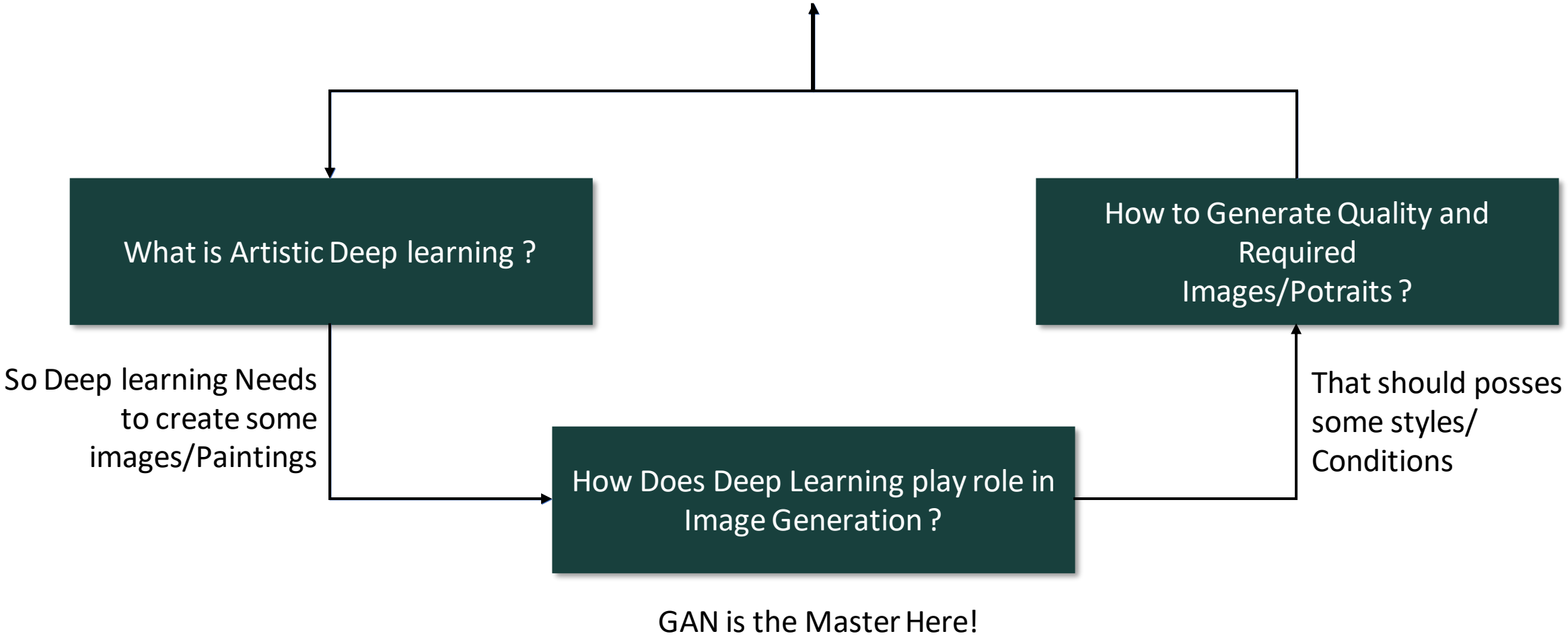

Thursday Learning Hour
Artistic Deep Learning
Prabakaran Chandran
09 – September - 2021

