# GAN

Generative adversarial networks (GANs)

# VAE

# Flow-based models

# diffusion models

<https://towardsdatascience.com/generating-images-using-vaes-gans-and-diffusion-models-48963ddeb2b2>

<https://towardsdatascience.com/understanding-variational-autoencoders-vaes-f70510919f73>

<https://scale.com/guides/diffusion-models-guide>

What about diffusion models makes them so strikingly different from their predecessors? The most apparent answer is their ability to generate highly realistic imagery and match the distribution of real images[better than GANs](https://proceedings.neurips.cc/paper/2021/file/49ad23d1ec9fa4bd8d77d02681df5cfa-Paper.pdf). Also, diffusion models are more stable than GANs, which are subject to [mode collapse](https://proceedings.neurips.cc/paper/2017/file/44a2e0804995faf8d2e3b084a1e2db1d-Paper.pdf), where they only represent a few modes of the true distribution of data after training. This mode collapse means that in the extreme case, only a single image would be returned for any prompt, though the issue is not quite as extreme in practice. Diffusion models avoid the problem as the diffusion process smooths out the distribution, resulting in diffusion models having more diversity in imagery than GANs.

1. Local Installation:

* Stability AI broke headlines when it announced that it was open-sourcing both the model weights and source code for its Diffusion model Stable Diffusion.
* You can [download and install Stable Diffusion](https://github.com/CompVis/stable-diffusion) on your local computer and integrate its capabilities into applications and workflows.
* Other models, such as Dall-E 2, are currently only available via API or web app as their models are not open-source like Stable Diffusion.