Generative Adversarial Networks (Part 5)

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Conditional GANs

We use additional information y that belongs to each data point x.

- We include y as input to both the generator (G) and the discriminator (D).
- G receives y so it knows what to generate.
- D receives y so it knows what it is looking for.

A normal GAN generates any realistic data, while a conditional GAN generates realistic data that can be attributed to y.
For example, we can ask the generator to produce a cat by using $G(z \mid y = \text{cat})$.
The objective of a conditional GAN can be formulated as follows:

$$\min_G \max_D V(G, D) = \mathbb{E}_{x \sim \text{Data}}[\log D(x \mid y)] + \mathbb{E}_{z \sim \mathcal{N}(0,1)}[\log(1 - D(G(z \mid y)))]$$