透過操作 Latent Space 與 Interpolation生成圖片間過度影像

WZX
12 min read · Just now

stable diffusion

phi4 與 florence 生成 step_list

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透過文字操作 Latent Space

透過文字操作 Latent Space
StableDiffusionImg2Img
medium.com

Latent Space

```
from diffusers import StableDiffusionImg2ImgPipeline
import torch
from PIL import Image, ImageDraw
import time
import numpy as np
import IPython.display as display

start_time = time.time()

pipe = StableDiffusionImg2ImgPipeline.from_pretrained("runwayml/stable-diffusic

image1 = Image.open("1.png").convert("RGB").resize((512, 512))
image2 = Image.open("2.png").convert("RGB").resize((512, 512))

steps_list = [
    {"step": 1, "title": "Tarp Reconfiguration", "description": "The large blue
    {"step": 2, "title": "Wall Development", "description": "As more of the blu
    {"step": 3, "title": "Facade Formation", "description": "The wall continues
    {"step": 4, "title": "Balcony Addition", "description": "As the facade becc
    {"step": 5, "title": "Palm Trees and Fence Adjustment", "description": "The
    {"step": 6, "title": "Completion of Building Height", "description": "The e
    {"step": 7, "title": "Sky and Background", "description": "The sky remains
    {"step": 8, "title": "Street Lamp Installation", "description": "A street l
    {"step": 9, "title": "Final Touches", "description": "The last adjustments
    {"step": 10, "title": "Final Scene", "description": "The entire image now f
]

image_list = []

# 逐步生成圖片
for i, step in enumerate(steps_list):
    alpha = i / (len(steps_list) - 1)
    blended_image = Image.blend(image1, image2, alpha)

    prompt = step['description']
    print(f"Processing Step {step['step']}: {step['title']}")

    generated_image = pipe(prompt=prompt, image=blended_image, strength=0.3).im

    image_list.append(generated_image)


end_time = time.time()
execution_time = end_time - start_time

cols = 5
rows = (len(image_list) + cols - 1) // cols
merged_width = cols * 512
merged_height = rows * 512
merged_image = Image.new("RGB", (merged_width, merged_height))
```

```
for idx, img in enumerate(image_list):
    x_offset = (idx % cols) * 512
    y_offset = (idx // cols) * 512
    merged_image.paste(img, (x_offset, y_offset))

display.display(merged_image)

gif_images = image_list
image_list[0].save("animation.gif", save_all=True, append_images=gif_images, du

print(f"執行時間: {execution_time:.2f} 秒")
```

