# Conditional Generative Adversarial Nets

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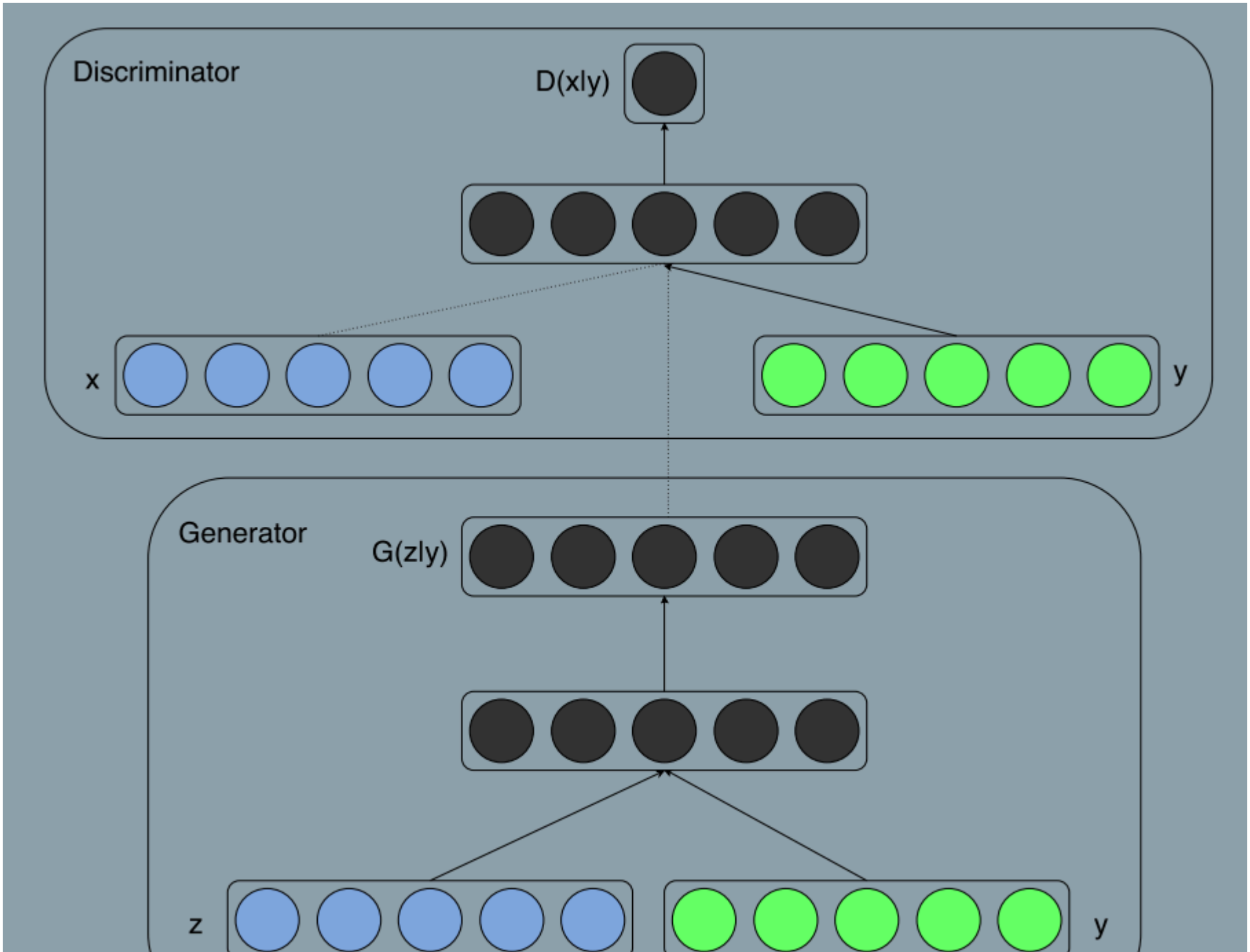
**authors:Mehdi Mirza**

> Generative adversarial nets can be extended to a conditional model if both the generator and the discriminator are conditioned on some extra information **y**. **y** could be any kind of auxiliary information, such as class labels or data from other modalities. We can perform the conditioning by feeding **y** into both the discriminator and generator as additional input layer.

> In the generator the prior input noise $p_z(z)$, and **y** are combined in joint hidden representation, and the adversarial training framework allows for considerable flexibility in how this hidden representation is composed.

> In the discriminator **x** and **y** are presented as inputs and to a discriminative fuction.

$$\min_G \max_D V(D,G) = E_{x\sim p_{data}(x)}[\log D(x|y)] + E_{z\sim p_z(z)}[\log(1-D(G(z|y)))]$$


Discriminator
D(xly)
x
y
Generator
G(zly)
z
y