

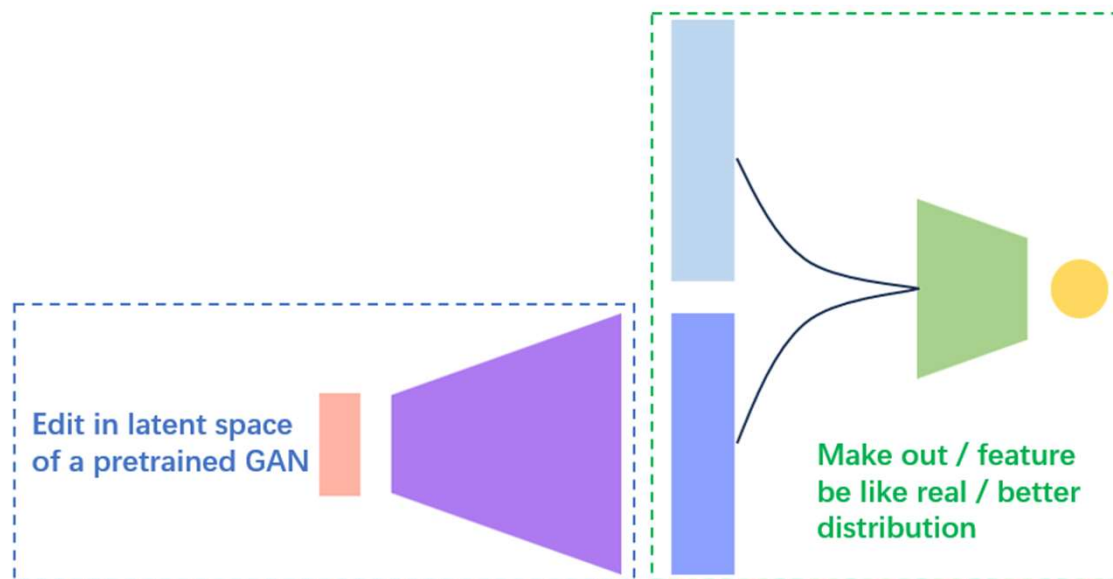


中国科学技术大学

University of Science and Technology of China

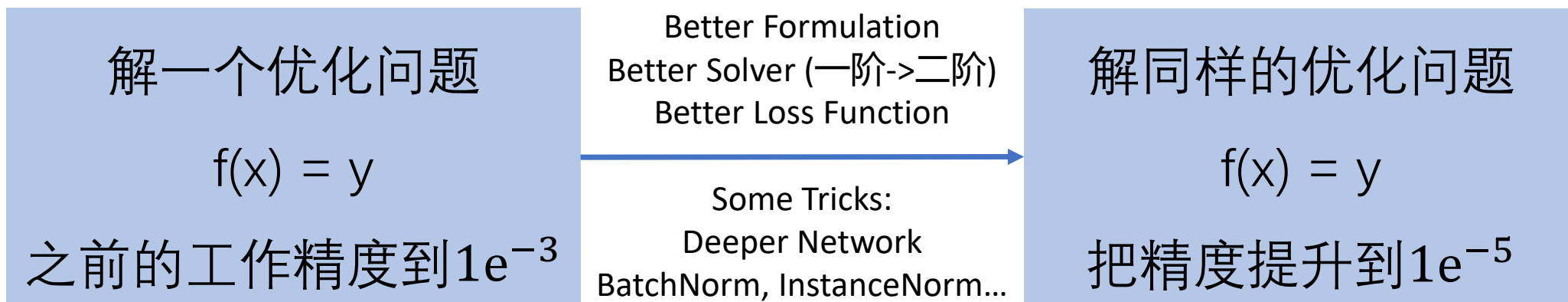
生成模型的两种用法

Play with GANs



https://github.com/YudongGuo/DIP-Teaching/tree/main/Assignments/03_PlayWithGANs

两个适合beginner的科研途径



Incremental Work

两个适合beginner的科研途径

有一个工作A
可以解决任务TaskA

有一个工作B
可以解决任务TaskB

工作A+B

同时解决Task A+B
通过B提升TaskA效果
通过B将A自动化

Combination Work

Examples

我在整理incremental work和combination work

incremental work就是用一些不是很大的改动把一个已有的工作效果提升

combination work就是把已有的工作A和工作B结合起来

请从近几年CVPR、SIGGRAPH、ICCV、ECCV等中分别找出一些incremental work和combination work的例子

Incremental Work 示例

1. CVPR 2021

- **Title:** "EfficientDet: Scalable Object Detection"
- **Description:** 在原有EfficientDet框架上进行微调和优化, 提高了模型的速度和准确性, 保持了模型的可扩展性。

2. ICCV 2021

- **Title:** "Revisiting Image Dehazing: A Dual-Branch Network for Unsupervised Image Dehazing"
- **Description:** 提出了一个双分支网络, 通过在现有的无监督图像去雾方法上增加新的模块, 提升了去雾效果。

3. ECCV 2020

- **Title:** "Swin Transformer: Hierarchical Vision Transformer using Shifted Windows"
- **Description:** 对现有Transformer结构进行局部和全局窗口划分的改进, 以提高计算效率和模型性能。

Combination Work 示例

1. CVPR 2020

- **Title:** "DeepLabv3+: Encoder-Decoder with Atrous Separable Convolution for Semantic Image Segmentation"
- **Description:** 结合了DeepLabv3的多尺度特征提取和编码-解码结构, 提升了语义分割的性能。

2. SIGGRAPH 2021

- **Title:** "NeRF: Representing Scenes as Neural Radiance Fields for View Synthesis"
- **Description:** 将神经网络与体积渲染技术结合, 能够高效合成新视角的场景图像。