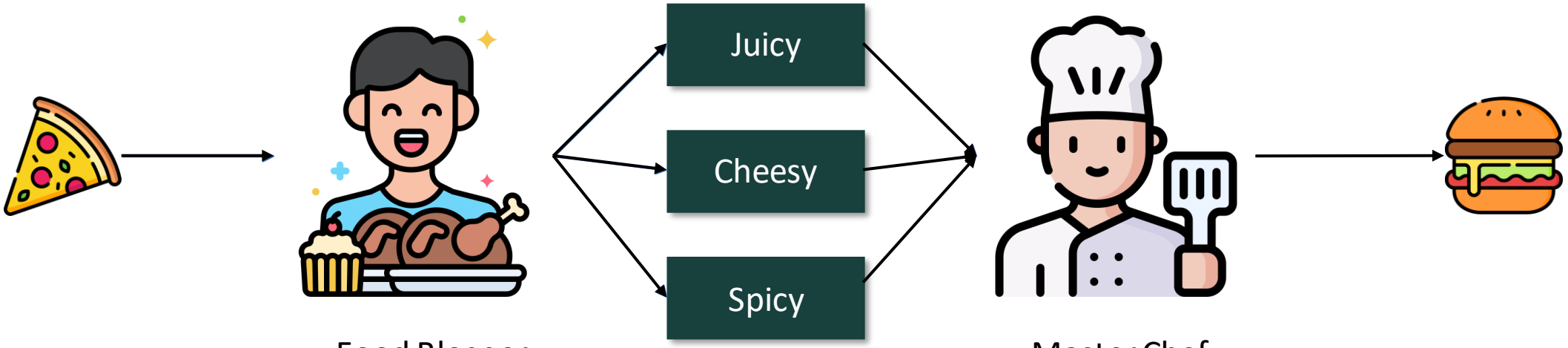
Agenda

Art + Deep Learning



GAN is the Master Here!

Before Getting into Details , Let's Learn What is Generative Models and Discriminative Models



- Models that are calculating the probability of a class for given set of features – Discriminative Models
- Models that are calculating the Features for given class / or no class -- Generative Models

Generative Model is needed to create an Art , But No one is here to ensure the quality

A random color palette is given to the artist

Artist

Artist can paint anything

No one is interested in Random Painting. That should have some values , should posses some styles , features

Generative in Nature

$P(X)$ or $P(X|Y)$

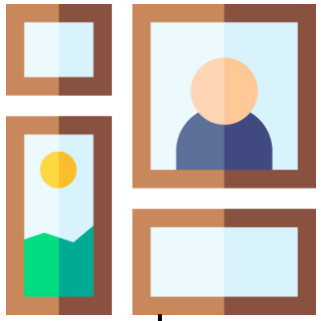
- We need a Jury to control the artist to draw properly or Artist himself should have the mentality to check and take the feedback while painting.
- So, We need a Discriminative Model / Behavior to ensure the Quality, Value and Realistic Nature.

So, We need an Adversarial Partner to Ensure Quality Images output

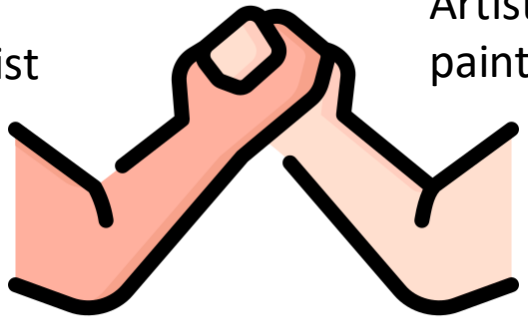
A random color palette is given to the artist

