
越放大越清晰

實做案例位置
github

https://github.com/AllanYiin/DeepBelief_Course5_Examples/tree/master/epoch402_越放大越清晰

colab

https://drive.google.com/open?id=1ppB5QOt4bE7ZprMZAZ37rSWZCpJ4DSLG

CrazyDog_300dpi.png - 內容

一般 安全性 詳細資料 以前的版本

屬性	值
來源	
拍攝日期	
影像	
尺寸	709 x 827
寬度	709 個像素
高度	827 個像素
位元深度	32
檔案	
名稱	CrazyDog_300dpi.png
項目類型	PNG 檔案
資料夾路徑	C:\使用者\Allan\OneDrive\畫展\small
建立日期	2019/11/13 下午 03:06
修改日期	2019/11/13 下午 03:06
大小	1.46 MB
屬性	AL
可用性	
離線狀態	
分享者	
擁有者	ALLANSURFACE\Allan
電腦	ALLANSURFACE (本機)

移除檔案屬性和個人資訊

確定 取消 套用(A)

模型內放大

LR

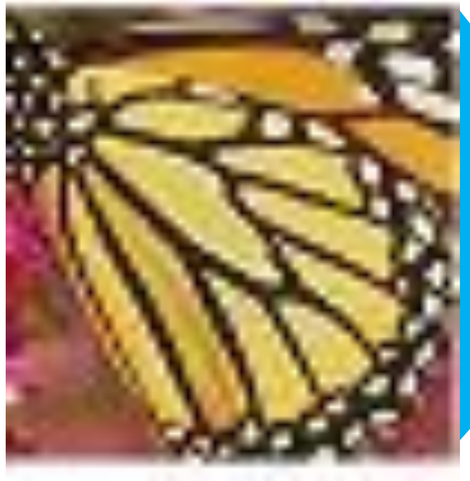
SR

HR

放大策略

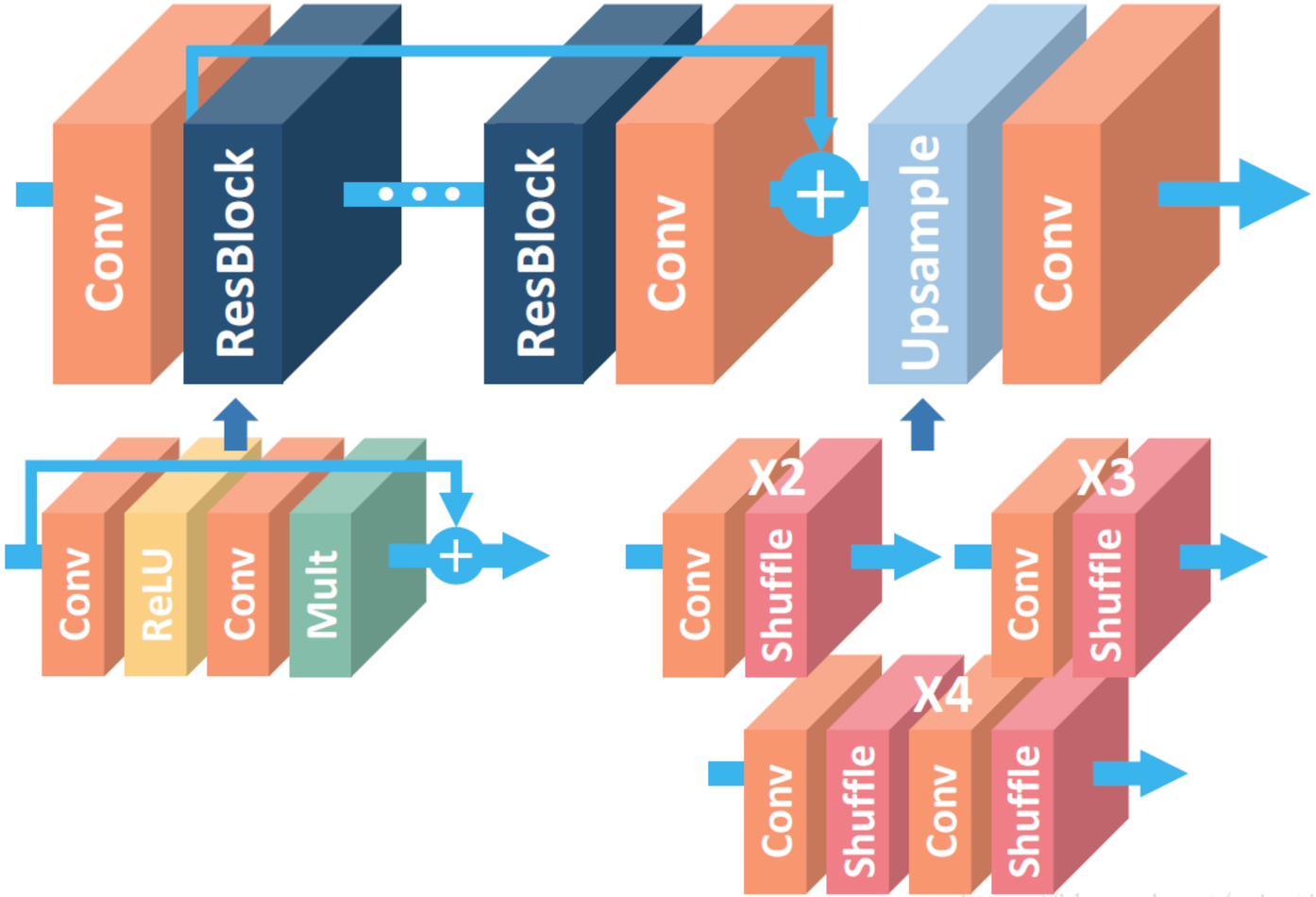
模型內修補

線性插值



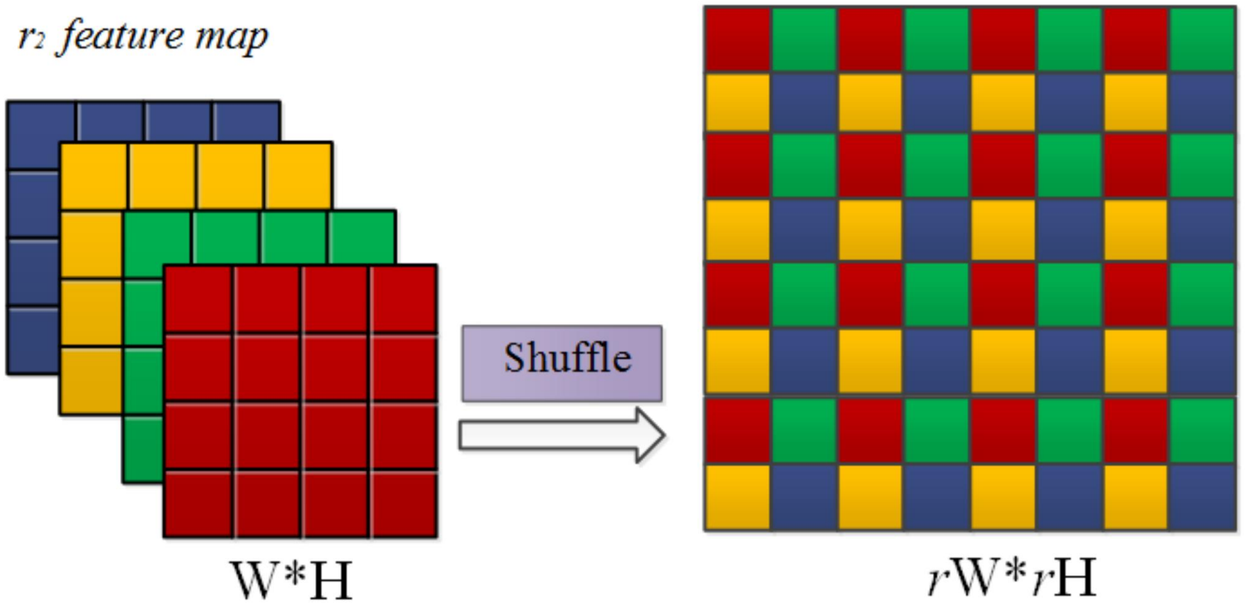
SRResNet

https://arxiv.org/abs/1609.04802



原論文改良

- 把relu換成parameter relu
- 使用pixel shffule



Pixel Shuffle

計算流程

假設入入張量如下，要長寬放大兩倍

(64,128,128)