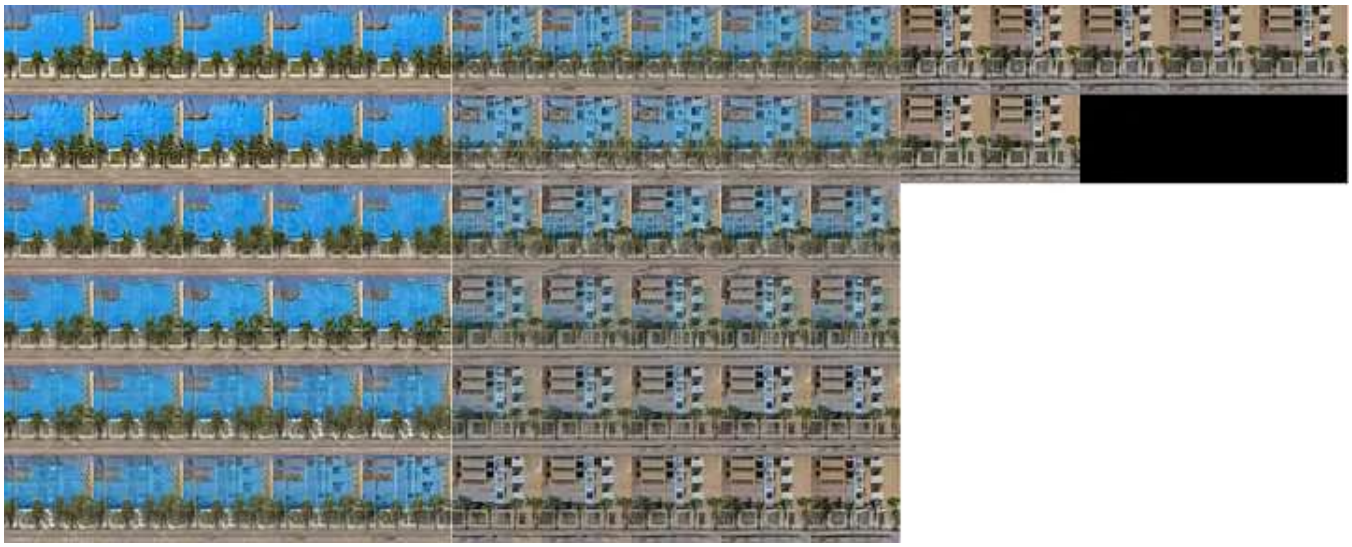
```
Loading pipeline components...: 100%|██████████| 7/7 [00:00<00:00, 11.37it/s]
Processing Step 1: Tarp Reconfiguration
100%|██████████| 15/15 [00:31<00:00,  2.09s/it]
Processing Step 2: Wall Development
100%|██████████| 15/15 [00:32<00:00,  2.16s/it]
Processing Step 3: Facade Formation
100%|██████████| 15/15 [00:32<00:00,  2.18s/it]
Processing Step 4: Balcony Addition
100%|██████████| 15/15 [00:31<00:00,  2.07s/it]
Processing Step 5: Palm Trees and Fence Adjustment
100%|██████████| 15/15 [00:32<00:00,  2.16s/it]
Processing Step 6: Completion of Building Height
100%|██████████| 15/15 [00:32<00:00,  2.16s/it]
Processing Step 7: Sky and Background
100%|██████████| 15/15 [00:32<00:00,  2.16s/it]
Processing Step 8: Street Lamp Installation
100%|██████████| 15/15 [00:32<00:00,  2.16s/it]
Processing Step 9: Final Touches
100%|██████████| 15/15 [00:32<00:00,  2.15s/it]
Processing Step 10: Final Scene
100%|██████████| 15/15 [00:32<00:00,  2.17s/it]
```

執行時間: 365.13 秒

```
num_interpolations = 5

# 線性內插
interpolated_images = []
for i in range(len(image_list) - 1):
    for j in np.linspace(0, 1, num=num_interpolations):
        interpolated_image = Image.blend(image_list[i], image_list[i + 1], j)
```

```
            interpolated_images.append(interpolated_image)

    # 組合內插圖片與原始圖片
    final_image_list = []
    for i in range(len(image_list) - 1):
        final_image_list.append(image_list[i])
        final_image_list.extend(interpolated_images[i * num_interpolations:(i + 1)
    final_image_list.append(image_list[-1])

    image_list = final_image_list  # 更新 image_list
```

