# Under the Hood: How GANs power generative images

How to use Generative AI to create content

# What are they

- GANs stands for Generative Adversarial Network
  - Generative - meaning, the ability to create new information
  - Adversarial - meaning 2 models that work opposite of each other
  - Network - Basically just means neural network

# Model Architecture

There are 2 networks, G and D.

The G stands for Generator network and basically creates images and pixels

The D stands for Discriminator network and basically looks at the generated samples and a real image and tries to decide whether it is real or fake

This is how the model is trained

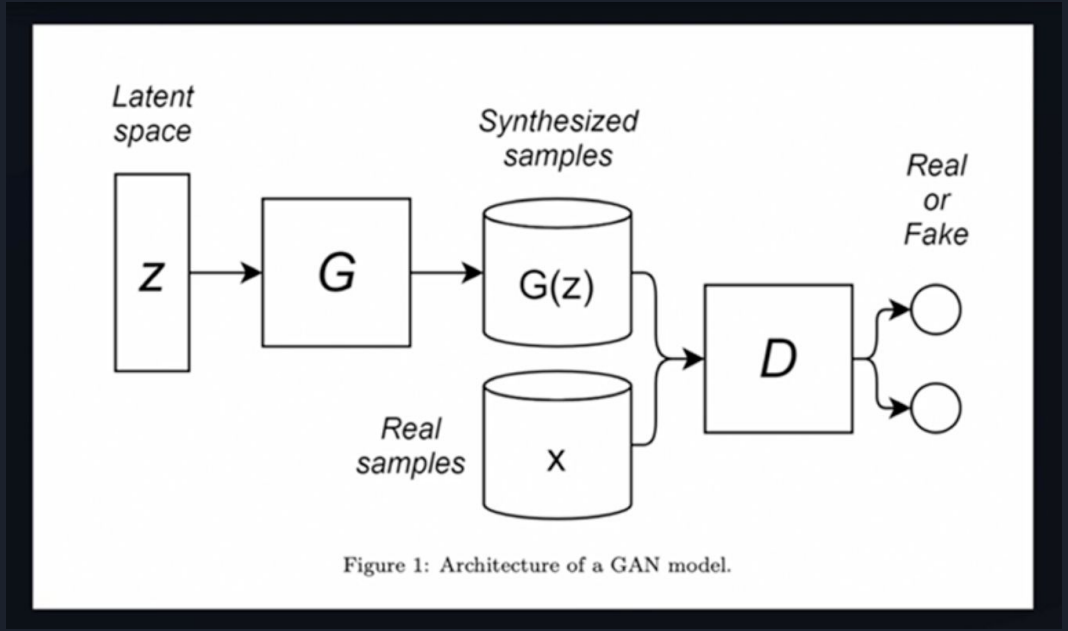


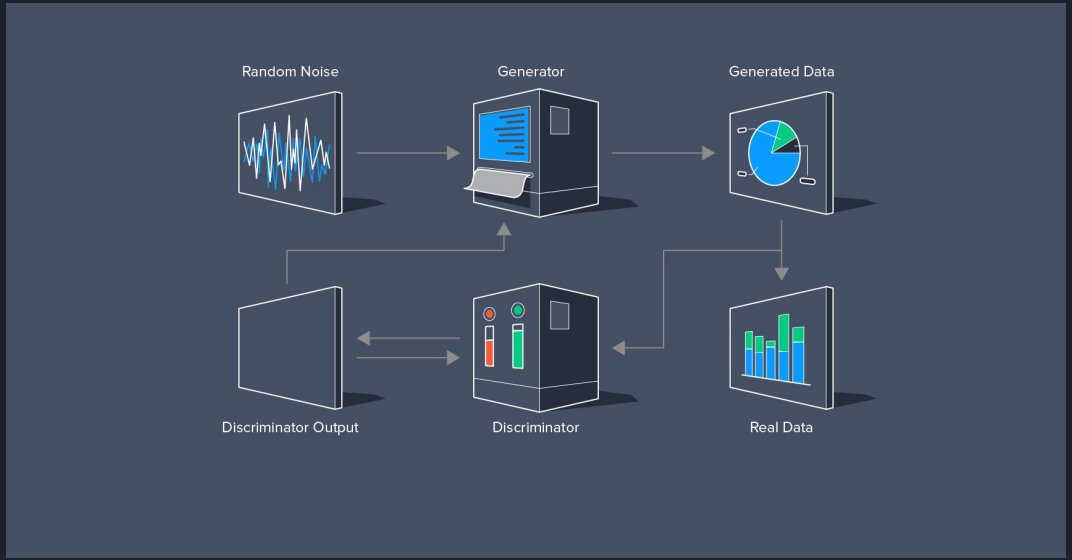
Figure 1: Architecture of a GAN model.