3. ICCV 2019

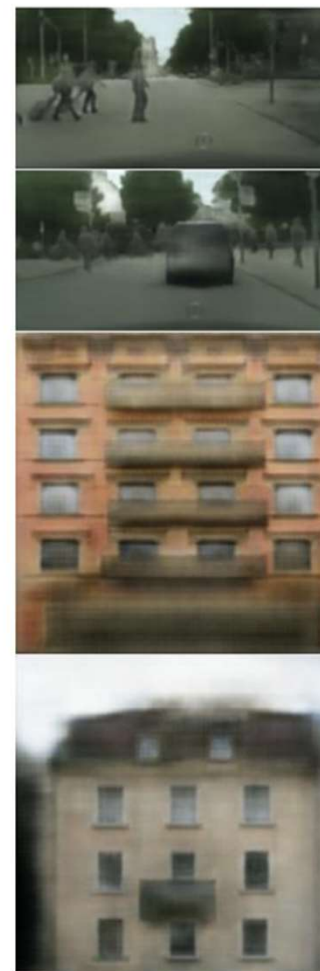
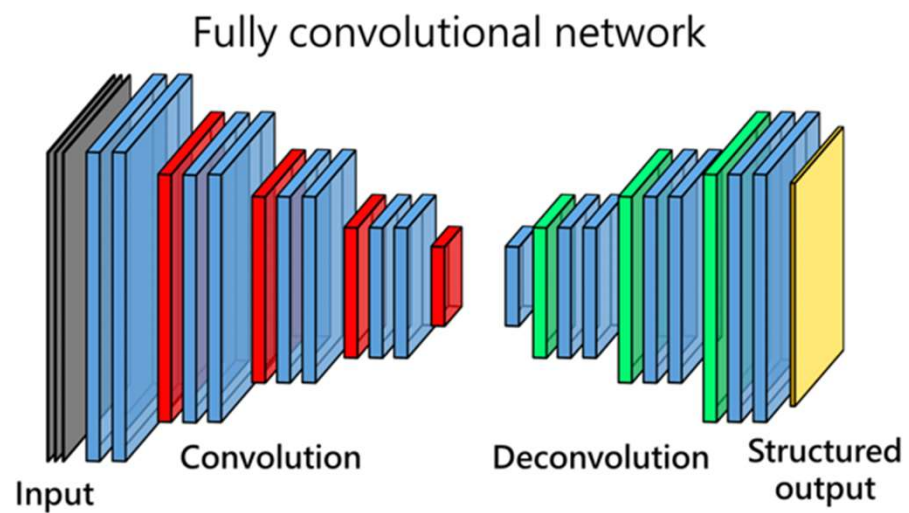
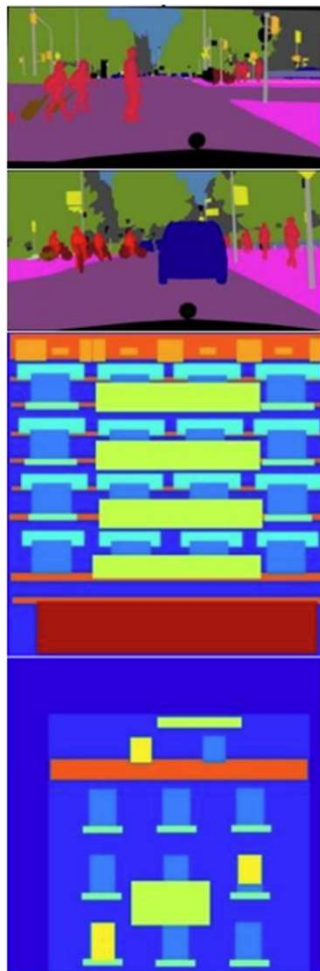
- **Title:** "CycleGAN: Unpaired Image-to-Image Translation using Cycle Consistent Adversarial Networks"
- **Description:** 结合了生成对抗网络与循环一致性约束, 实现了无配对图像间的转换。

