

# Stable Diffusion Model 本地端安裝

AI生成式繪圖



Lee, Ming-Chang

<https://www.youtube.com/@alan9956>

<http://rwepa.blogspot.com/>

[alan9956@gmail.com](mailto:alan9956@gmail.com)

# Outline

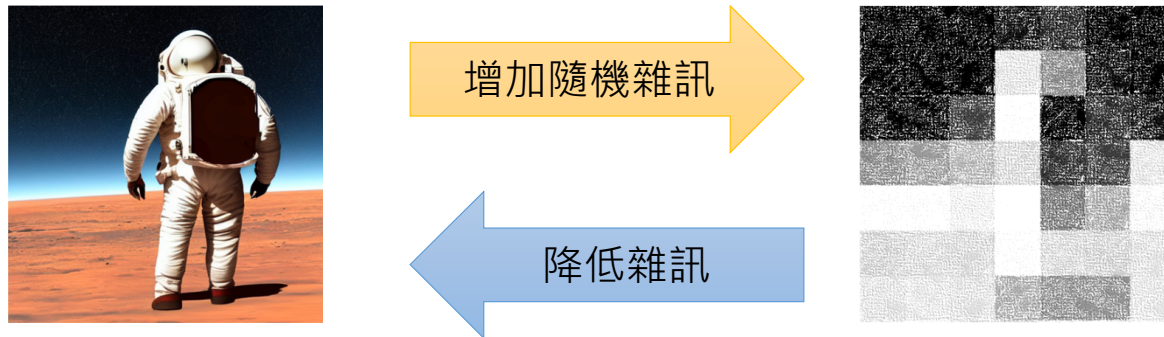
- 1.Stable Diffusion 簡介
- 2.SD 安裝與參數設定
- 3.SD 使用
- 4.SD 中文化
- 5.Google Colab
- 6.結論

# 1.Stable Diffusion 簡介

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# Stable Diffusion

- 2022年8月德國慕尼黑大學 CompVis 團隊在 Hugging Face 發表穩定擴散模型 (Stable Diffusion, SD) 1.1版本，同年10月發表 SD 1.5版本，目前2024年最新版本為 SD 3.0版。
- 2023年11月發表 Stable Video Diffusion。
- SD 是一種基於擴散技術 (Diffusion) 的深度學習模型，可應用於文字生成圖片。



參考: [https://en.wikipedia.org/wiki/Stable\\_Diffusion](https://en.wikipedia.org/wiki/Stable_Diffusion)

# SD 架構

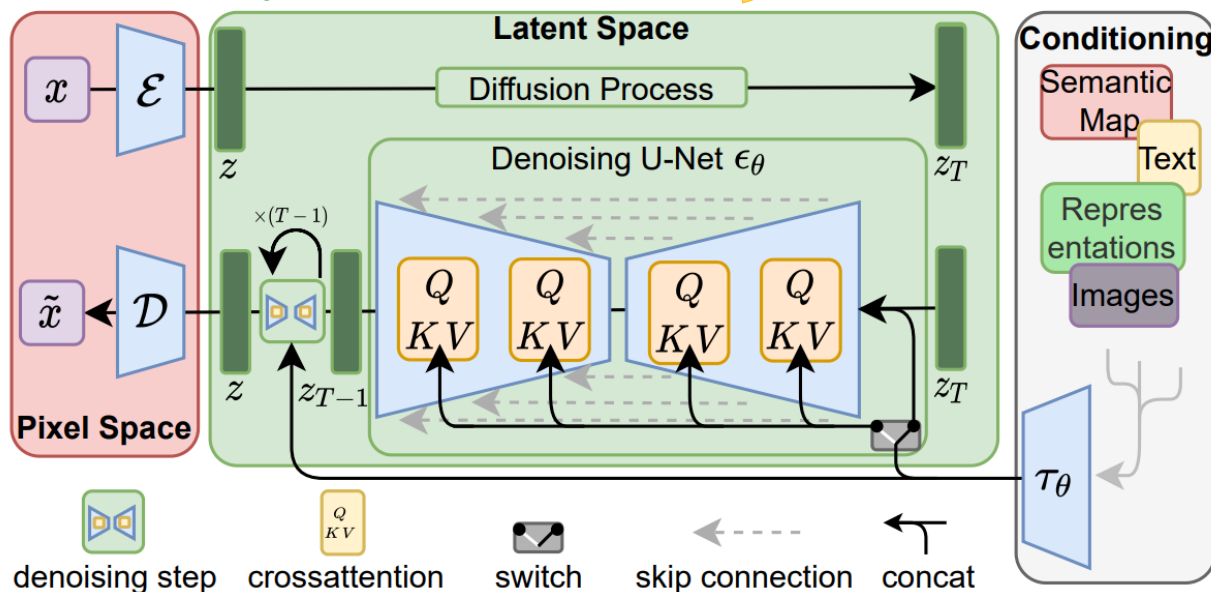
- <https://arxiv.org/abs/2112.10752>

②變分自編碼器  
(Variational Autoencoder, VAE)

③U-Net

## 3.2. Latent Diffusion Models

**Diffusion Models** [82] are probabilistic models designed to learn a data distribution  $p(x)$  by gradually denoising a normally distributed variable, which corresponds to learning the reverse process of a fixed Markov Chain of length  $T$ .



①對比語言影像預訓練  
(Contrastive Language-  
Image Pre-training, CLIP)

## 2.SD 安裝與參數設定

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# SD 下載

- SD 官方網站
  - <https://github.com/CompVis/stable-diffusion>

### Requirements

A suitable [conda](#) environment named `ldm` can be created and activated with:

```
conda env create -f environment.yaml
conda activate ldm
```

You can also update an existing [latent diffusion](#) environment by running

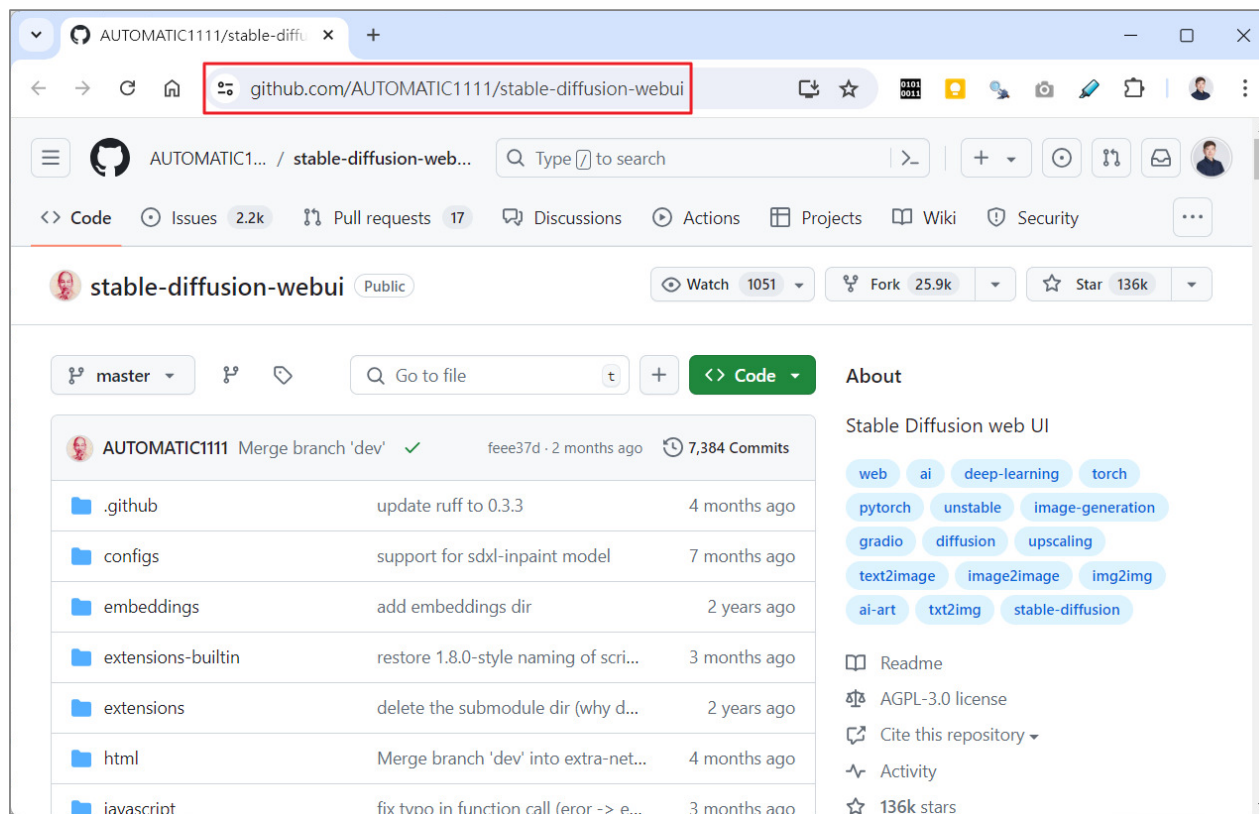
```
conda install pytorch torchvision -c pytorch
pip install transformers==4.19.2 diffusers invisible-watermark
pip install -e .
```