# The networks work against each other

In a way the generator network is basically trying to trick the discriminator model to trick it to think that a generated image is real

Everytime the network outputs an image and answer, one of the models will improve.

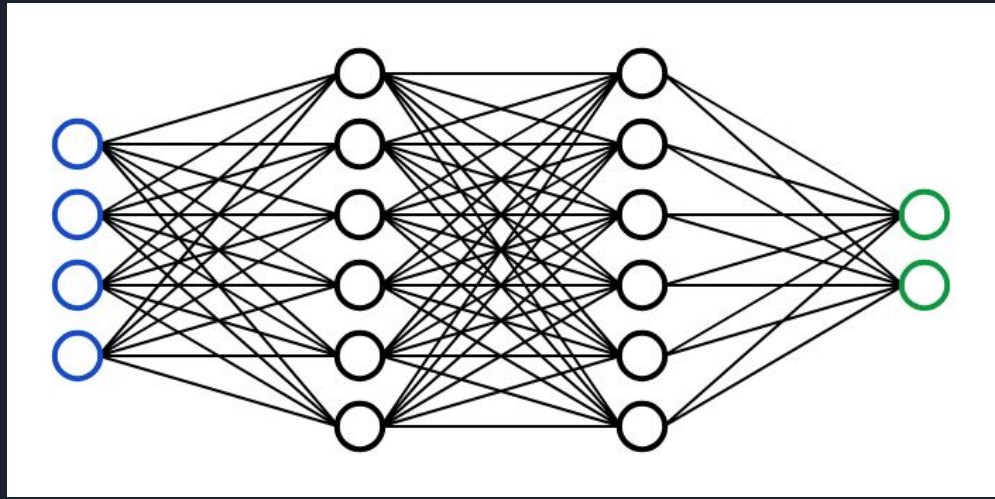
If the discriminator chooses a fake image as real, the discriminator will adjust it's model weights and everytime the generator creates an image that is detected as fake, then the generator will have it's weight adjusted as well.



# Anatomy of a Neural Network

Both the Discriminator and Generator are neural networks, meaning they are a set of nodes that are interconnected with different weights. These weights are adjusted based on each training iterator.

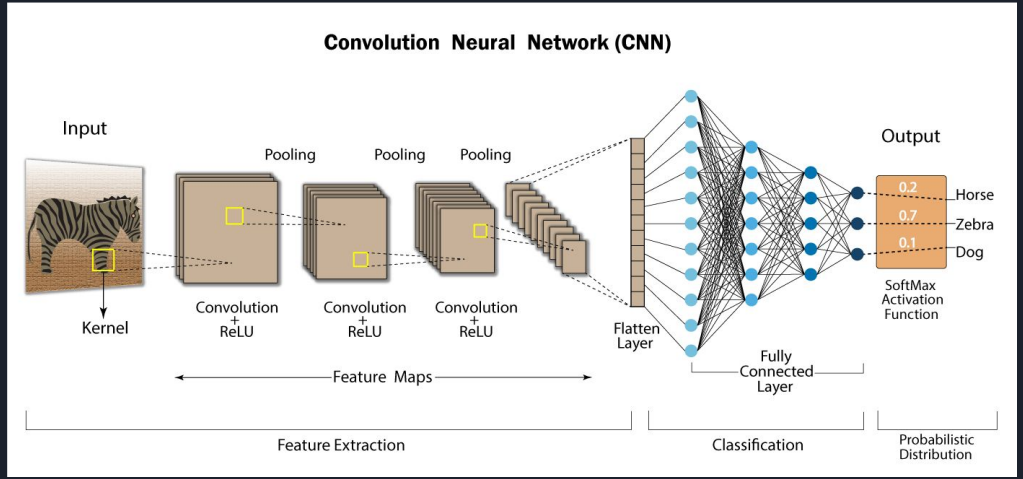
Relationships that work will have their weights increased, and relationships that don't work that have their weights decreased



# Neural Networks are probabilistic

At the heart of each relationship, is a probabilistic chance that the next node is the correct choice.

For example of a node has 4 relationships, each with a weight of 0.25 then this is basically saying that there is a 25% chance that each of the connected nodes will happen after the current node.



# GANs have come a long way

After being created in 2014, GANs have already made massive progress and have become more realistic and high quality

The realism of the output image is dependent on the quality of the training data