Assignment3

Exercise the two Ways

Part 1: Increment hw2 with Discriminative Loss

Results of hw2



Increment hw2 with Discriminative Loss

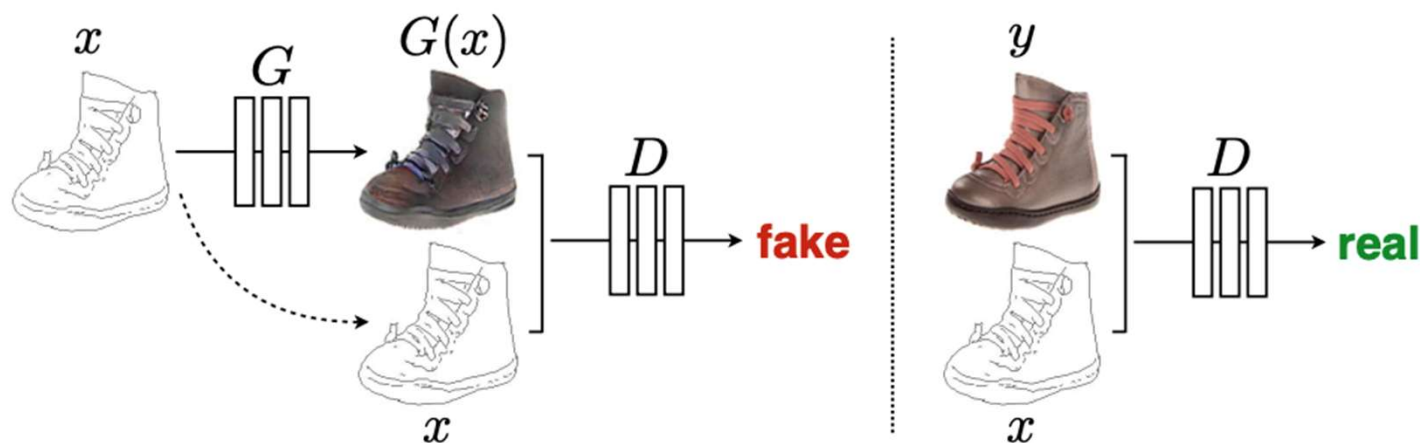
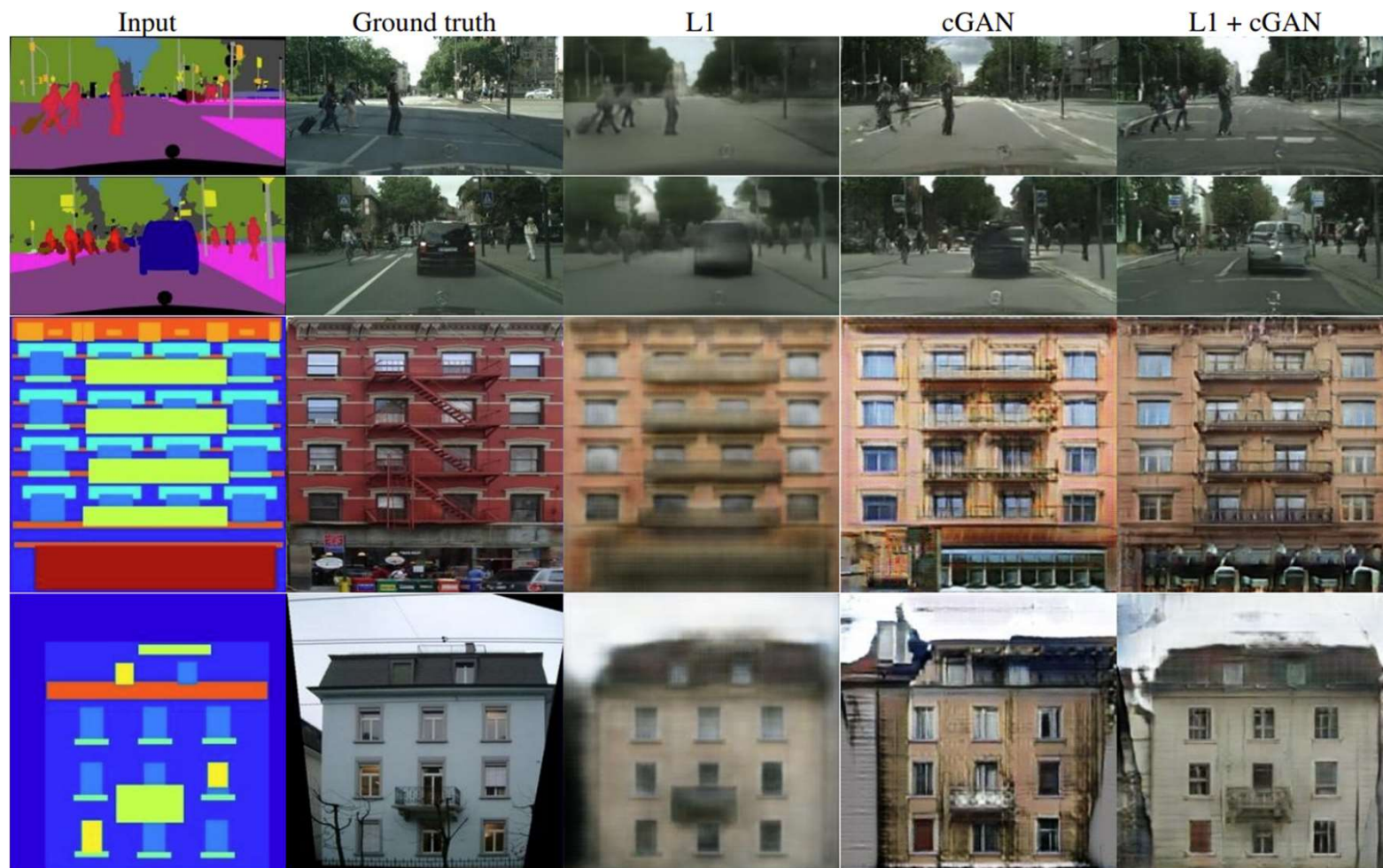


Figure 2: Training a conditional GAN to map edges→photo. The discriminator, D , learns to classify between fake (synthesized by the generator) and real {edge, photo} tuples. The generator, G , learns to fool the discriminator. Unlike an unconditional GAN, both the generator and discriminator observe the input edge map.

