

Real-Time Chatroom Sticker Generation with Image Generative AI

影像生成式 AI 於聊天室貼圖即時生成應用

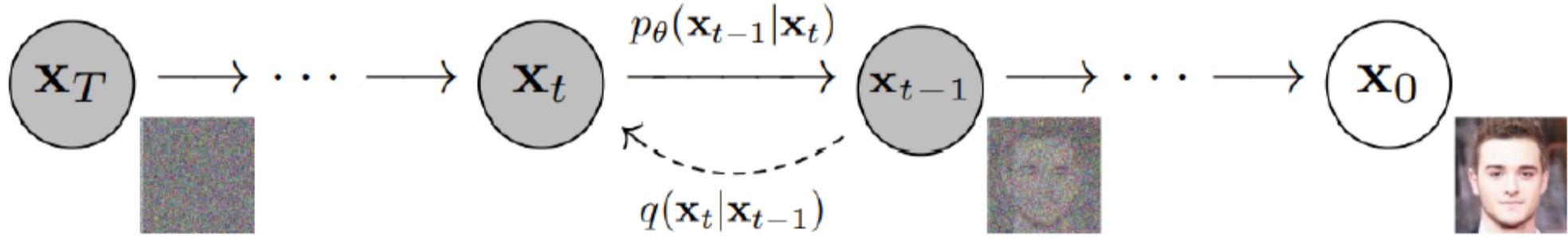
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Abstract

People use "stickers" during online chatting to convey emotions. However, they often face the challenge of not finding a sticker that fully meets their expressive needs. To address this, we developed an image generative model tailored to create chatroom stickers. Using the open-source model SDXL-Turbo as a foundation, we trained the model through Low-Rank Adaptation (LoRA) and LoRA fusion. Currently, our model can generate stickers with unique styles and a wide range of expressions. Additionally, an online chatroom has been implemented to demonstrate the model's capabilities.

Diffusion Model

Diffusion models have gained significant popularity in recent years for high-quality image synthesis that often surpass GAN. These models generate images by defining a **Markov chain** that progressively adds noise to data and then learns to reverse the process, $p_{\theta}(x_{t-1}|x_t)$, as illustrated in the figure^[1] below.



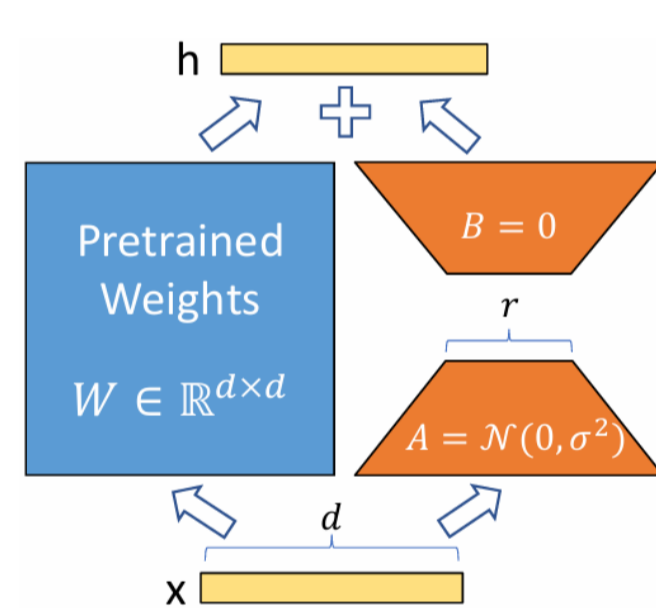
Methodology

1. SDXL-Turbo^[2]

Based on Adversarial Diffusion Distillation (ADD), this model is initially trained for **real-time** image synthesis, and we fine-tune it for chatroom sticker generation.

2. Low-Rank Adaptation (LoRA)^[3]

Since SDXL-Turbo has billions of parameters, fine-tuning the entire model is impractical. Therefore, we adopt LoRA, which reduces the number of trainable parameters, thus decreasing both training time and computational load.



3. Fuse LoRA

This method can directly fuse the LoRA weights with the original weights of the underlying model, enabling faster inference and reducing memory usage.