- Web UI
  - **AUTOMATIC1111**, ComfyUI, **Fooocus**
- Google Colab (免費/付費)

# Web UI - AUTOMATIC 1111

- <https://github.com/AUTOMATIC1111/stable-diffusion-webui>





# AUTOMATIC 1111 – Windows 安裝

- 選取 v1.0.0-pre 並下載 sd.webui.zip (50.3MB)

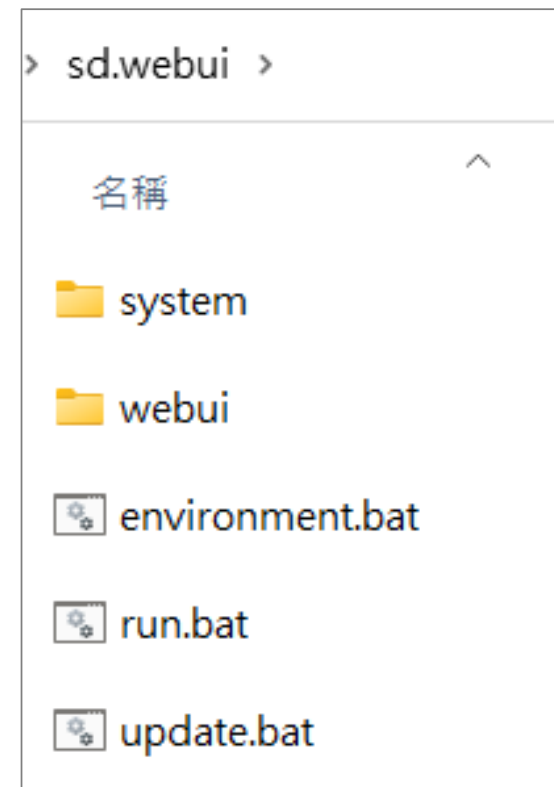
## Installation on Windows 10/11 with NVidia-GPUs using release package

1. Download `sd.webui.zip` from [v1.0.0-pre](#) and extract its contents.
2. Run `update.bat` .
3. Run `run.bat` .

For more details see [Install-and-Run-on-NVidia-GPUs](#)

# AUTOMATIC1111 下載

- 解壓縮後有2個資料夾與3個bat執行檔
- 系統:
  - Windows 11專業版 – 23H2
  - RAM 16GB
  - 顯示卡 Intel(R) UHD Graphics



# 參數設定 \webui\webui-user.bat

- 將第6行程式碼最左側新增 REM, 第7行新增以下內容。
- `set COMMANDLINE_ARGS= --lowvram --precision full --no-half --skip-torch-cuda-test`

```
webui-user.bat
1 @echo off
2
3 set PYTHON=
4 set GIT=
5 set VENV_DIR=
6 REM set COMMANDLINE_ARGS=
7 set COMMANDLINE_ARGS= --lowvram --precision full --no-half --skip-torch-cuda-test
8 call webui.bat
9
```

注意：本例因沒有NVIDIA顯示卡，  
因此須執行上述設定。

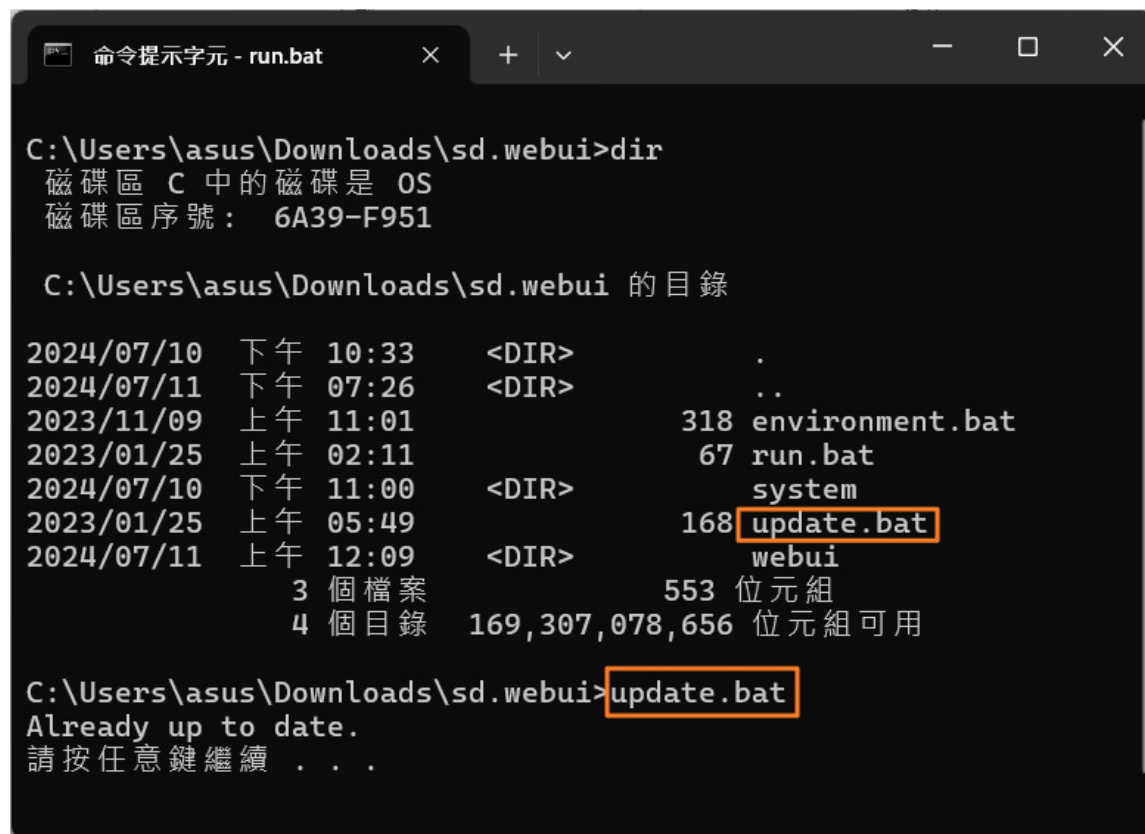
## webui-user.bat 參數

- --medvram : 使用中等 VRAM
- --lowvram : 使用較小 VRAM
- --xformers : 最佳化算圖記憶體佔用量，可以讓較小VRAM也可以計算大圖，只能使用在NVIDIA顯示卡。
- --precision full : 增加算圖精度。
- --no-half : 不要使用16bit單精準數來運算，一般會和 precision full 一起使用。
- --skip-torch-cuda-test : 不要使用CUDA，只使用CPU運算。

參考: <https://github.com/AUTOMATIC111/stable-diffusion-webui/wiki/Command-Line-Arguments-and-Settings>