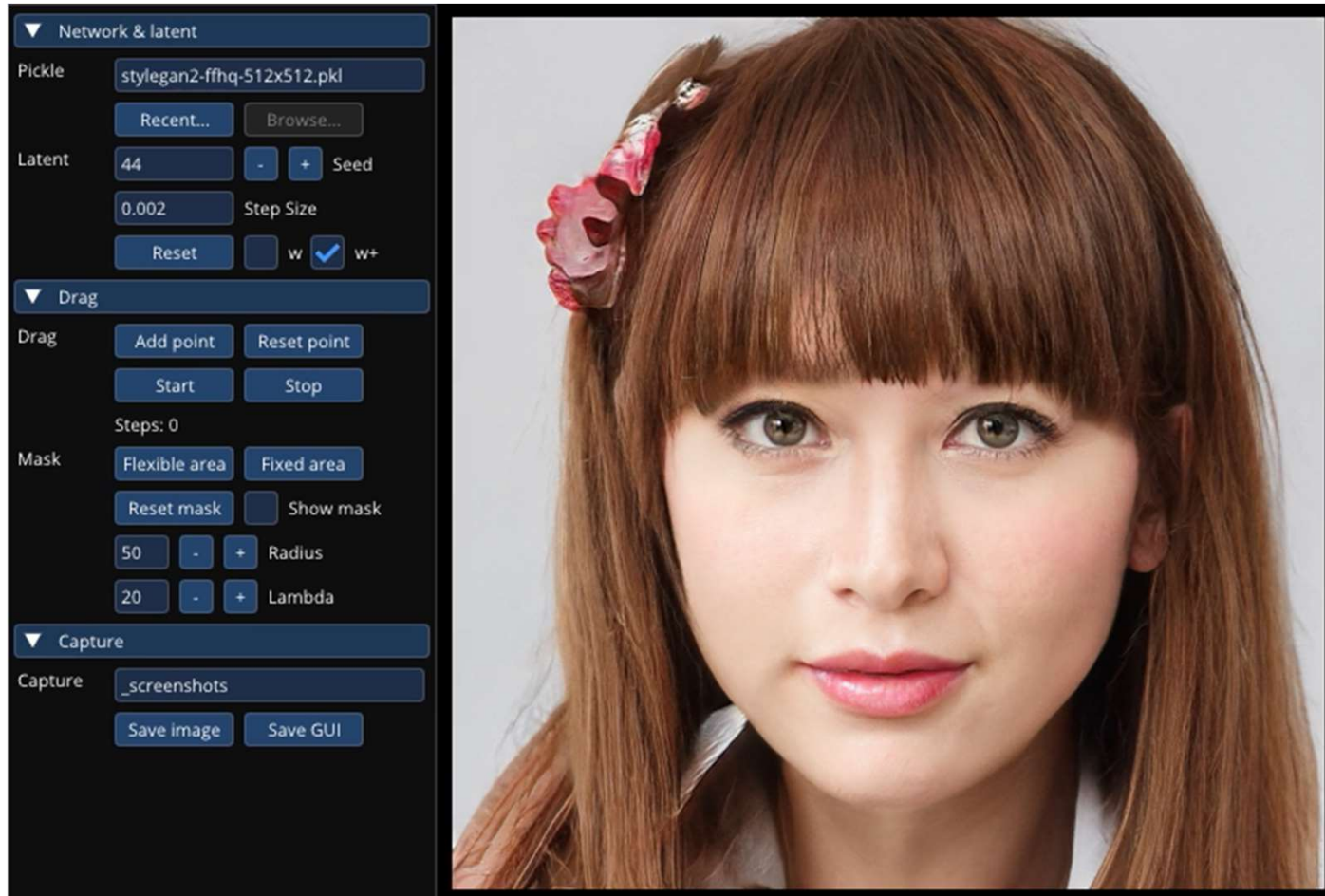
$$\mathcal{L}_{cGAN}(G, D) = \mathbb{E}_{x,y}[\log D(x, y)] + \mathbb{E}_{x,z}[\log(1 - D(x, G(x, z)))]$$

Increment hw2 with Discriminative Loss



Part 2: **Combine** DragGAN with Automatic Face Landmarks

DragGAN



How to make the process
Automatically?

DragGAN Implementations

This screenshot shows the official GitHub repository for DragGAN, maintained by XingangPan. The repository is public and has 994 watches, 3.4k forks, and 35.7k stars. The main branch is selected. The file list on the left includes folders for code (dnnlib, gradio_utils, gui_utils, scripts, stylegan_human, torch_utils, training, viz), documentation (.gitignore, Dockerfile, DragGAN.gif, LICENSE.txt, README.md, arial.ttf, environment.yml, gen_images.py, legacy.py, requirements.txt, visualizer_drag.py, visualizer_drag_gradio.py), and a merge pull request #129. The right sidebar contains an 'About' section with the official code for DragGAN (SIGGRAPH 2023), a list of tags (artificial-intelligence, generative-adversarial-network, image-manipulation, generative-models), and sections for Releases, Packages, and Contributors.

<https://github.com/XingangPan/DragGAN>

This screenshot shows an unofficial implementation of DragGAN on GitHub, maintained by Zeqiang-Lai. The repository is public and has 66 watches, 490 forks, and 5k stars. The main branch is selected. The file list on the left includes folders for workflows, assets, and draggan, as well as various files like .gitignore, Dockerfile, INSTALL.md, README.md, colab.ipynb, gradio_app.py, requirements.txt, and setup.py. The right sidebar contains an 'About' section with an unofficial implementation of DragGAN - "Drag Your GAN: Interactive Point-based Manipulation on the Generative Image Manifold" (DragGAN 全功能实现, 在线Demo, 本地部署试用, 代码、模型已全部开源, 支持Windows, macOS, Linux), a list of tags (image-editing, image-generation, gradio-interface, draggan, internpt), and sections for Releases, Packages, and Contributors.