Artist

Artist can paint anything



Knowledge Gathered



Competitive

Critic

Few Changes can be made

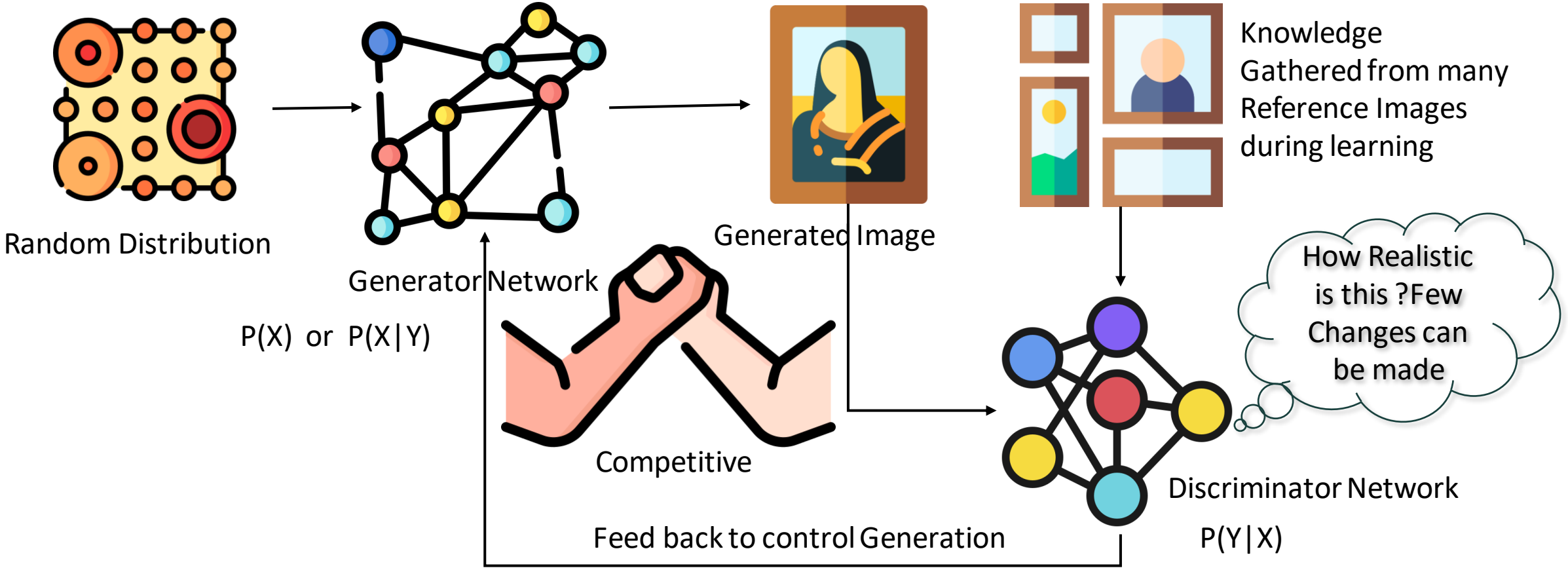
Gives Critics

Generative in Nature

$P(X)$ or $P(X|Y)$

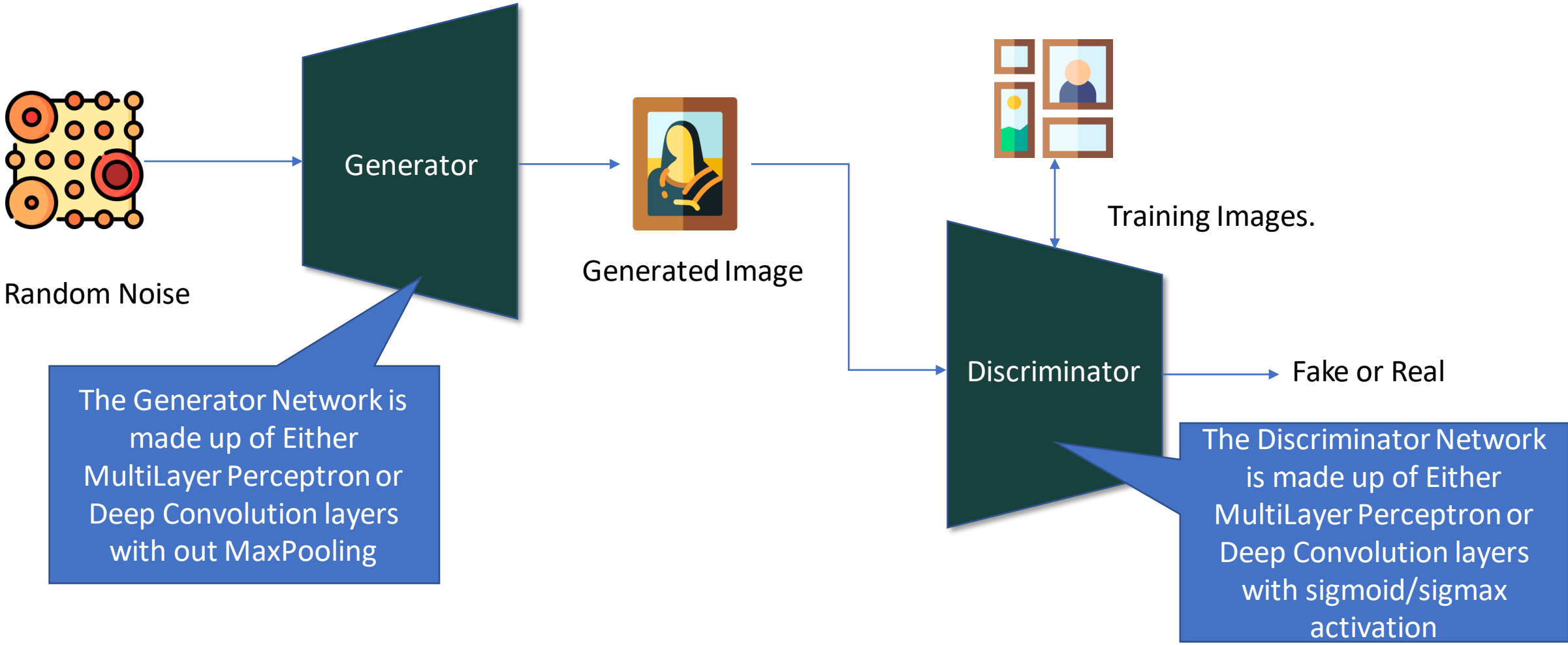
- If both Artist and Critic maintain healthy competition in drawing and reviewing , the end painting will be a great one. What if we could replace the humans with Neural Networks ? Our HEROES!

