

# Supplementary Material “DERO: Diffusion-Model-Erasure Robust Watermarking”

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## ABSTRACT

1. The system interface and corresponding setting of the Stable Diffusion we used in experiments.
2. The visual quality of the watermarked images.
3. The detailed results of the influence of sampling steps and denoising strength.

## 1 THE SYSTEM INTERFACE.

We will show the system interface of SD-WebUI we used in this paper in Fig. 1. All the tools and models are open-sourced, by downloading the tool from “<https://github.com/AUTOMATIC1111/stable-diffusion-webui>” and the corresponding models, it is easy to conduct the watermark erasure by setting appropriate parameters and clicking the “Generate” button, the tool can be run with/without the GPU environment. The different versions of the model we tested are downloaded from:

Stable Diffusion v1.2: <https://huggingface.co/CompVis/stable-diffusion-v1-2-original>  
Stable Diffusion v1.4: <https://huggingface.co/CompVis/stable-diffusion-v1-4-original>  
Stable Diffusion v1.5: <https://huggingface.co/runwayml/stable-diffusion-v1-5>  
Stable Diffusion v2.1: <https://huggingface.co/stabilityai/stable-diffusion-2>  
Realistic Vision: <https://civitai.com/models/4201/realistic-vision-v20>  
DreamShaper: <https://huggingface.co/Lykon/DreamShaper>  
Deliberate: <https://huggingface.co/XpucT/Deliberate>

## 2 THE VISUAL QUALITY OF THE PROPOSED FRAMEWORK.

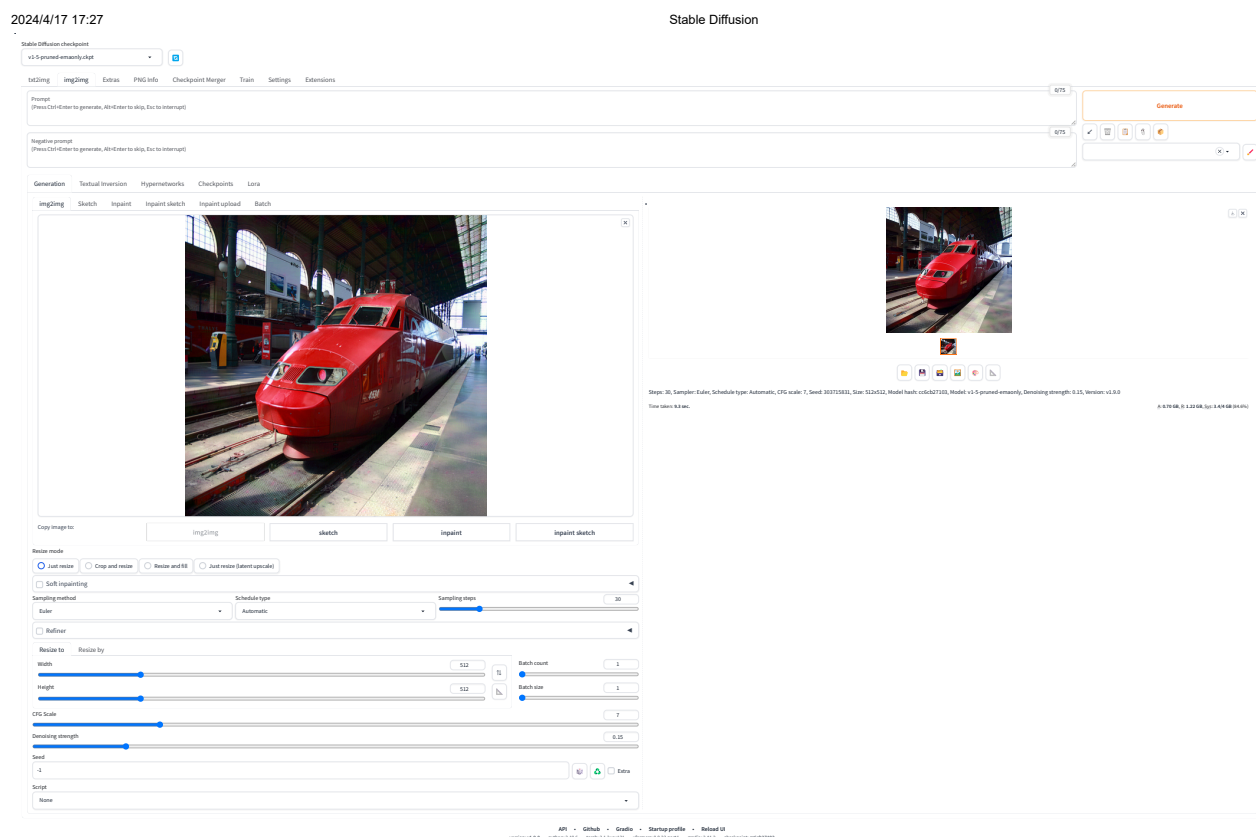
We will show more visual examples of the watermarked images embedded with DERO in Fig. 2.