# 程式碼更新

- 在命令提示字元視窗執行 **update.bat**



```
命令提示字元 - run.bat
C:\Users\asus\Downloads\sd.webui>dir
磁碟區 C 中的磁碟是 OS
磁碟區序號: 6A39-F951

C:\Users\asus\Downloads\sd.webui 的目錄

2024/07/10 下午 10:33 <DIR> .
2024/07/11 下午 07:26 <DIR> ..
2023/11/09 上午 11:01 318 environment.bat
2023/01/25 上午 02:11 67 run.bat
2024/07/10 下午 11:00 <DIR> system
2023/01/25 上午 05:49 168 update.bat
2024/07/11 上午 12:09 <DIR> webui
3 個檔案 553 位元組
4 個目錄 169,307,078,656 位元組可用

C:\Users\asus\Downloads\sd.webui>update.bat
Already up to date.
請按任意鍵繼續 . . .
```

## 3.SD 使用

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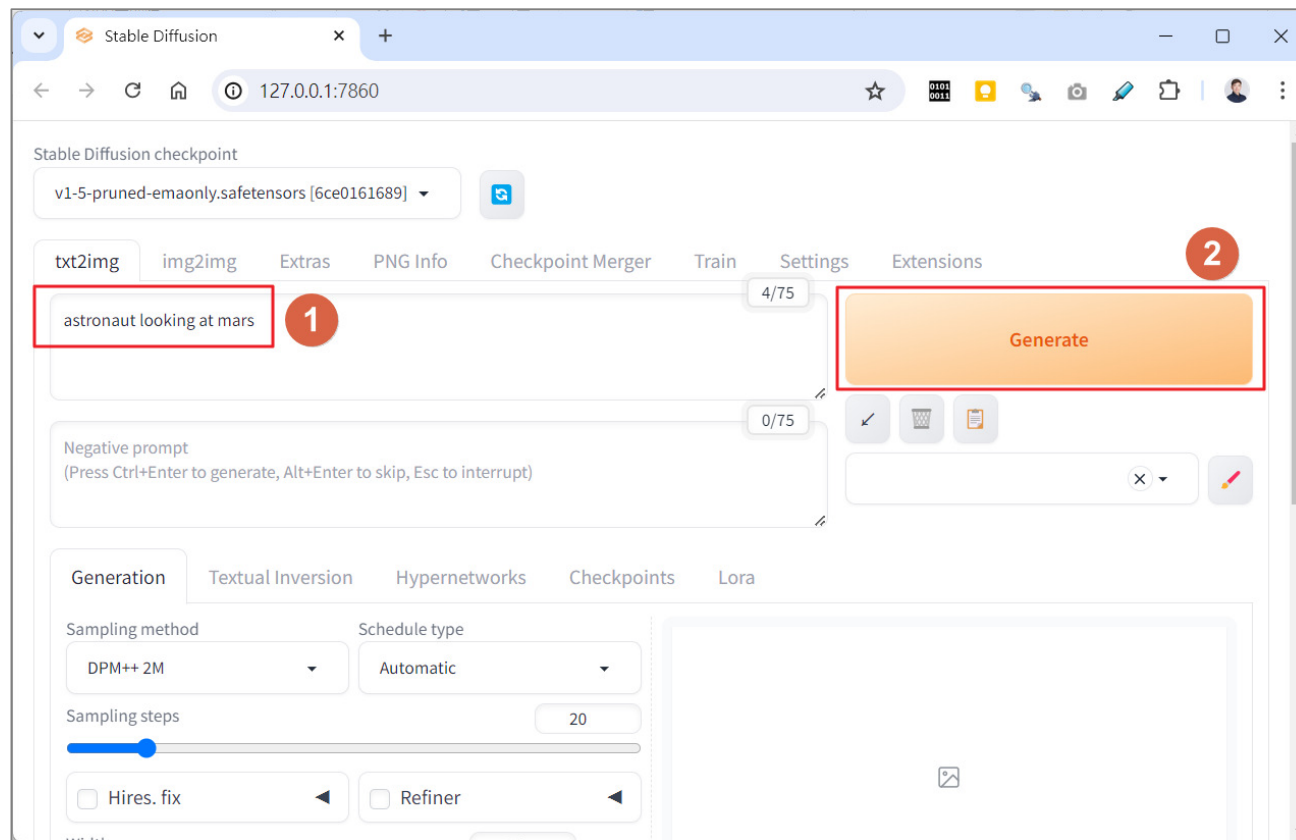
## 啟動 WebUI

- 在命令提示字元視窗執行 **run.bat**
- 執行生成式繪圖，此視窗不可關閉。
- 使用完成後，如需結束 WebUI，命令提示字元中按 CTRL + C，再按 Y。

```
命令提示字元 - run.bat - run.b
warnings.warn(
To create a public link, set 'share=True' in 'launch()'.
C:\Users\asus\Downloads\sd.webui\system\python\lib\site-pack
ated and will be removed in version 1.0.0. Downloads always
warnings.warn(
Startup time: 55.8s (prepare environment: 0.6s, import torch
ts: 10.2s, load scripts: 1.7s, create ui: 0.7s, gradio launch
Applying attention optimization: InvokeAI... done.
Model loaded in 12.4s (load weights from disk: 0.8s, create
45%|
Total progress: 45%|
```

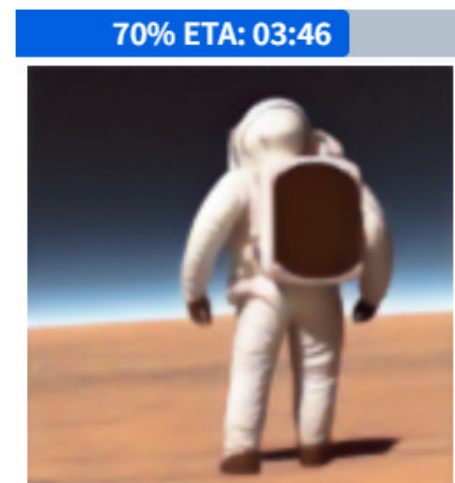
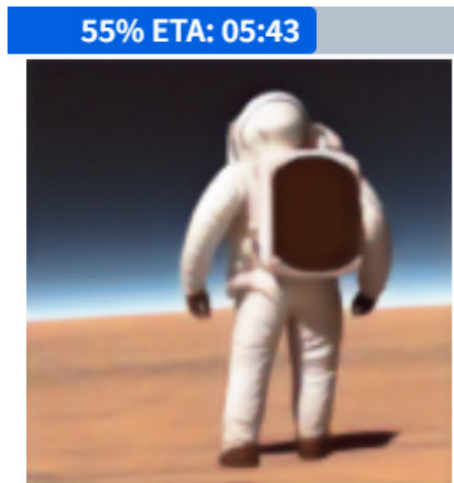
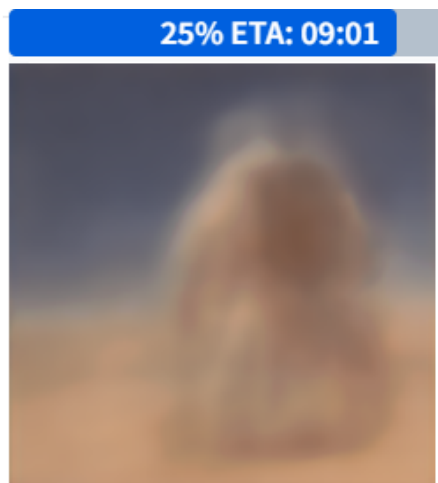
# SD – 範例