Let's Replace with Our Neural Networks! & Name it as Generative Adversarial Networks!

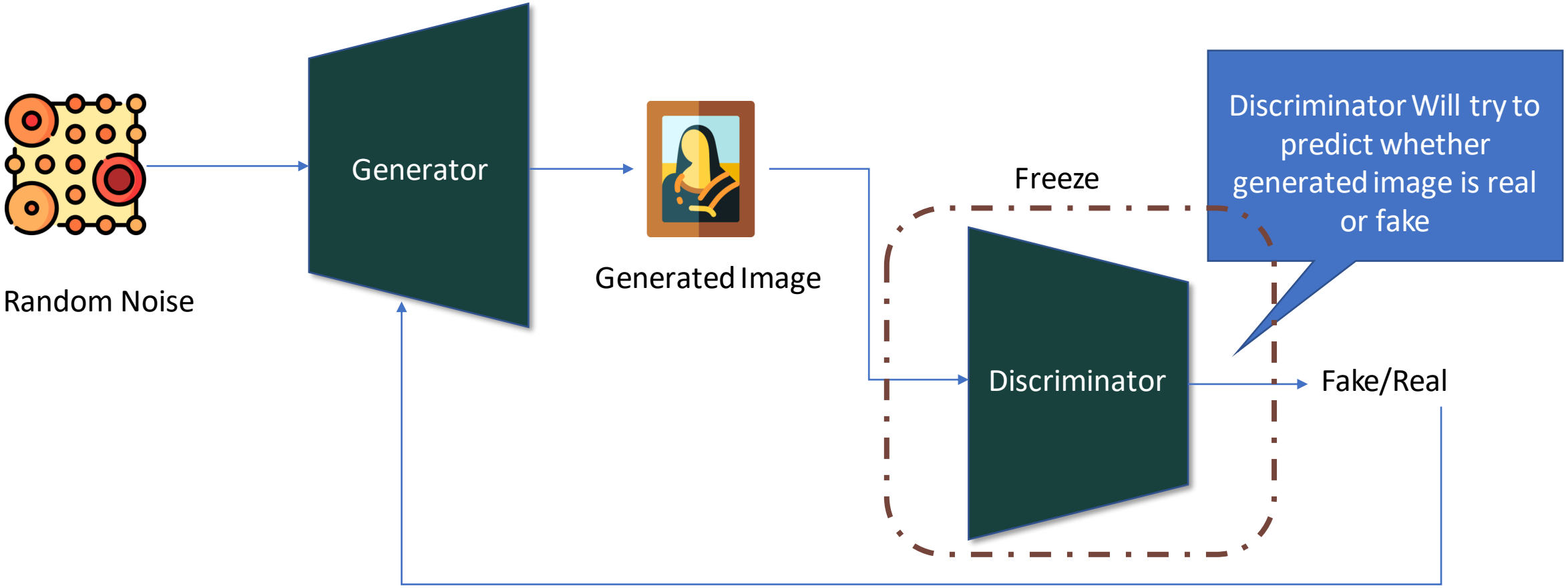


- The concept of generative adversarial network (GAN) is designed by **Ian Goodfellow** and his colleagues in 2014
- **Yann LeCun** described it as "the most interesting idea in the last 10 years in Machine Learning".

Here we have Architecture and Learning Aspect of simple GAN - And We are Randomly creating images