<https://github.com/OpenGVLab/DragGAN>

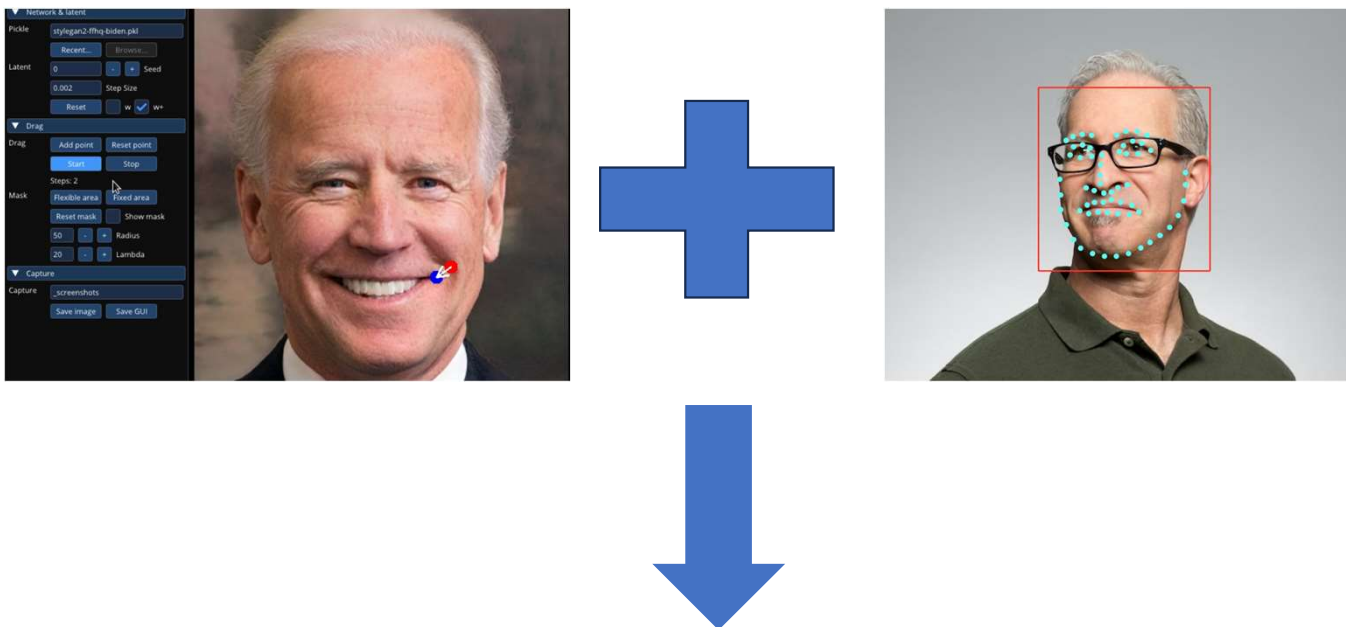
Make it Automatic with Facial Landmarks



<https://github.com/1adrianb/face-alignment>