- 輸入提示字元「astronaut looking at mars」，按 [Generate]。

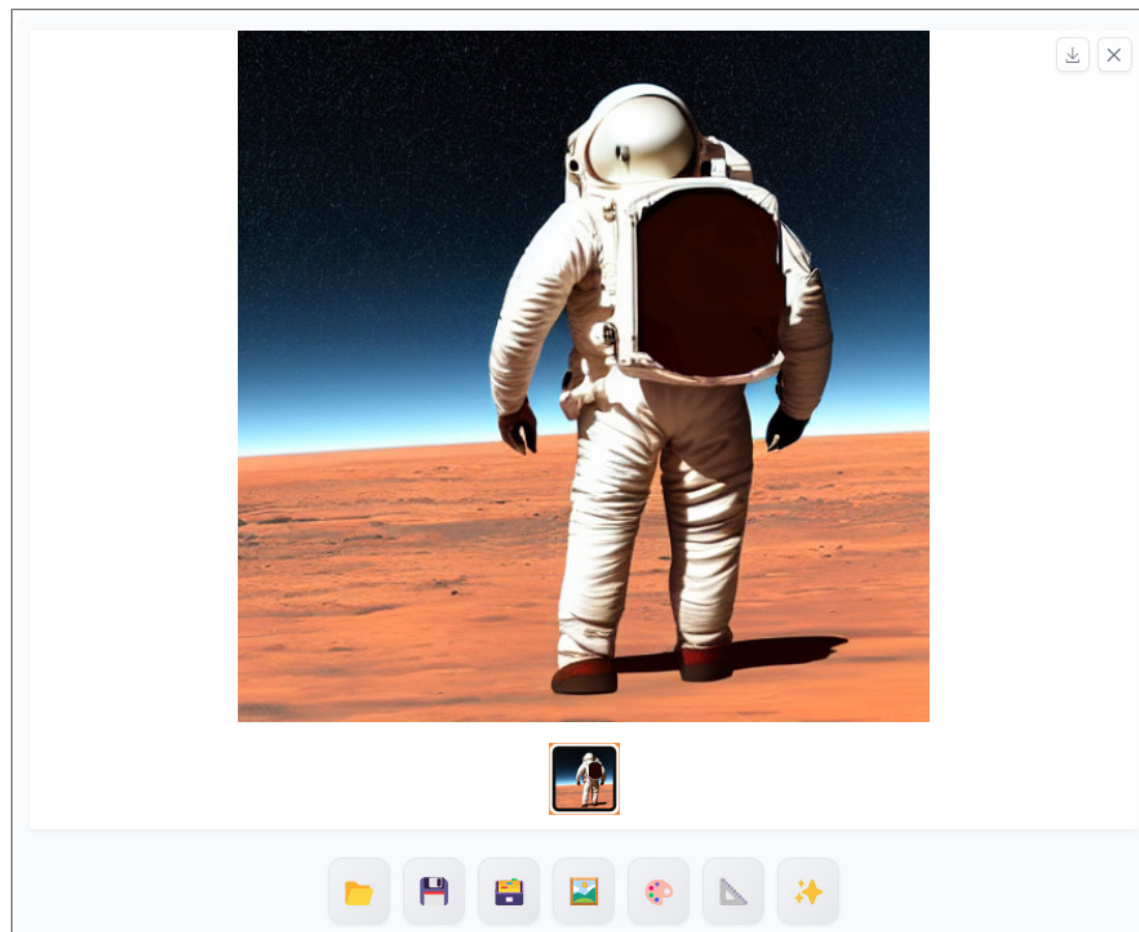




# SD – 生成過程



## SD – 完成圖



# AUTOMATIC 1111 – Ubuntu 安裝

- `lsb_release -a`

```
(base) rwepa@rwepa:~$ lsb_release -a
No LSB modules are available.
Distributor ID: Ubuntu
Description:    Ubuntu 22.04.4 LTS
Release:        22.04
Codename:       jammy
(base) rwepa@rwepa:~$
```

- Ubuntu 22.04.4 LTS
- RAM: 16GB

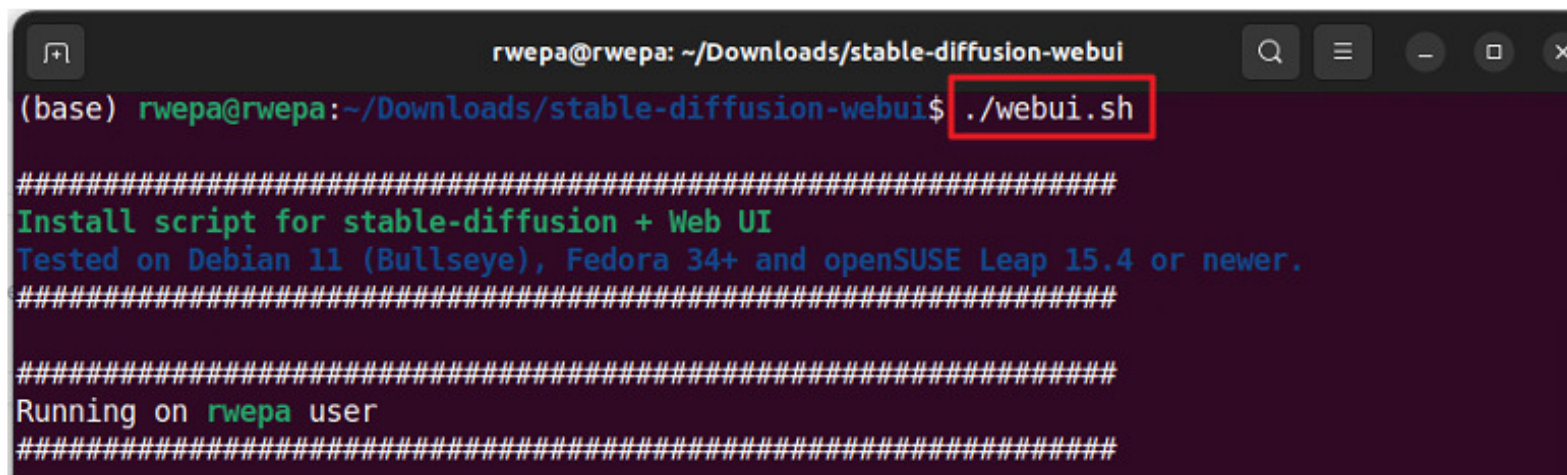
- `free -g`

```
rwepa@rwepa: ~
(base) rwepa@rwepa:~$ free -g
```

	total	used	free	shared	buff/cache	available
Mem:	15	2	5	0	7	12
Swap:	1	0	1			

# AUTOMATIC 1111 – Ubuntu 安裝(續)

- `sudo apt install wget git python3 python3-venv libgl1 libglib2.0-0`
- `cd Downloads`
- `wget -q https://raw.githubusercontent.com/AUTOMATIC1111/stable-diffusion-webui/master/webui.sh`
- `./webui.sh`