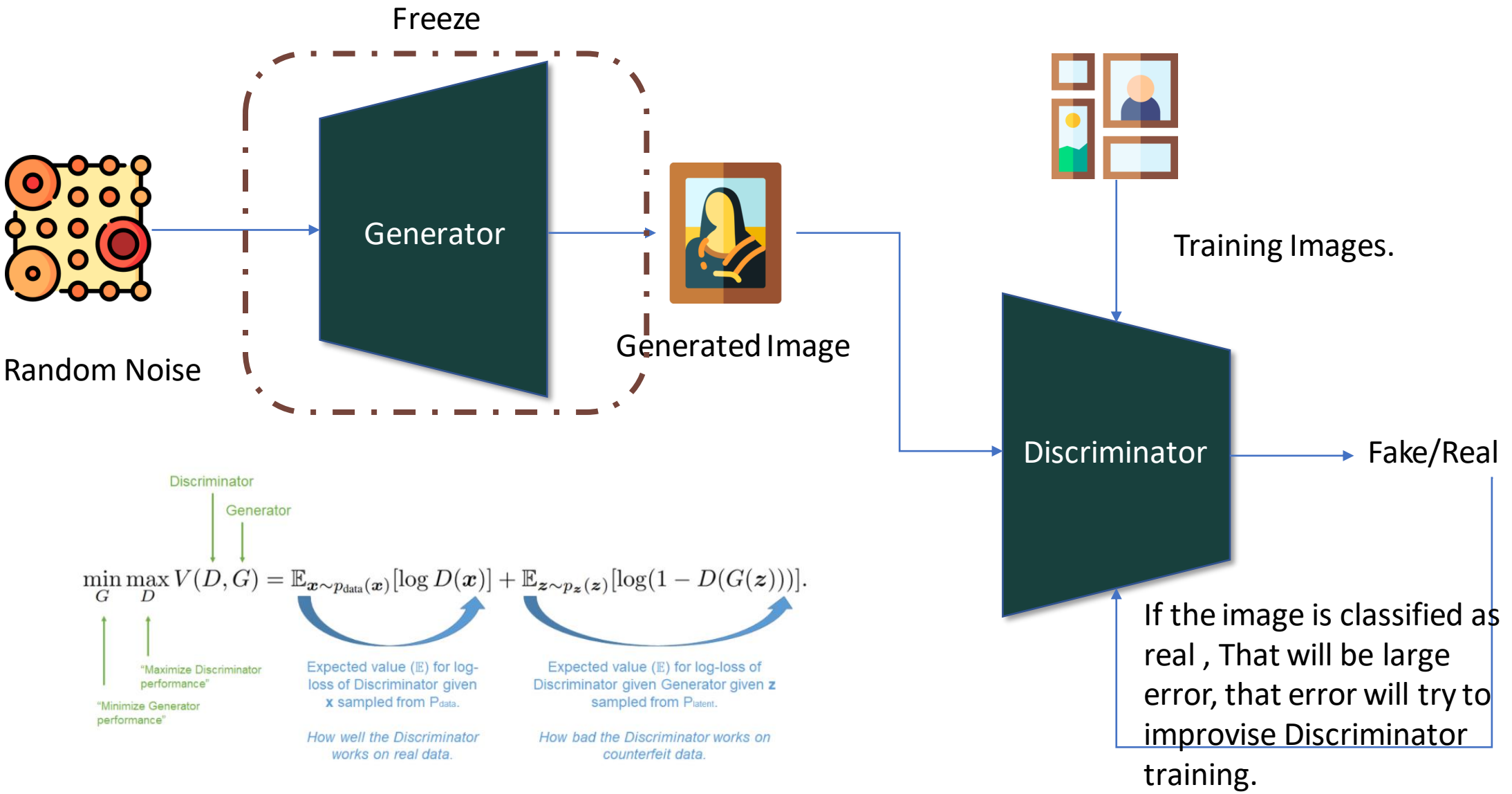


We can't train Generator and Discriminator together in Naïve GAN proposed by Goodfellow



If the image is classified as Fake , That will be large error, that error will try to improvise Generator training.

Discriminator will try to learn “How to distinguish Real and Fake ?”



