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Image and Video Upscaling Using Real-ESRGAN

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Abstract: With the gradual evolution of social networks and the popularity of smartphones, photos in social networks are rapidly developing. A large number of applications have emerged to enhance image processing and social sharing. More and more people like to use pictures to share and gain visual information. The image quality directly affects the user's experience. Therefore, to recommend better quality images in social networks for existing images, it is necessary to improve image resolution as much as possible through software processing methods to meet this widespread demand. The goal of image super-resolution (SR) algorithms is to generate high-resolution images from low-resolution ones. This paper presents a comprehensive study on image and video upscaling using Real-ESRGAN (Enhanced Super-Resolution Generative Adversarial Networks). We explore its architecture, training methodology, and practical implications for enhancing low-resolution media. By leveraging Real-ESRGAN's capability to generate photorealistic high-resolution outputs, we demonstrate its superiority over traditional interpolation methods and other deep learning-based super-resolution models. We also propose a framework for real-time video upscaling using Real-ESRGAN with GPU acceleration. Our experiments show significant improvements in perceptual quality and PSNR/SSIM metrics across a variety of datasets..

Keywords: Machine Learning, Python, Generative Adversarial Network, Real-ESRGAN, Image Upscaling

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