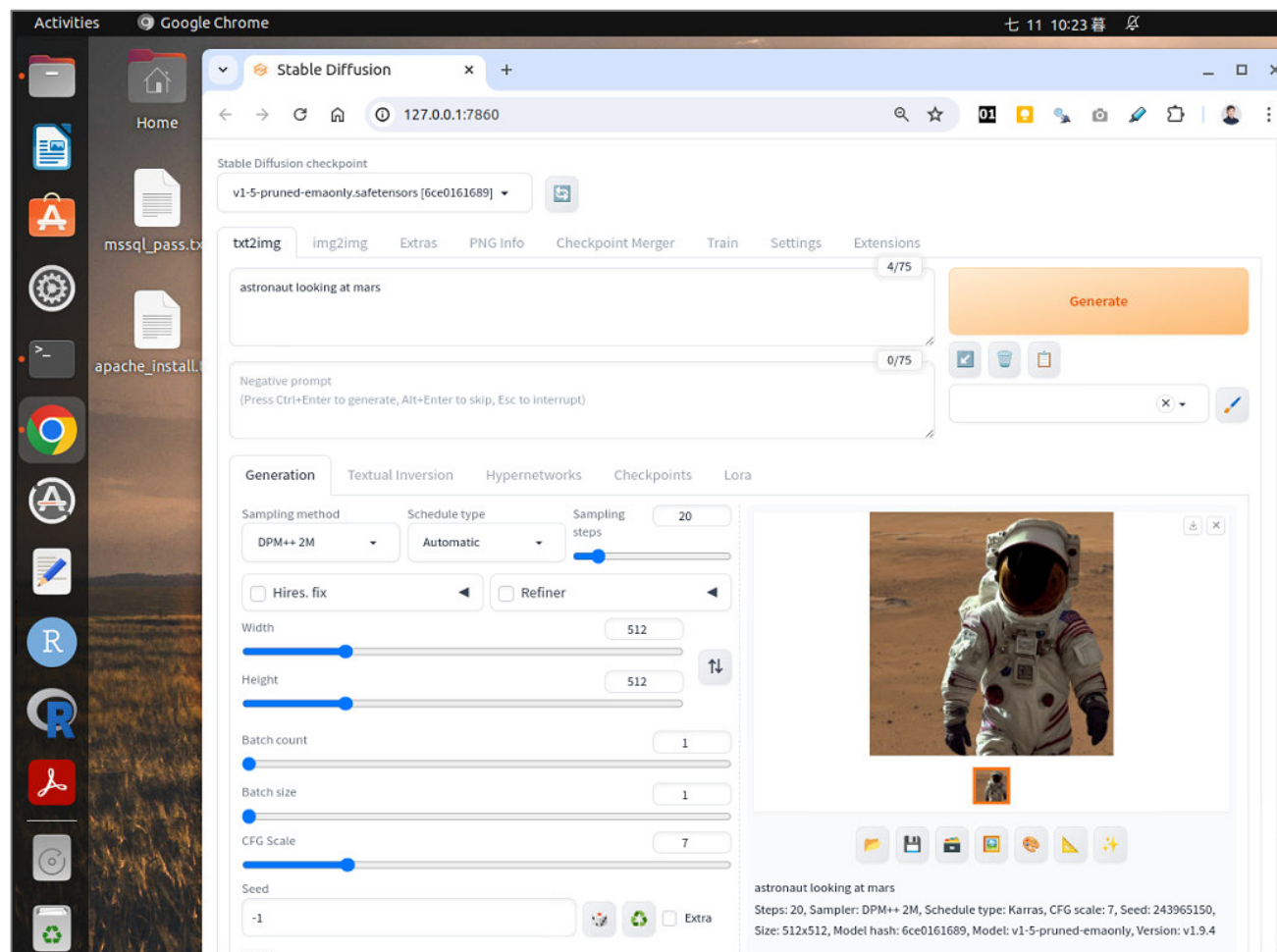
```
rwepa@rwepa: ~/Downloads/stable-diffusion-webui
(base) rwepa@rwepa:~/Downloads/stable-diffusion-webui$ ./webui.sh

#####
Install script for stable-diffusion + Web UI
Tested on Debian 11 (Bullseye), Fedora 34+ and openSUSE Leap 15.4 or newer.
#####

#####
Running on rwepa user
#####
```

- 啟動後即可顯示 WebUI
- Ubuntu 無須設定 webui-user.sh 亦可正常啟動

# AUTOMATIC 1111 – Ubuntu 完成圖

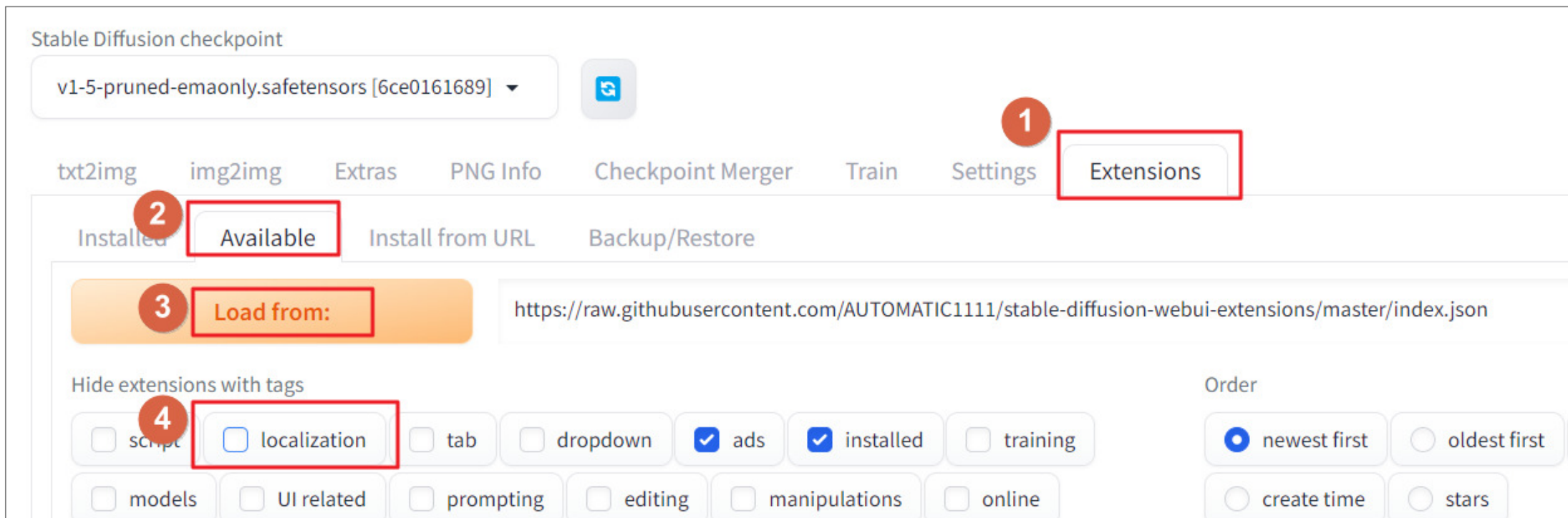


## 4.SD 中文化

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# SD 擴充功能-中文化

- Extensions \ Available \ Load from: 按鈕 \ 取消 localization





## SD 擴充功能-中文化 (續)

- 選取 zh\_TW Location localization 右側 [Install]

zh_TW Localization localization	Traditional Chinese localization Update: 2023-12-14 Added: 2022-11-09 Created: 2023-04-19	stars: 11	Install
------------------------------------	--	-----------	---------

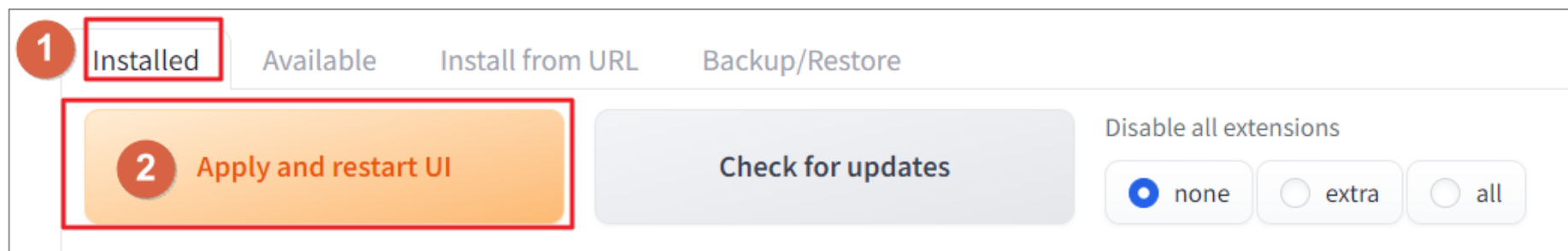
- 安裝時畫面反白，完成後本選項會移除，表示安裝完成，最上方顯示 Install into...

