

# 評估基於對抗生成網路的影像超解析度與去雜訊之表現

## Performance Assessment of Image Super Resolution and Denoising Based on Generative Adversarial Network

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開發工具：Pytorch、Tensorflow、opencv、PyQt5

測試環境：Windows 10、Matlab

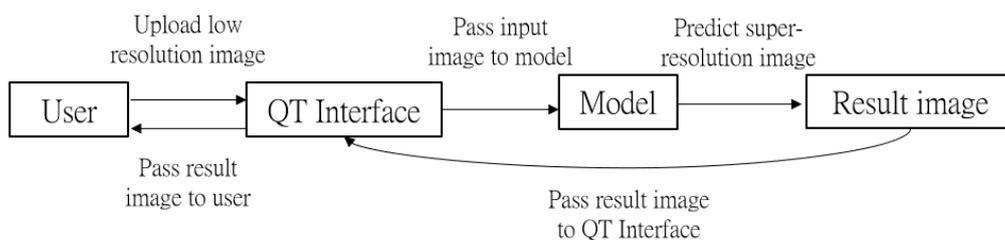
### 一、簡介：

Sometimes we take a photo, but we end up getting the undesired images having low resolution or noise owing to poor quality camera or the influence of the surroundings. Consequently, we would like to restore the undesired images.

However, images we take may be downgraded owing to the combination of blur, noise, resize (down-sampling), and JPEG compression, which is hard to “guess” what degradation model the low resolution image is. That is, restoring the resolution of the real world images is a hard work.

Therefore, in my project, I will propose SRGAN, ESRGAN, and Real-ESRGAN for super resolution and compare their performance, and I will provide a simple QT interface for better usage of my project to restore poor quality images with the model which has best performance among them.

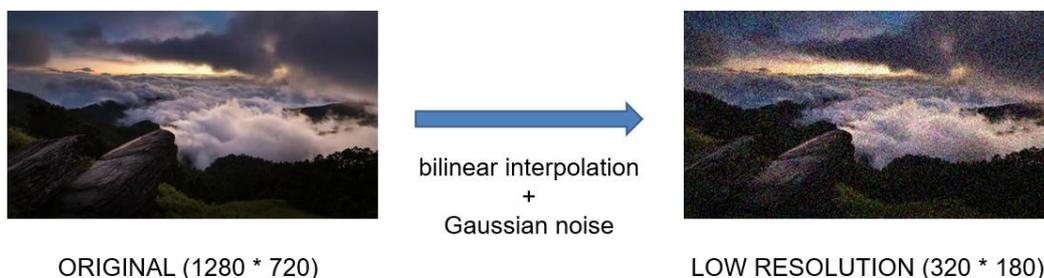
系統架構圖：



## 二、測試結果：

Example：

Original high-resolution image → low-resolution image (resized + noised) using bilinear interpolation (scale : 4) and gaussian noise：



Then restore low-resolution image to super-resolution image using SRGAN, ESRGAN, and Real-ESRGAN. (scale : 4)



	SRGAN	ESRGAN	Real-ESRGAN
PSNR	19.0711	15.0668	28.6179
SSIM	0.1715	0.0710	0.7967
LPIPS	0.448	1.007	0.269
NIQE	5.5502	7.0807	2.9377
Time Cost (s)	19.9649	19.4307	77.8971

As seen above, Real-ESRGAN has the best visual performance both objectively and subjectively among these three models.