Requirements: Automatically Edit Faces

Combining

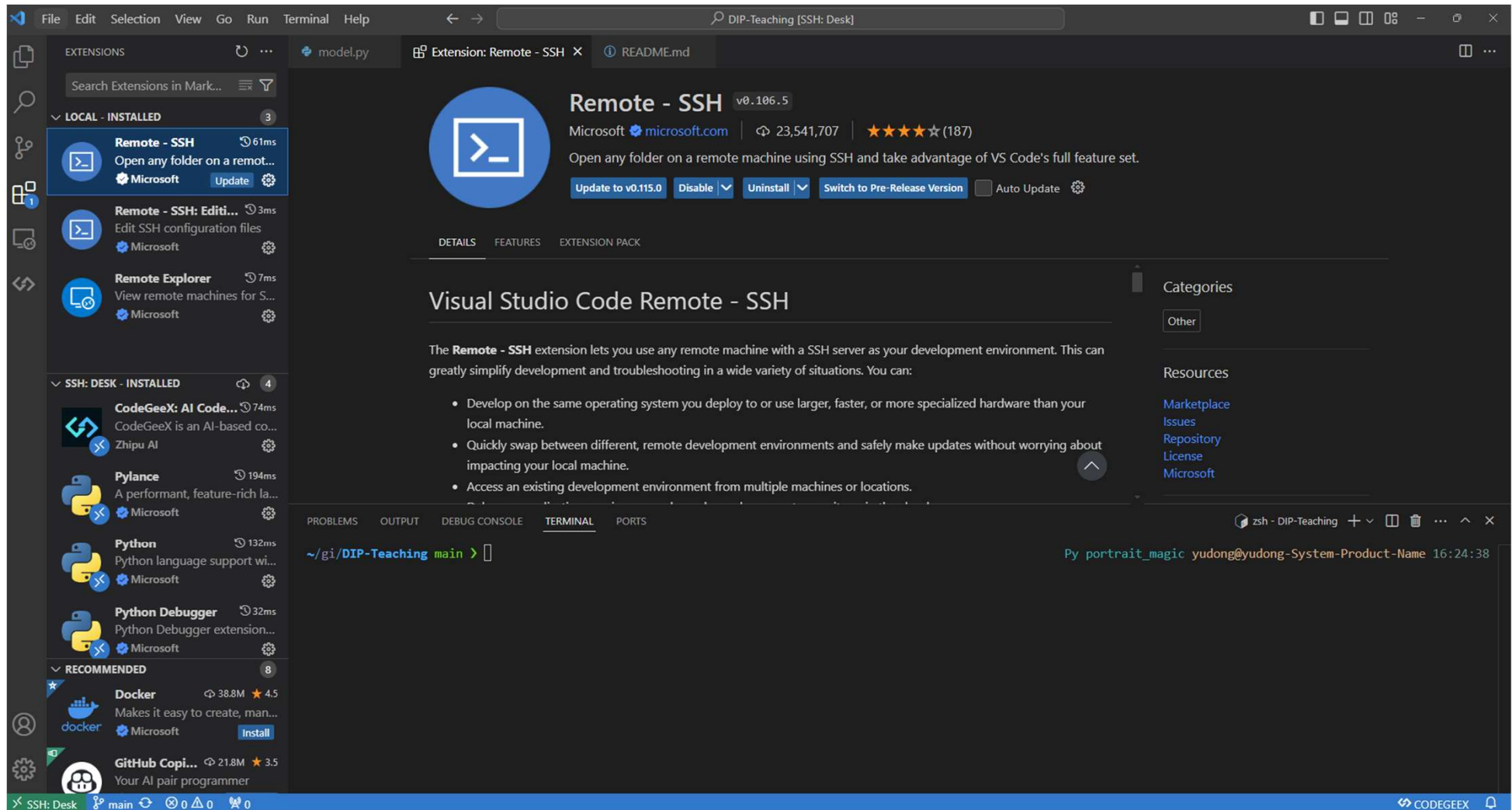


自动肖像编辑器

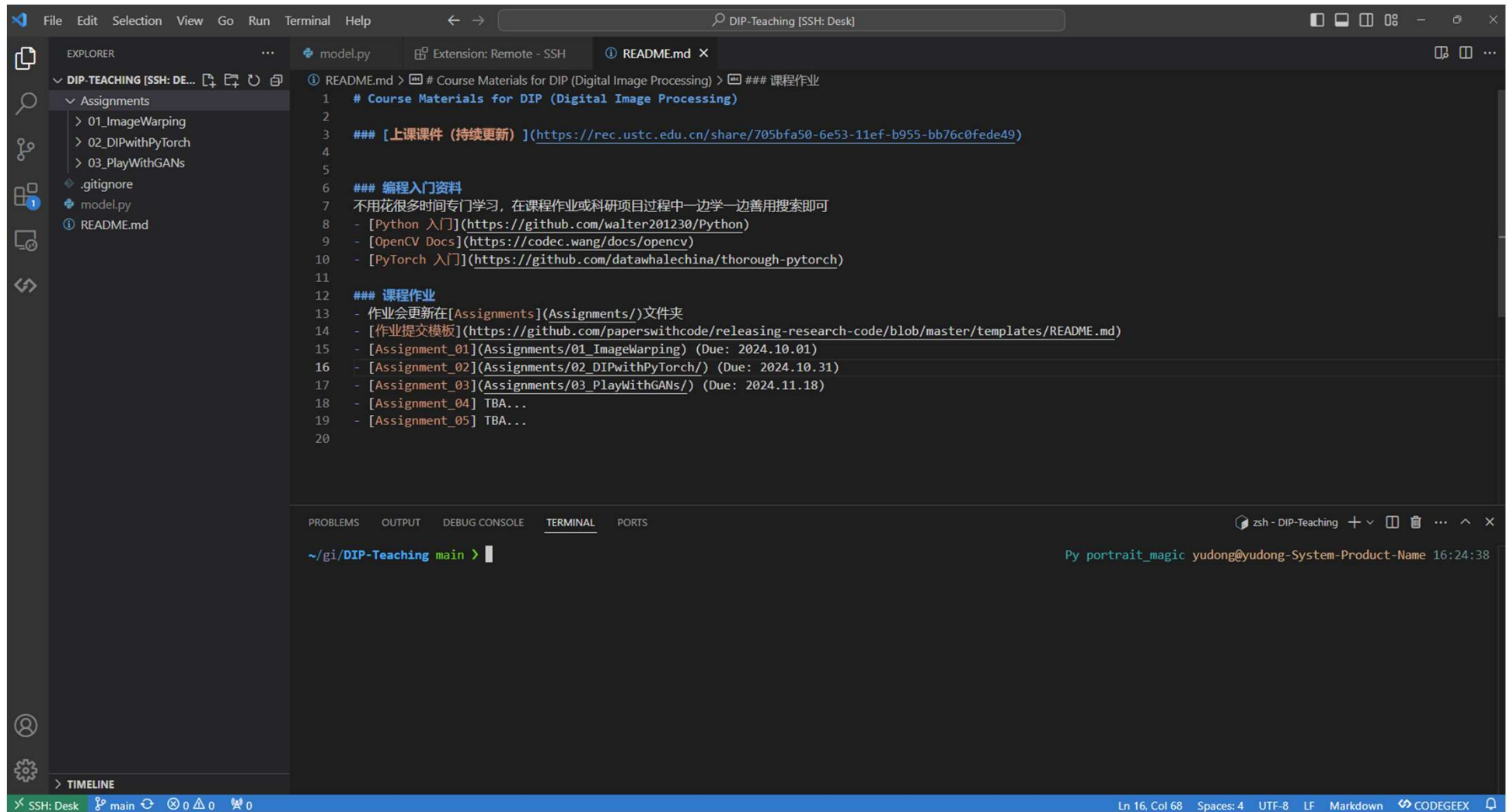
微笑、瘦脸、大眼、闭眼等等...

