	40.02	0.9687
CBDNet(JPEG)	Blind	**41.31**	**0.9784**

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Homework 5

CNN architecture

CIFAR-10 improvement

https://github.com/Bilchuck/computer-vision-tasks/tree/master/HW5

1st try:

- I set 32 filters on 1st conv layer and 64 filters on 2nd conv layer

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- Decreased filter size for 1st layer to 3x3

Accurancy 73%

2nd try:

- I added batch normalization after conv layers and fc1 layer

Accurancy 61%

Future plans:

- Configure batch normalization params

- Train data on pretrained model (ResNet for example)

- Increase fc1 layer output