## 3 THE INFLUENCE OF SAMPLING STEPS AND DENOISING STRENGTH.

Now we give more visual examples to show the influence of the sampling steps and denoising strength. Moreover, we provide a detailed explanation of how these two parameters have an impact on the source code.

Different denoising strength gives different starting points to the latent sampling. Higher denoising strengths result in deeper denoising. Different sampling steps will lead to different schedules of timestep, which will further influence the sampling weight  $\alpha_t$  in each step. In the realization of SD-webUI, the value of the sampling step  $S$  determines the schedules of the timestep, which is done by uniformly sampling  $S$ -steps from time steps 1 to 1000. E.g., when  $S = 10$ , the timesteps shall be  $T = \{0, 99, 199, 299, 399, 499, 599, 699, 799, 899, 999\}$ ,

where each timestep  $t$  corresponds to a specific  $\alpha_t$ . The actual diffusion steps are set as the product of the denoising strength and sampling step, and each step corresponds to the  $\alpha_t$  which is scheduled by  $S$ . For example, when  $S = 10$  and strength=0.2, the actual diffusion steps are 2, and with the timesteps  $T = \{899, 999\}$ . Then the  $\alpha_t$  corresponded to  $t = \{899, 999\}$  is utilized for denoising procedure. Since smaller  $t$  resulted in larger  $\alpha_t$ , the higher strength we set, the larger noise we added in the latent features, and the larger changes we made during the denoising process. As for the same strength, sampling steps only affect the specific sampling numbers but will not influence the overall denoising magnitudes. Thus, different sampling steps do not seriously affect the denoising results, but different intensities do. The correctness of such an analysis is also well illustrated in Figure 7 in the main paper. Different sampling steps have a small influence, but different denoising strength has a large influence.



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Figure 1: The system interface of the SD-WebUI, we can simply download the tool and realize the watermark erasure by just calling the img2img function and clicking the generate button.

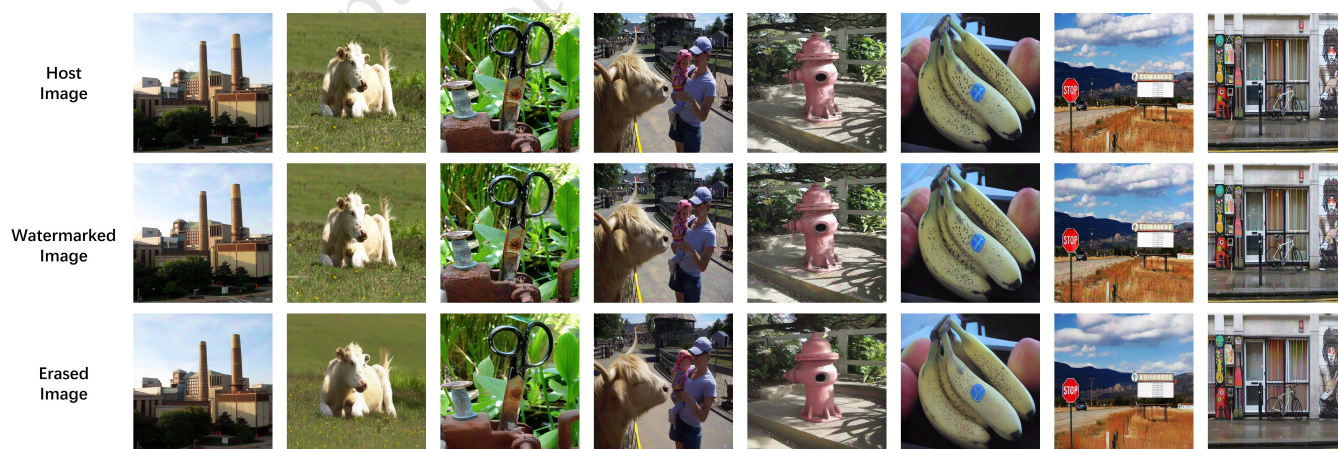


Figure 2: The watermarked images as well as the erased images of the proposed method.



Figure 3: The capturing and correcting process.