Installed into C:\Users\asus\Downloads\sd.webui\webui\extensions\stable-diffusion-webui-localization-zh_TW. Use Installed tab to restart.	
Extension	Description



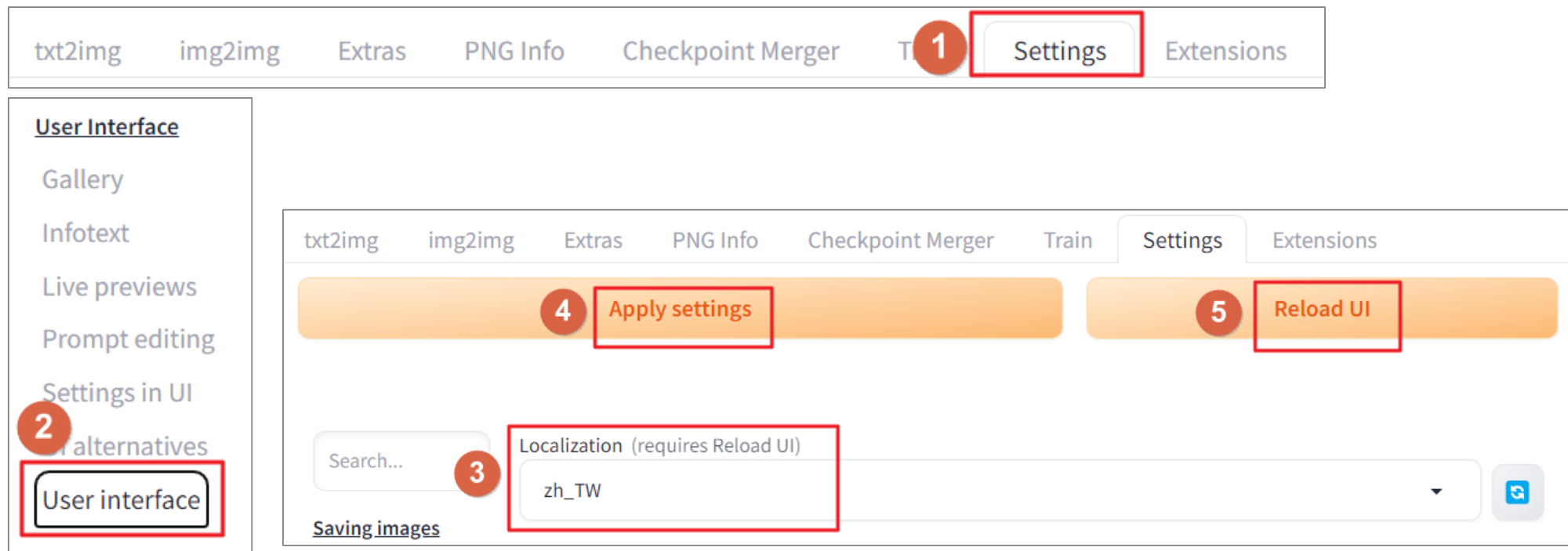
## SD 擴充功能-中文化 (續)

- 選取 Installed 標籤，按 [Apply and restart UI]
- 重新啟動後仍是英文版？



# Settings

- 1.Settings 2.User interface 3.zh\_TW 4.Apply settings 5.Reload UI



# 中文化-完成版

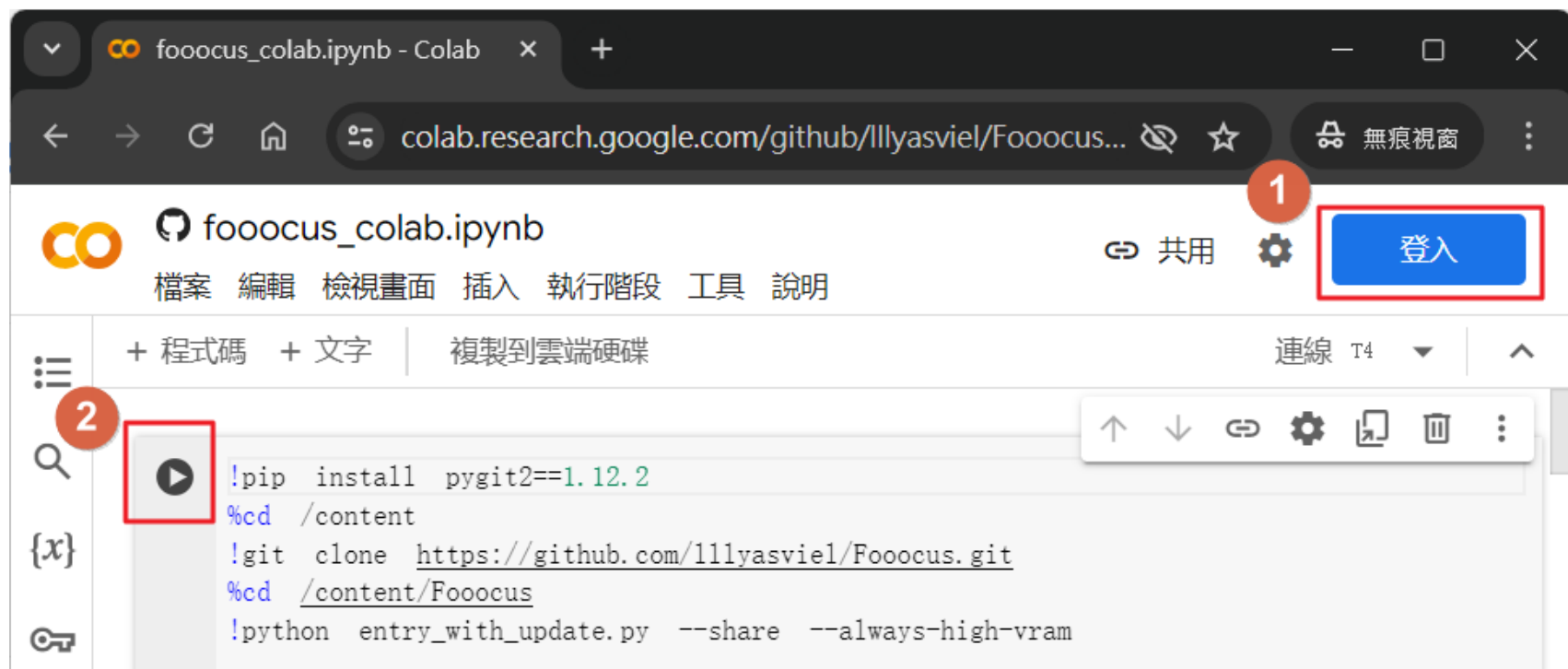


## 5. Google Colab

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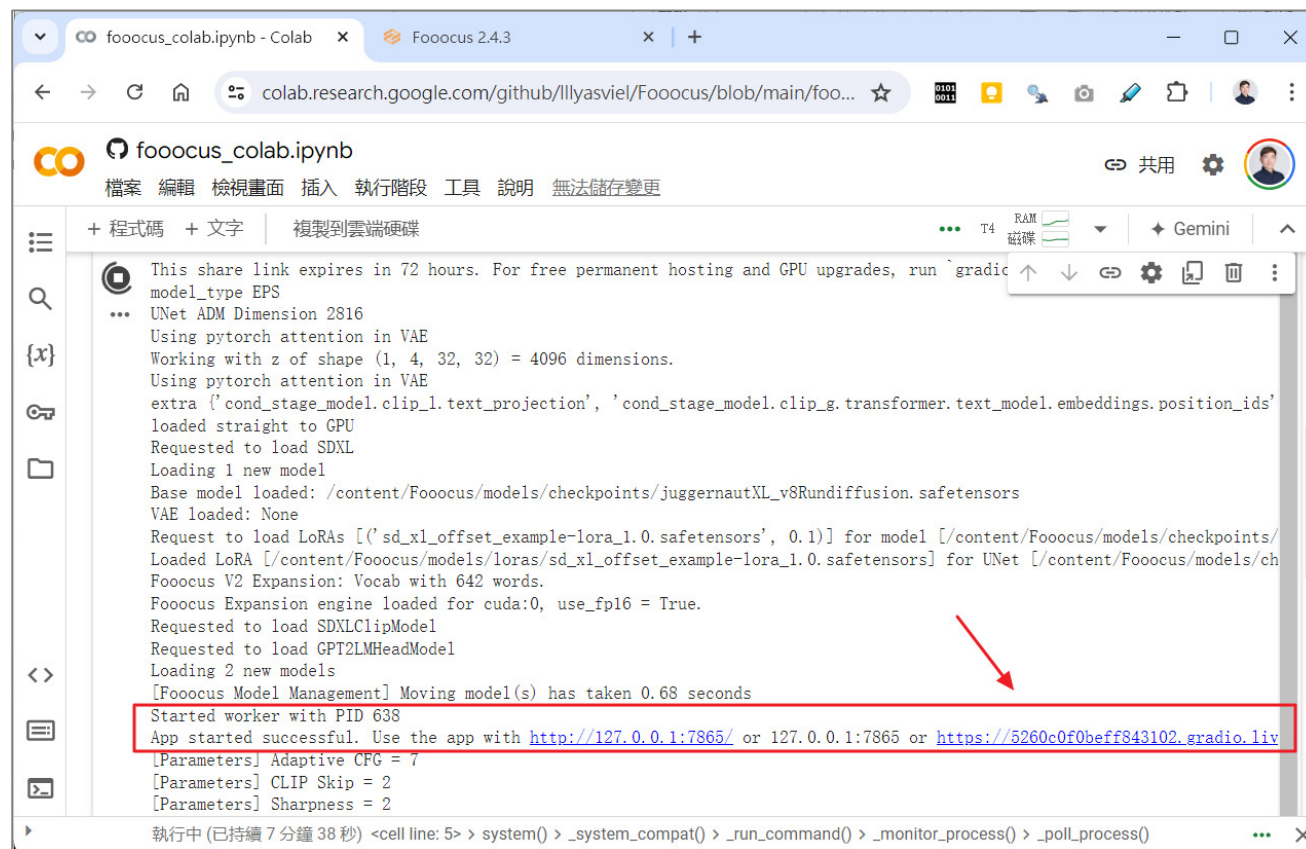
# Google Colab - Fooocus