Some Useful Tools

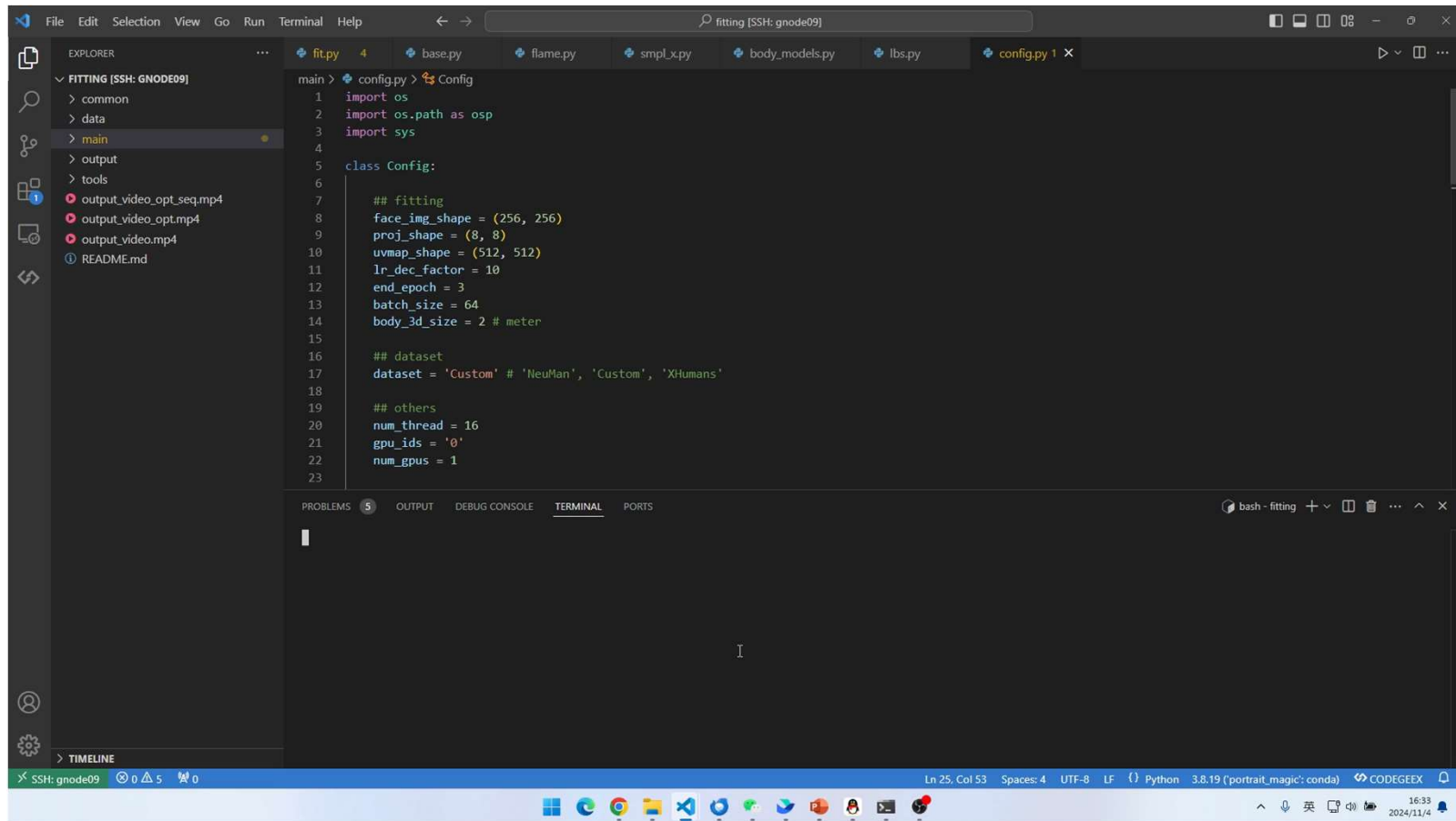
(Remote) Code Editor: VS Code



(Remote) Code Editor: VS Code



A Good Terminal



https://github.com/YudongGuo/DIP-Teaching/blob/main/resources/convenient_terminal.md