從通道除4，擴充兩個新維度

(16,2,2,128,128)

轉置將新維度置於最後

(16, 128,128,2,2)

將高度(axis=1)切片再根據axis=3疊合

[(16, m,128,2,2) for m in h]

完成將高度放大2倍

(16, 128,256,2)

將寬度(axis=1)切片再根據axis=3疊合

[(16, n,256,2) for n in w]

完成將寬度放大2倍

(16,256,256)

本次實作改良

- 換掉Batch Normalization
- 將Upscale2x區域的卷積換成深度可分離卷積(DepthwiseConv2d)
- 把ResBlock的第一個通道數降為32
- 把16個ResBlock的dilatio分別設置為1,2,4,8
- 最後一層活化函數修改為tanh
- 開頭的9x9卷積換成5x5
- 結尾的9x9卷積換成5x5

原始論文
Total params: 1,546,754
Trainable params: 1,546,754
Non-trainable params: 0
Total MACC: 9,094,381,568.0
Total FLOPs: 18.19697 GFLOPs
模型大小:6.3 MB

本次實作改良
Total params: 642,050
Trainable params: 642,050
Non-trainable params: 0
Total MACC: 2,758,885,376.0
Total FLOPs: 5.52910 GFLOPs
模型大小: 2.7 MB

L1 Loss L2 Loss Smooth L1 Loss....

L2 loss

$$L_2 = |f(x) - Y|^2$$
$$L_2' = 2f'(x)(f(x) - Y)$$ ..... (1)