內插



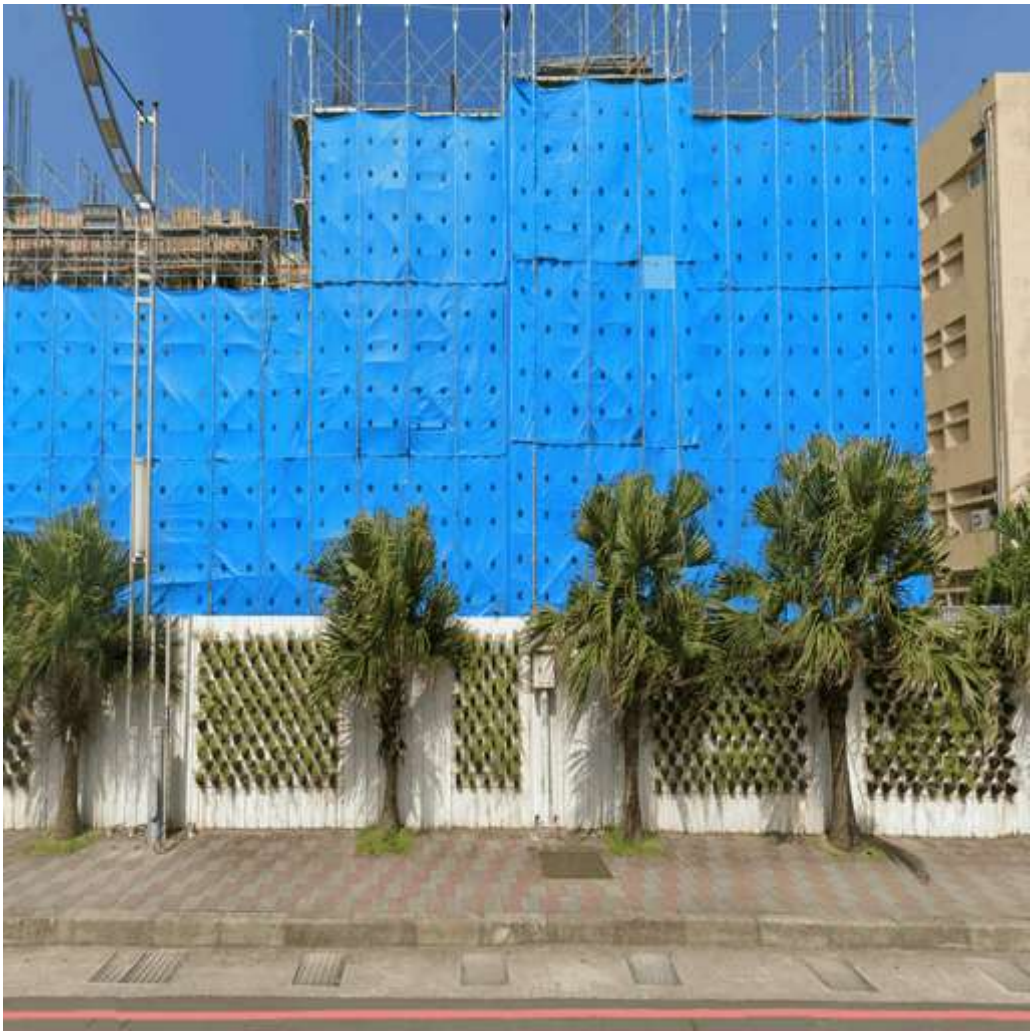
內插

Strength

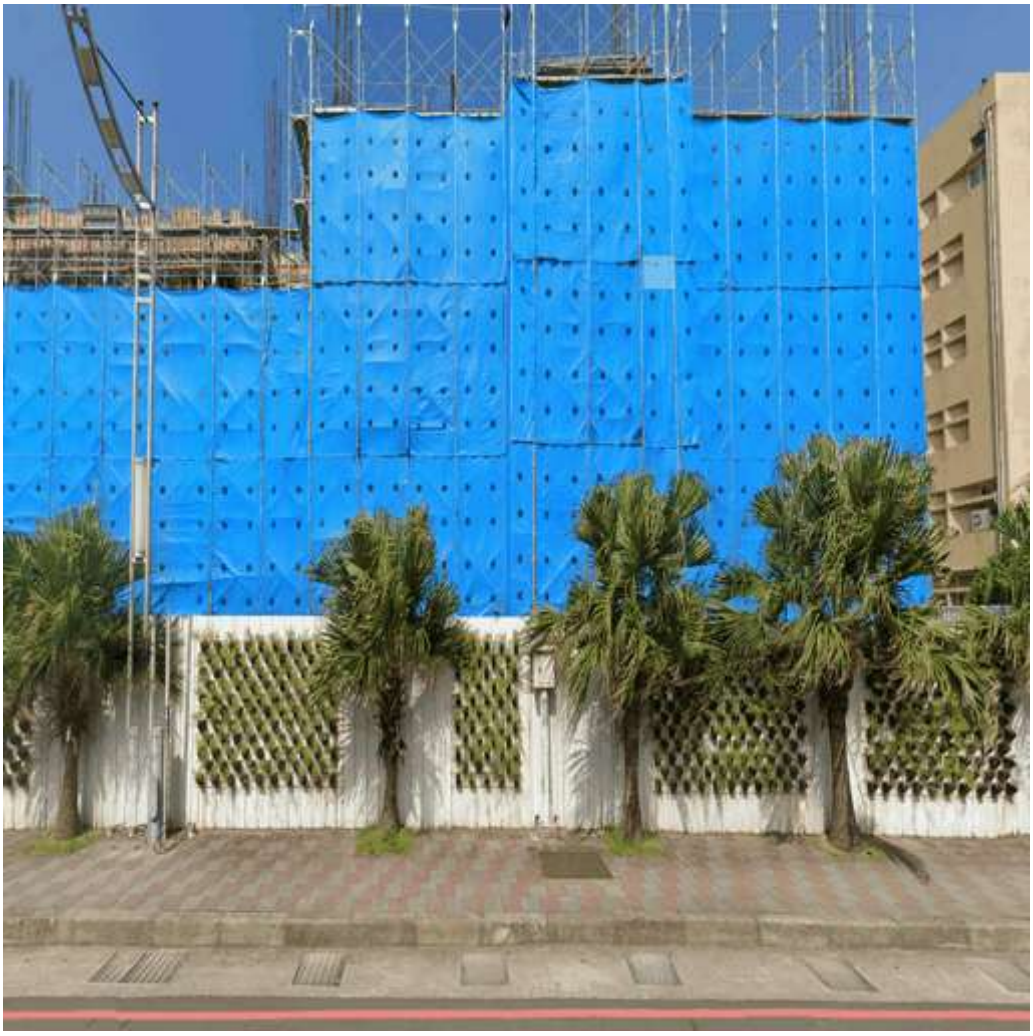
添加或去除的噪聲量

- **較低的 strength** 生成的圖像與原圖差異不大，僅有細微變化。
- **較高的 strength** 生成的圖像與原圖差異較大，接近完全重新生成。