- [https://colab.research.google.com/github/l1lyasviel/Fooocus/blob/main/fooocus\\_colab.ipynb](https://colab.research.google.com/github/l1lyasviel/Fooocus/blob/main/fooocus_colab.ipynb)
- 按 [登入] \ 按 執行儲存格 (CTRL + Enter)



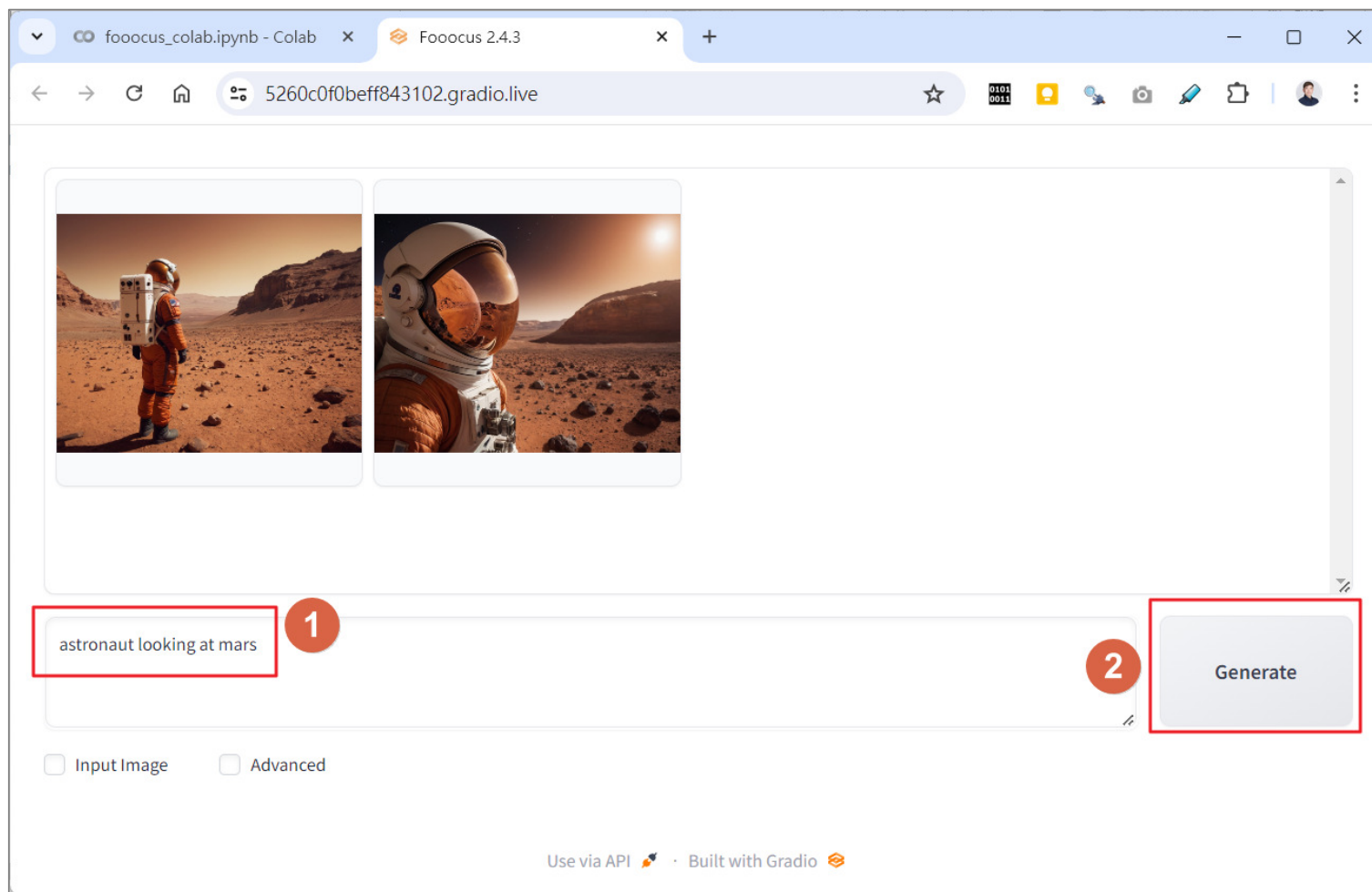
# Fooocus Colab

- 完成後點選以下網址

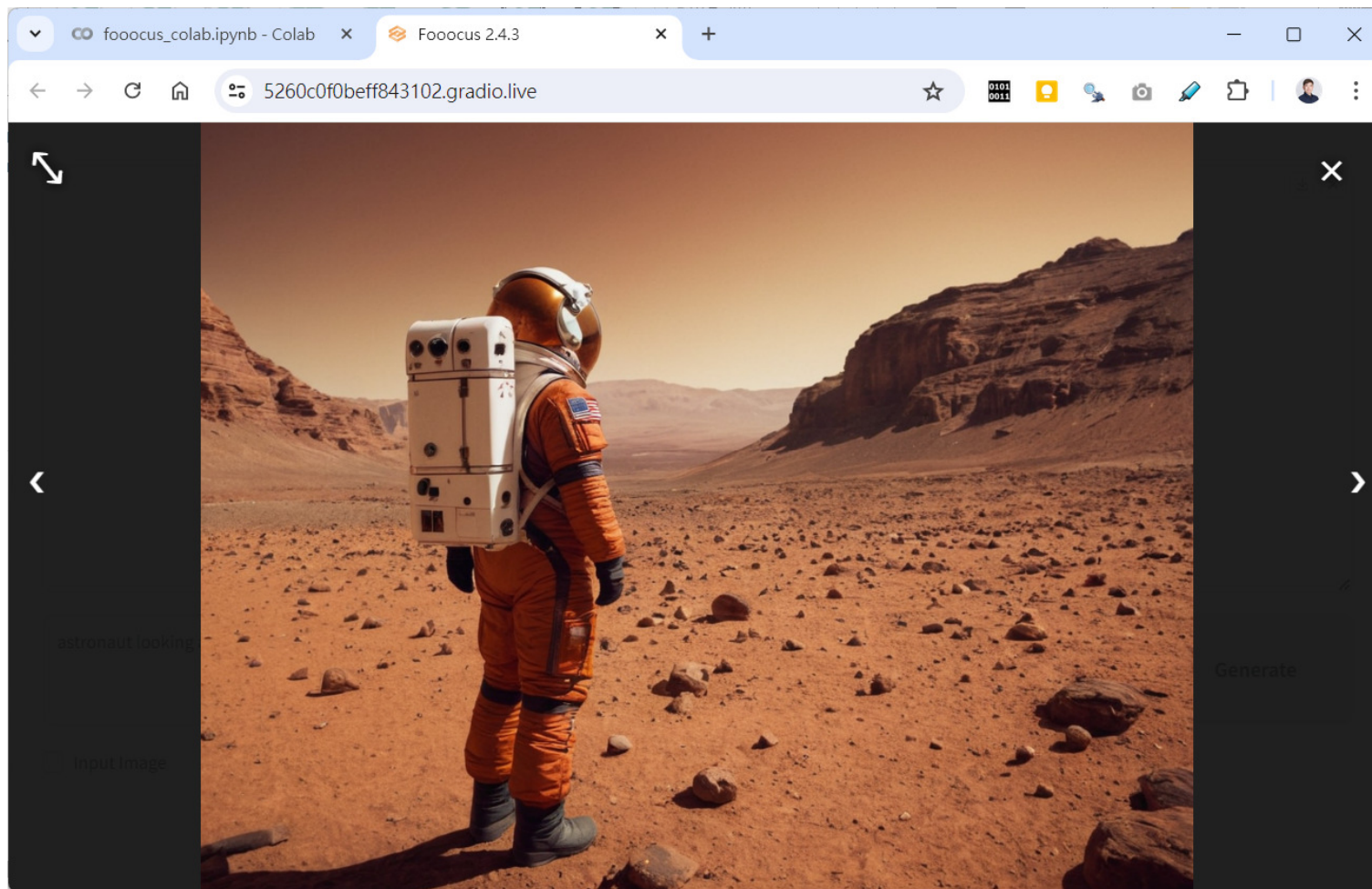


```
fooocus_colab.ipynb - Colab x Fooocus 2.4.3 x +
colab.research.google.com/github/lllyasviel/Fooocus/blob/main/foo...
fooocus_colab.ipynb
檔案 編輯 檢視畫面 插入 執行階段 工具 說明 無法儲存變更
+ 程式碼 + 文字 複製到雲端硬碟
This share link expires in 72 hours. For free permanent hosting and GPU upgrades, run `gradic
...
model_type EPS
UNET ADM Dimension 2816
Using pytorch attention in VAE
Working with z of shape (1, 4, 32, 32) = 4096 dimensions.
Using pytorch attention in VAE
extra {'cond_stage_model.clip_l.text_projection', 'cond_stage_model.clip_g.transformer.text_model.embeddings.position_ids'}
loaded straight to GPU
Requested to load SDXL
Loading 1 new model
Base model loaded: /content/Fooocus/models/checkpoints/juggernautXL_v8Rundiffusion.safetensors
VAE loaded: None