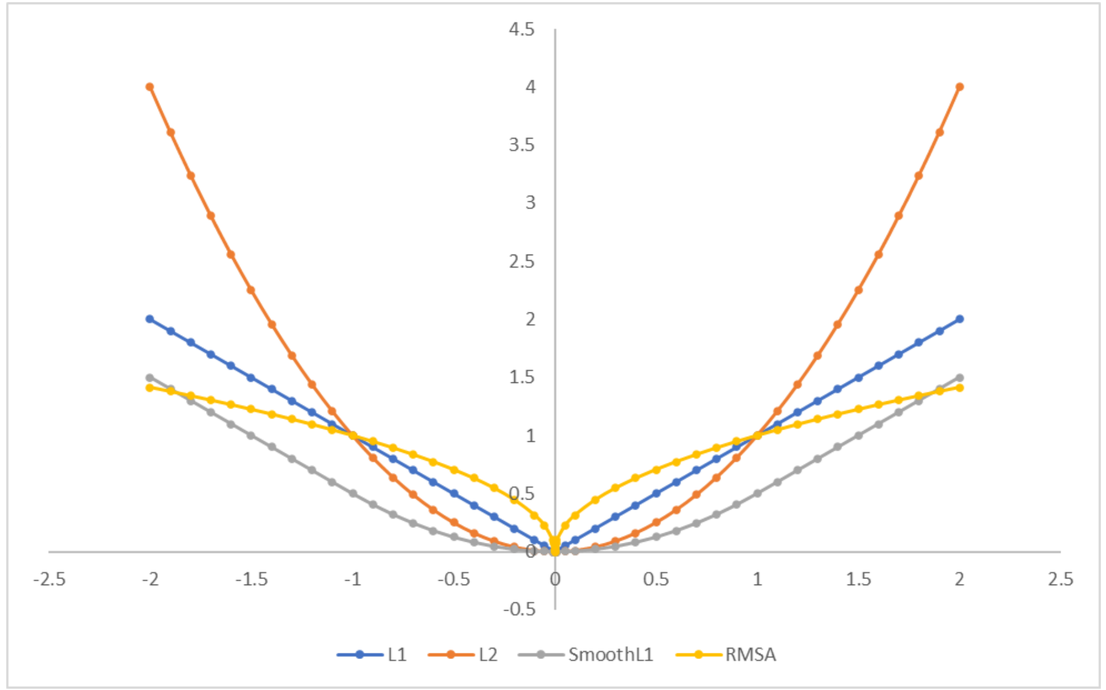
L1 loss

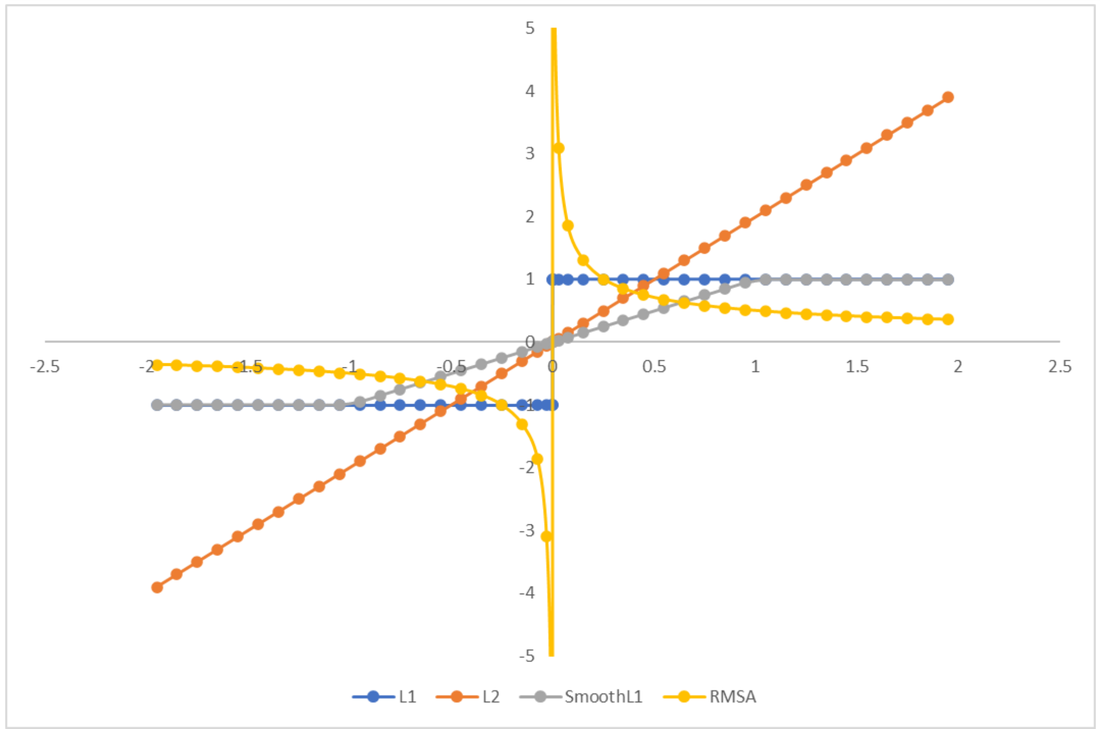
$$L_1 = |f(x) - Y|$$
$$L_1' = \pm f'(x)$$ ..... (2)

Smooth L1 loss

$$Smooth \quad L_1 = \begin{cases} 0.5x^2, & |x| < 1 \\ |x| - 0.5, & x < -1 \, or \, x > 1 \end{cases}$$

$$Smooth \quad L_1' = \begin{cases} x, & |x| < 1 \\ -1, & x < -1 \\ 1, & x > 1 \end{cases}$$ ..... (3)