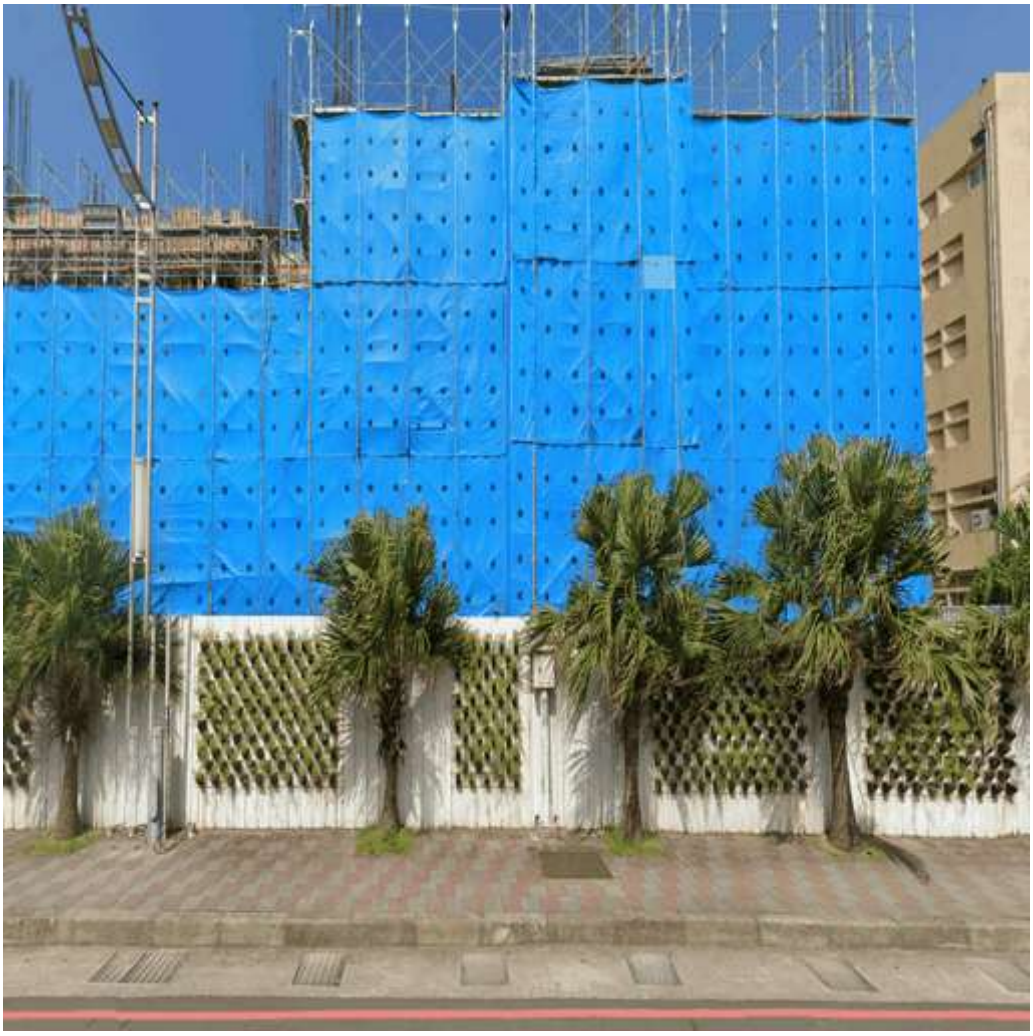
strength=0.2



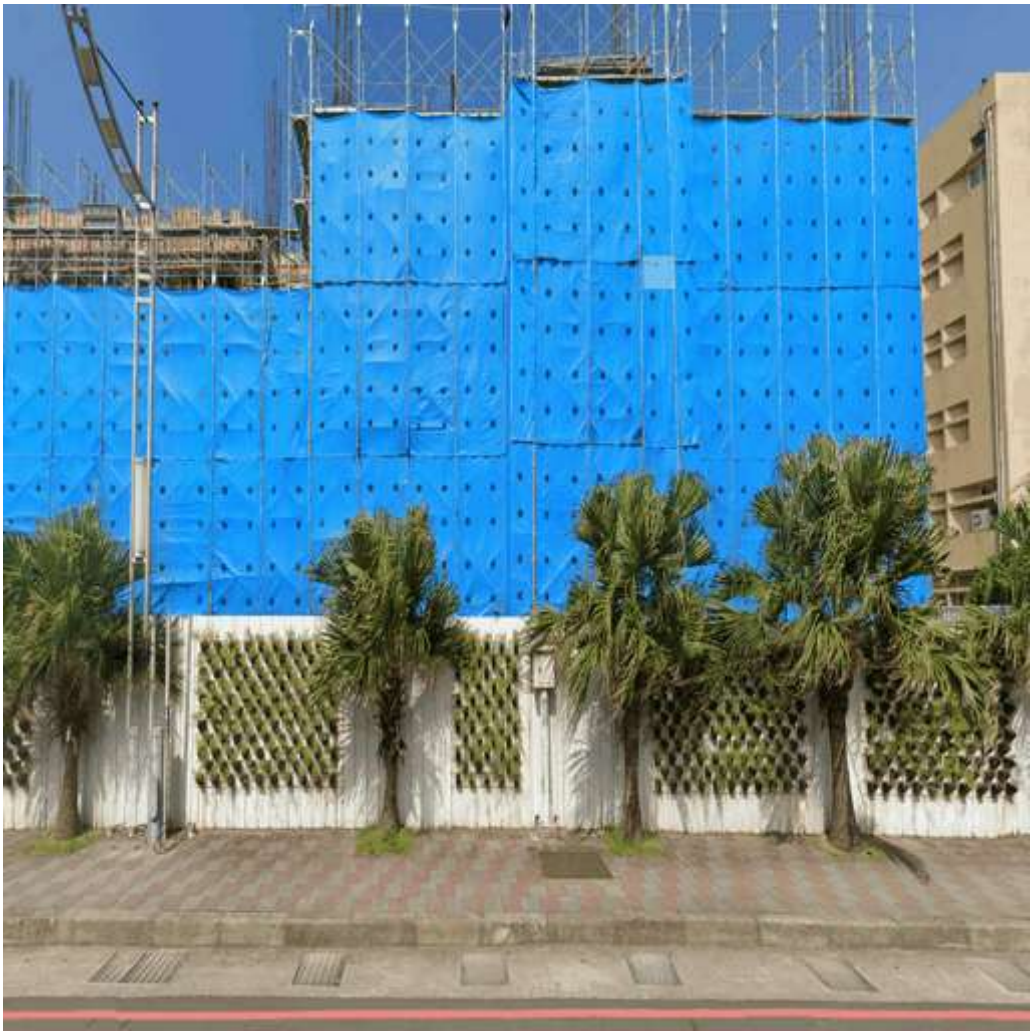
strength=0.3



strength=0.4



strength=0.5



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Written by WZX

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