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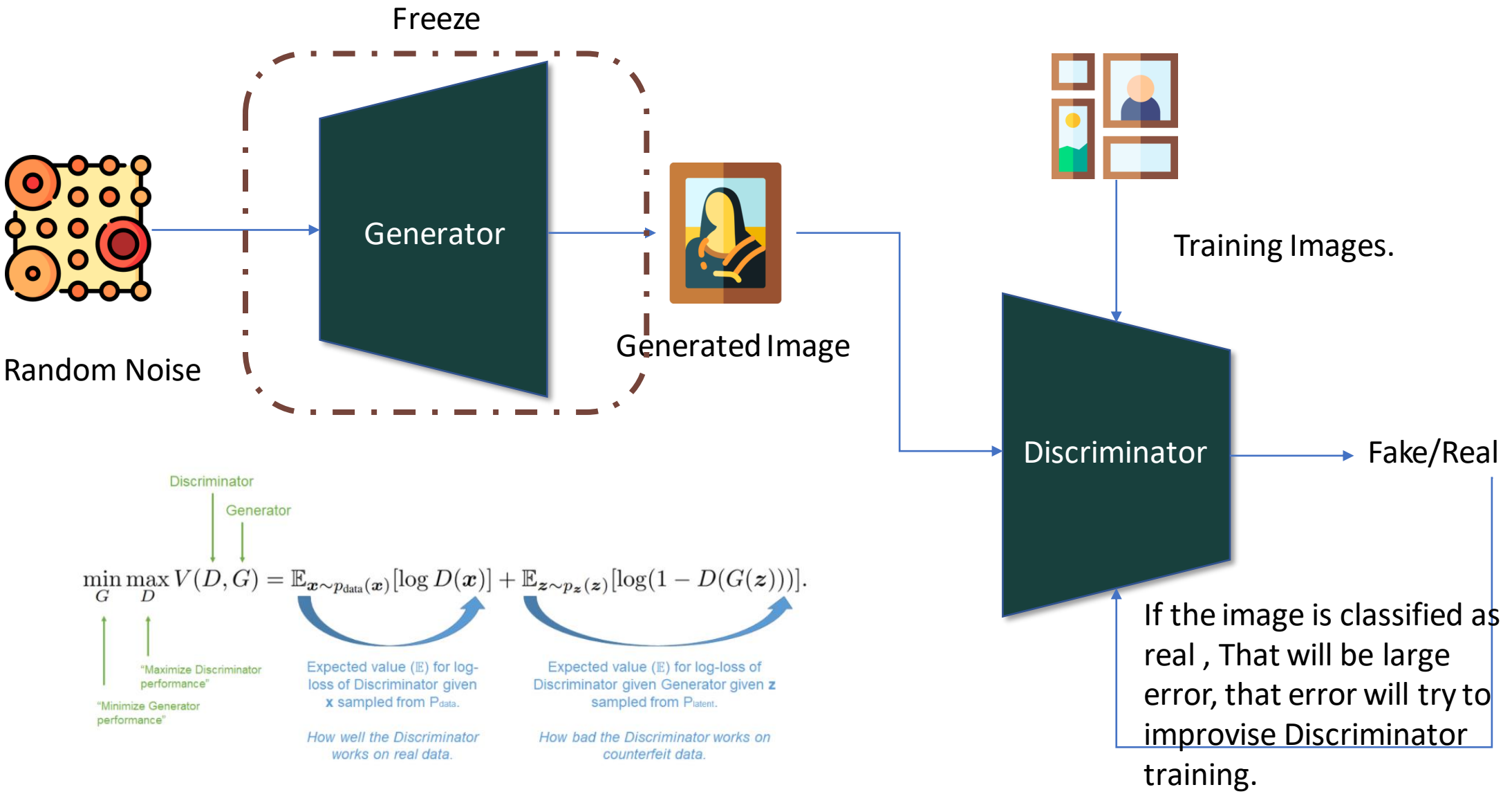
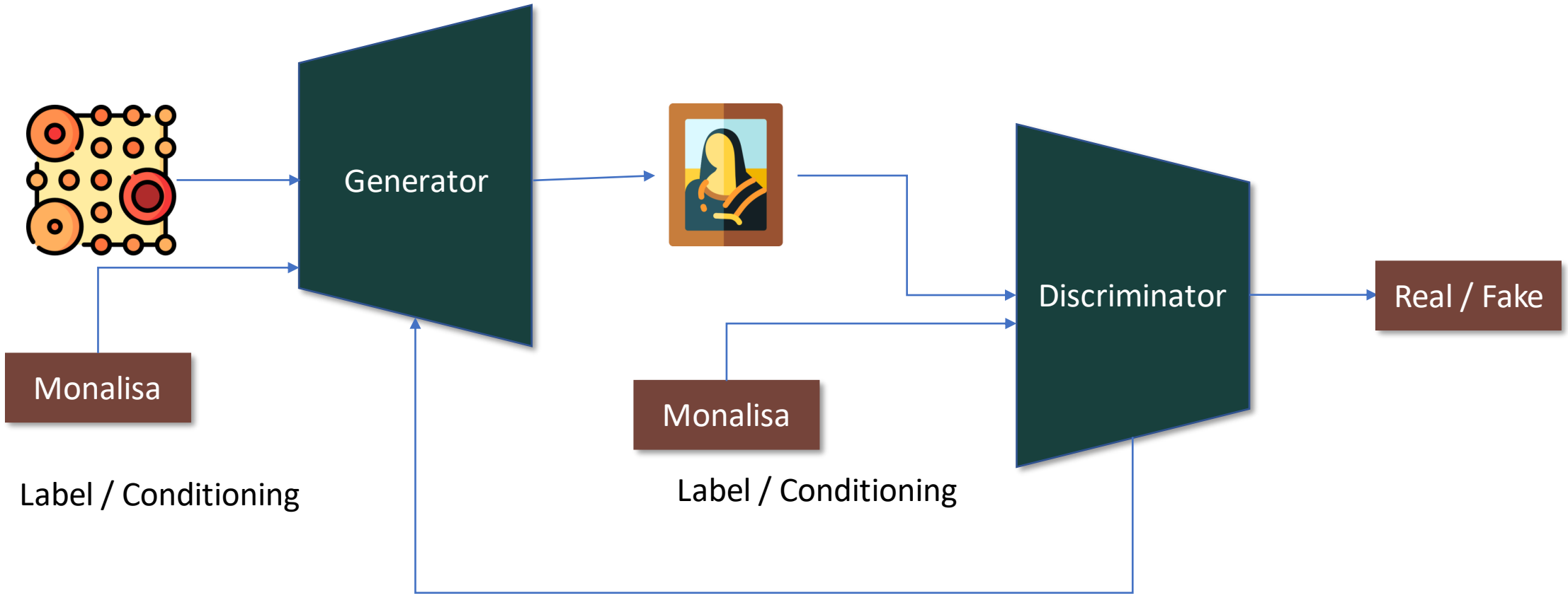