Request to load LoRAs [('sd_xl_offset_example-lora_1.0.safetensors', 0.1)] for model [/content/Fooocus/models/checkpoints/
Loaded LoRA [/content/Fooocus/models/loras/sd_xl_offset_example-lora_1.0.safetensors] for UNet [/content/Fooocus/models/ch
Fooocus V2 Expansion: Vocab with 642 words.
Fooocus Expansion engine loaded for cuda:0, use_fp16 = True.
Requested to load SDXLClipModel
Requested to load GPT2LMHeadModel
Loading 2 new models
[Fooocus Model Management] Moving model(s) has taken 0.68 seconds
Started worker with PID 638
App started successful. Use the app with http://127.0.0.1:7865/ or 127.0.0.1:7865 or https://5260c0f0beff843102.gradio.live
[Parameters] Adaptive CFG = 7
[Parameters] CLIP Skip = 2
[Parameters] Sharpness = 2
執行中 (已持續 7 分鐘 38 秒) <cell line: 5> > system() > _system_compat() > _run_command() > _monitor_process() > _poll_process()
```

# Foocus Colab – 範例



# 完成視窗

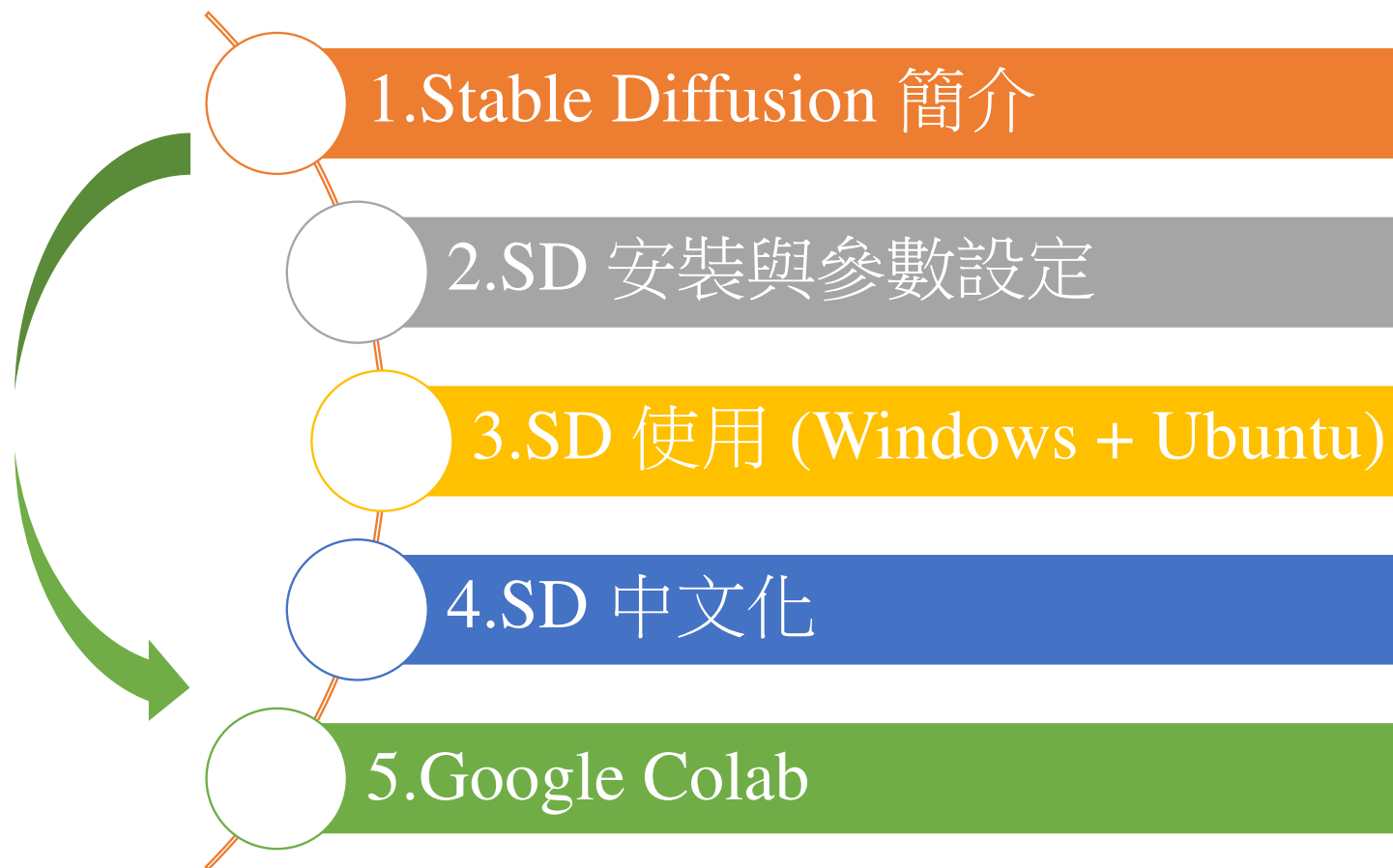




## 6.結論

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# Reviews



# 謝謝您的聆聽

## Q & A



李明昌

*alan9956@gmail.com*

<http://rwepa.blogspot.tw/>