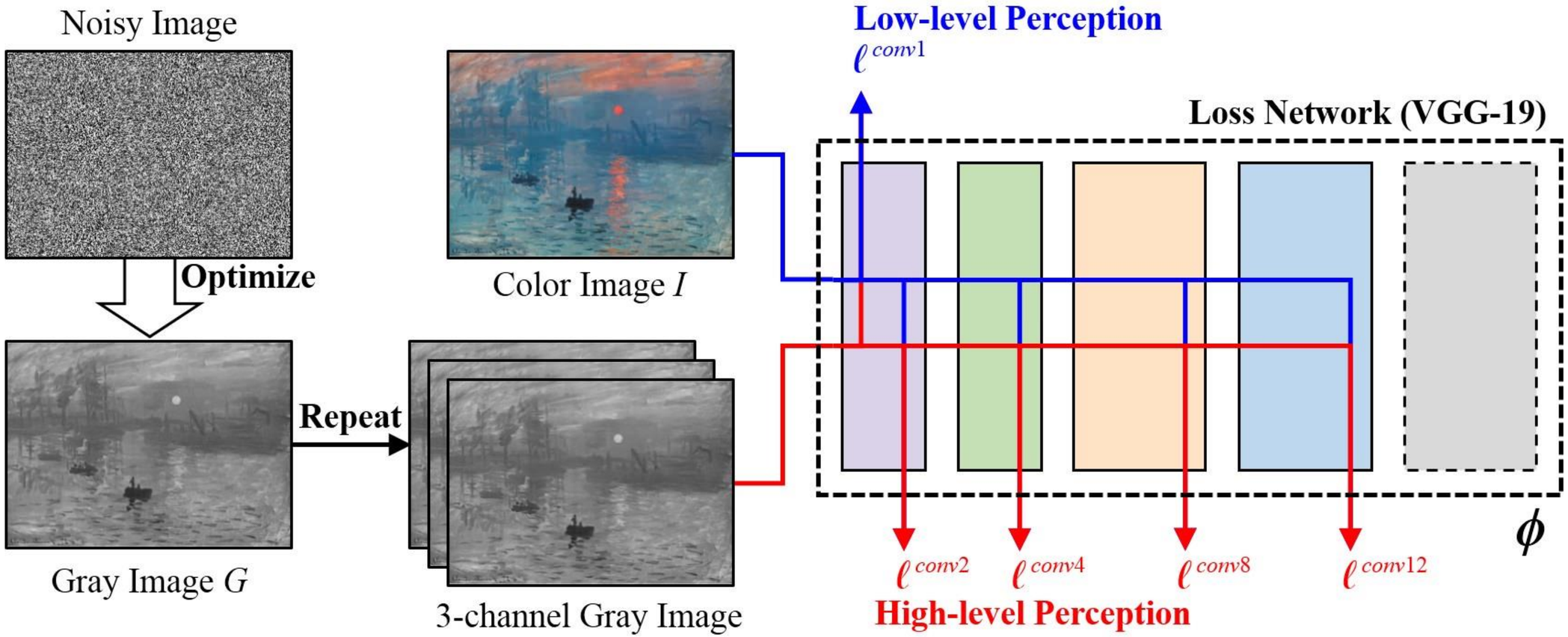


rmse: 19.689% ,psnr: 14.13

rmse: 24.457% ,psnr:12.14

機器只管對應精確位置的像素值是否正確...

Perception Loss



SSIM Structure Similarity Index 結構相似性指標

$$l(x,y) = \frac{2\mu_x\mu_y + c_1}{\mu_x^2 + \mu_y^2 + c_1}$$ 照明度(平均值)