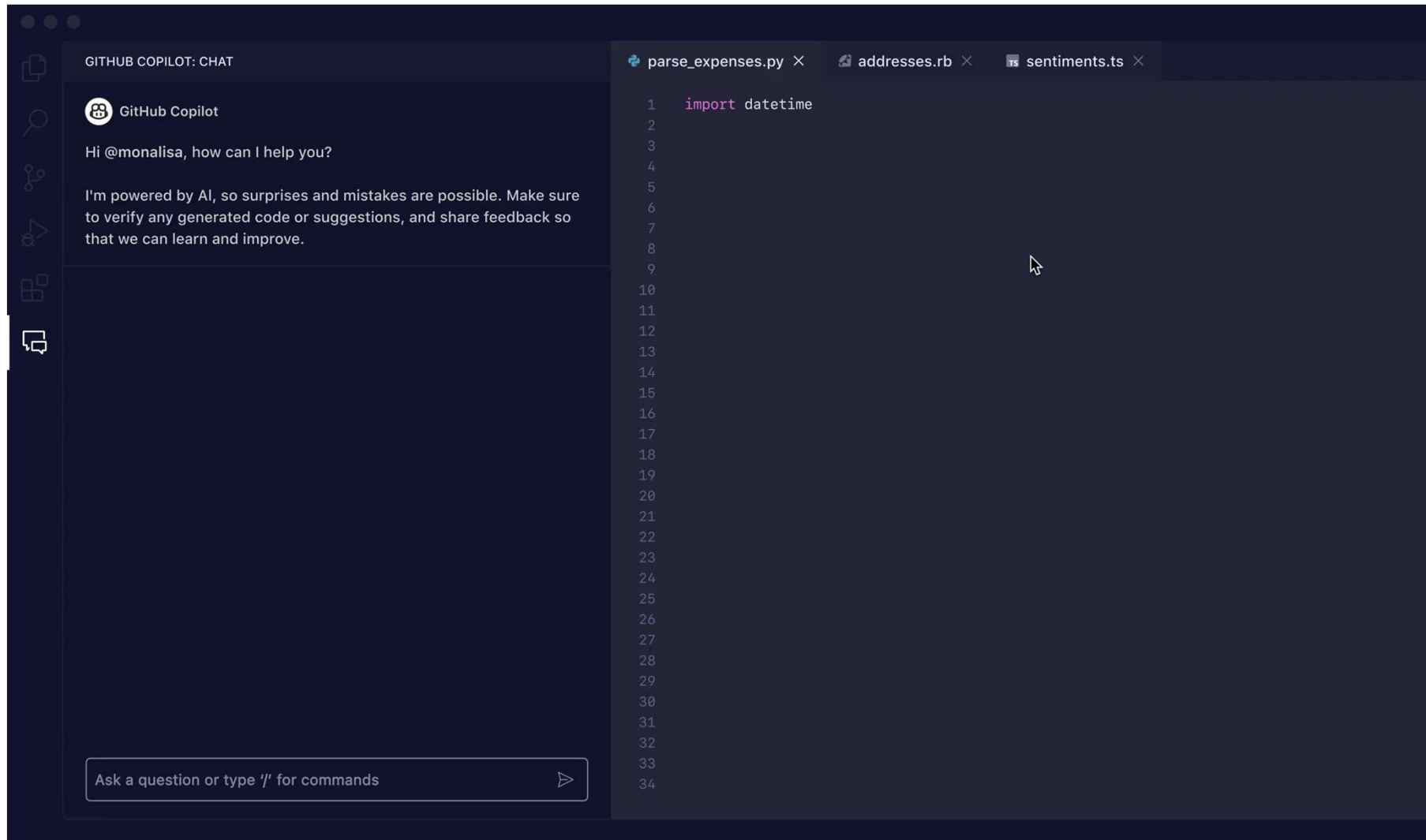
Coding Faster and Better

(作业练习时不推荐过于依赖)

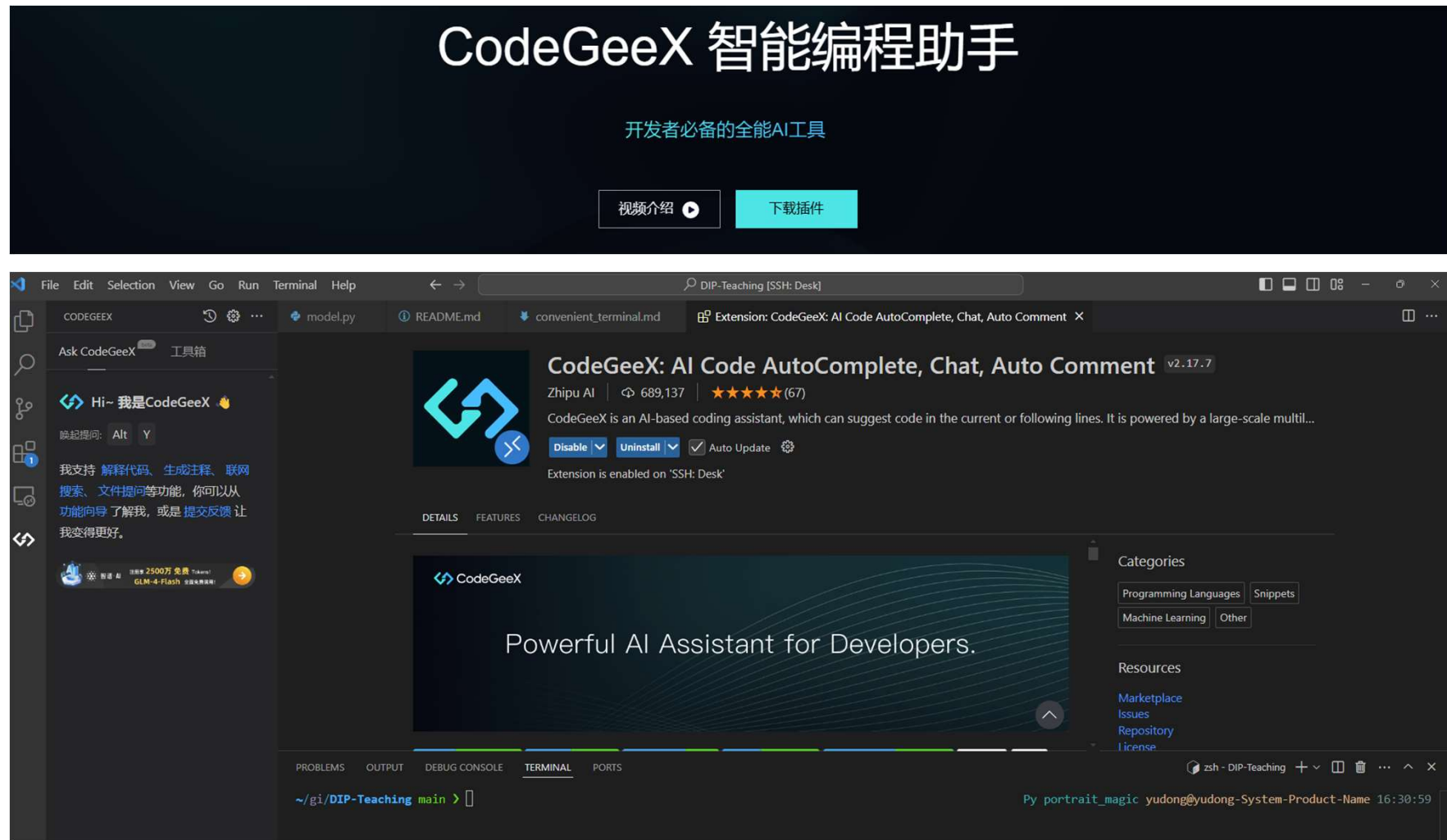
ChatGPT (Better o1-preview)



Code Completion Tools



Free Code Completion Tools



实践演示：训练一个GAN网络



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Q&A