Experimental Results

Prompt: let's go, otter, dm-sticker



LoRA Training



Result generated by SDXL-Turbo

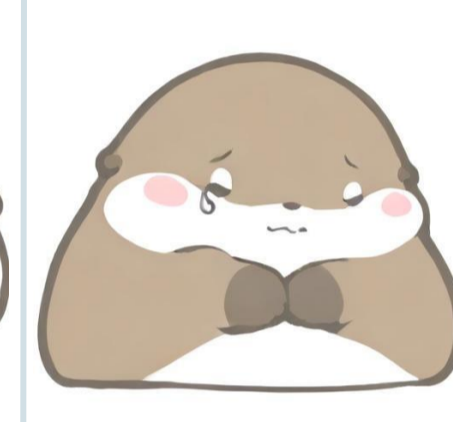
Result generated by our model

Daily use of generated stickers

Prompt: eating, otter, dm-sticker



Prompt: sad, otter, dm-sticker



Diversity of generated stickers

Prompt: I love you, otter, dm-sticker

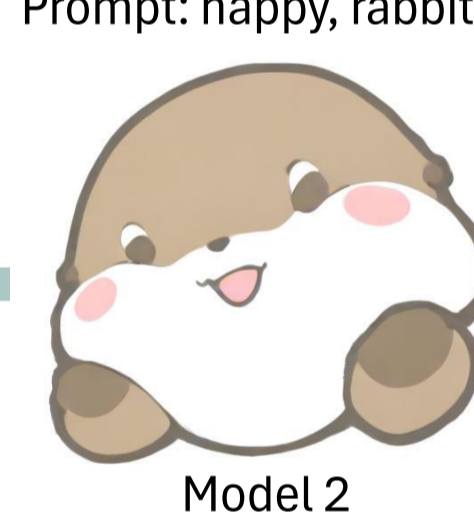


Fuse LoRA

Prompt: happy, rabbit, dm-sticker



Model 1



Model 2

Fuse LoRA

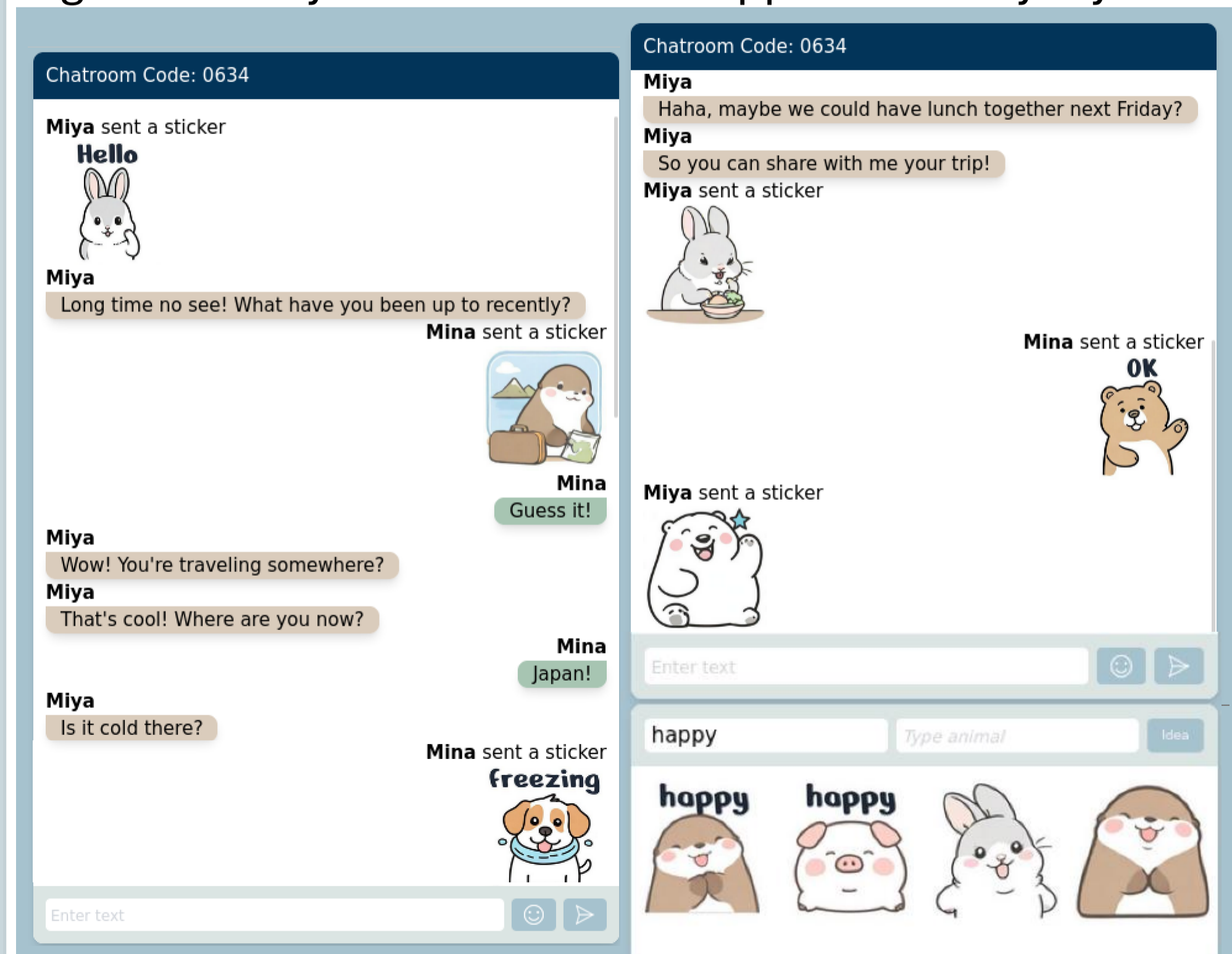


New Style

(Training Dataset: LINE Stickers)

Chatroom Demonstration

We've developed a chatroom to show how the stickers generated by our model can be applied in everyday life.



(All stickers in the figure above are generated by our model.)

Chatroom System Design



Conclusion

With social media playing a significant role in daily life, sticker creation with image generation models is a promising area for future exploration. Our model has already shown potential to revolutionize online chatting experience by providing vivid and diverse stickers that meet users' needs.

Demo Video



Reference

- [1] Jonathan Ho, Ajay Jain, and Pieter Abbeel. Denoising diffusion probabilistic models. 2020.
- [2] Axel Sauer, Dominik Lorenz, Andreas Blattmann and Robin Rombach. Adversarial Diffusion Distillation. 2023.
- [3] Edward J. Hu, Yelong Shen, Phillip Wallis, Zeyuan Allen-Zhu, Yuanzhi Li, Shean Wang, Lu Wang and Weizhu Chen. LoRA: Low-Rank Adaptation of Large Language Models. 2021.