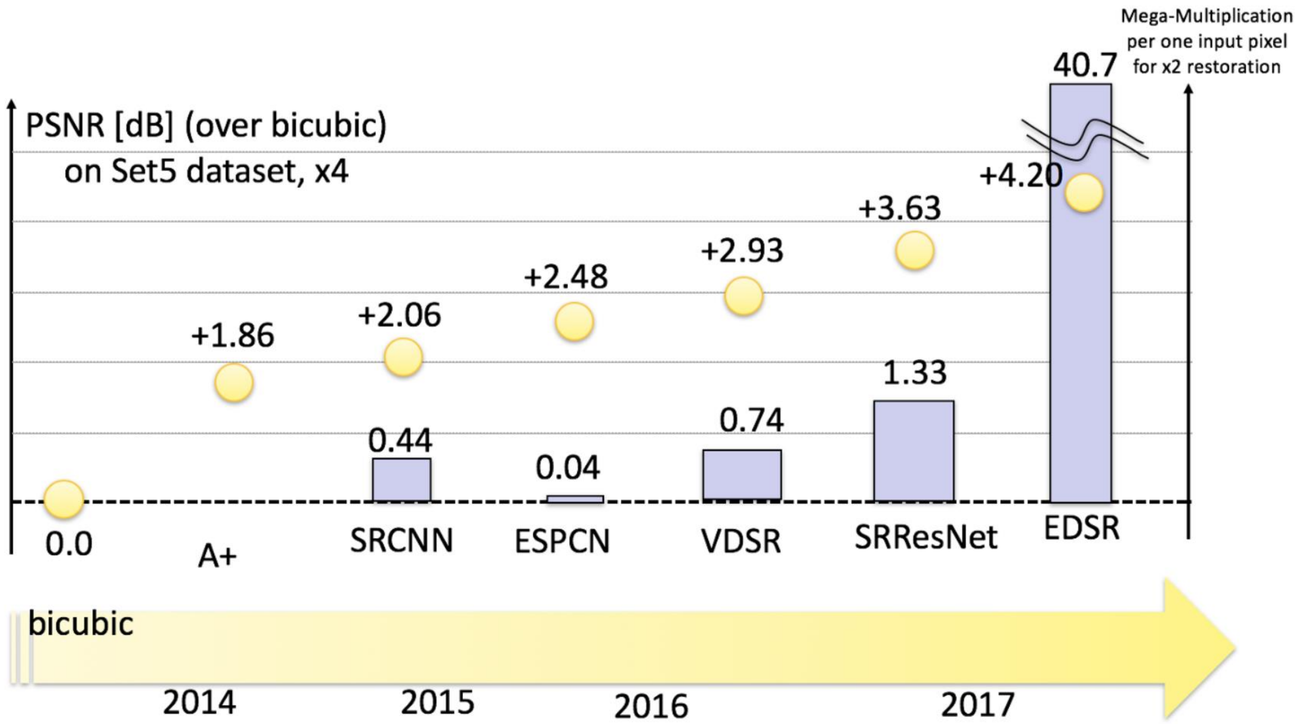
$$c(x,y) = \frac{2\sigma_x\sigma_y + c_2}{\sigma_x^2 + \sigma_y^2 + c_2}$$ 對比度(標準差/變異數)

$$s(x,y) = \frac{\sigma_{xy} + c_3}{\sigma_x\sigma_y + c_3}$$ 結構(共變數)

峰值信號雜訊比
(Peak Signal to Noise Ratio)

$$PSNR = 10 \times \log\left(\frac{255^2}{MSE}\right)$$

$$MSE = \frac{\sum_{n=1}^{FrameSize} (I_n - P_n)^2}{FrameSize}$$




Q&A

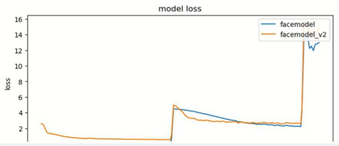
File Edit View Insert Cell Kernel Widgets Help

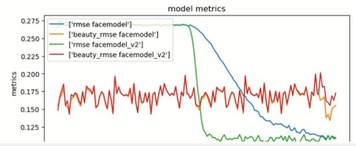
Trusted Python 3

Run Code

In [14]:
```
plan=TrainingPlan()\
    .add_training_item(facemodel,name='facemodel',start_epoch=1) \
    .add_training_item(facemodel_v2,name='facemodel_v2') \
    .with_data_loader(data_provider)\
    .repeat_epochs(12)\
    .within_minibatch_size(8)\
    .print_progress_scheduling(10,unit='batch')\
    .display_loss_metric_curve_scheduling(frequency=100,unit='batch',imshow=True)\
    .save_model_scheduling(20,unit='batch')
```

In [*]:
```
plan.start_now()
```





In [*]:
```
facemodel_v2.preprocess_flow=[
    to_rgb(),
    resize((112,112),True),
    normalize(127.5,127.5)
```