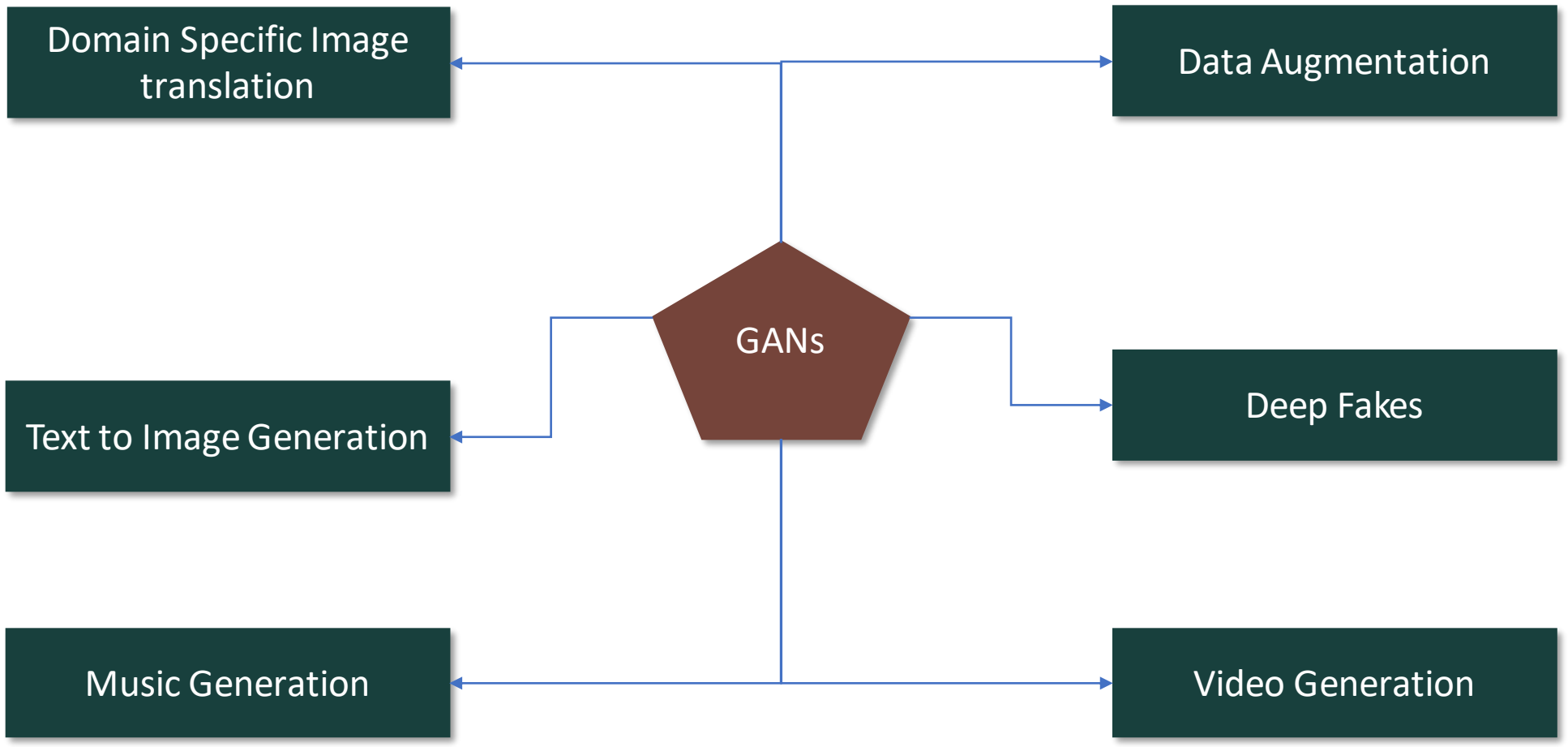
Instead of Creating random Images , We need a control to regulate the Image Generation based on our need! – Conditional GANs



From Here ➔
Conditional min Max Loss ➔

E_x[log (D(x))] + E_z[log (1 — D(G(z)))] to
E_x[log (D(x|y))] + E_z[log (1 — D(G(z|y)))]

GANs for Various Use cases



Any Questions! Cuz GANs don’t Generate Questions