

GENERATIVE ADVERSARIAL NETWORKS

11785- Introduction to Deep Learning

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“This (GANs), and the variations that are now being proposed is the most interesting idea in the last 10 years in ML, in my

~~Opinion~~”
LeCun

Video:

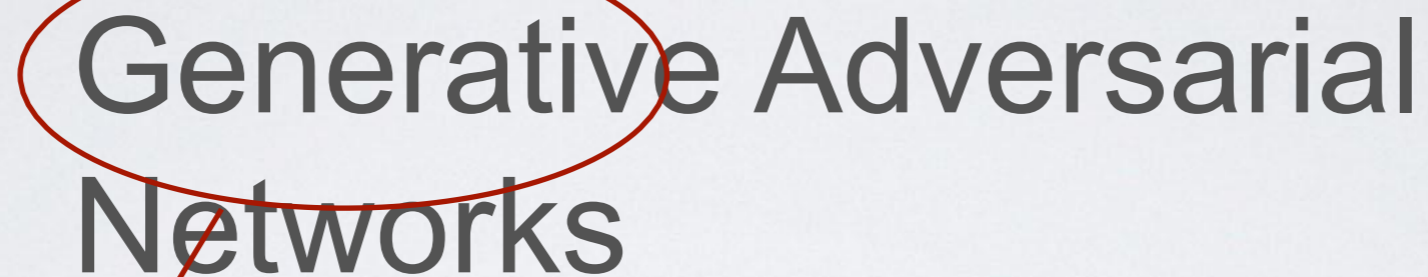
<https://www.youtube.com/watch?v=QiiSAvKJIHo>

WHAT ARE GANS?

Generative Adversarial
Networks

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Generative Models

We try to learn the underlying the distribution from which our dataset comes from.

Eg: Variational AutoEncoders (VAE)

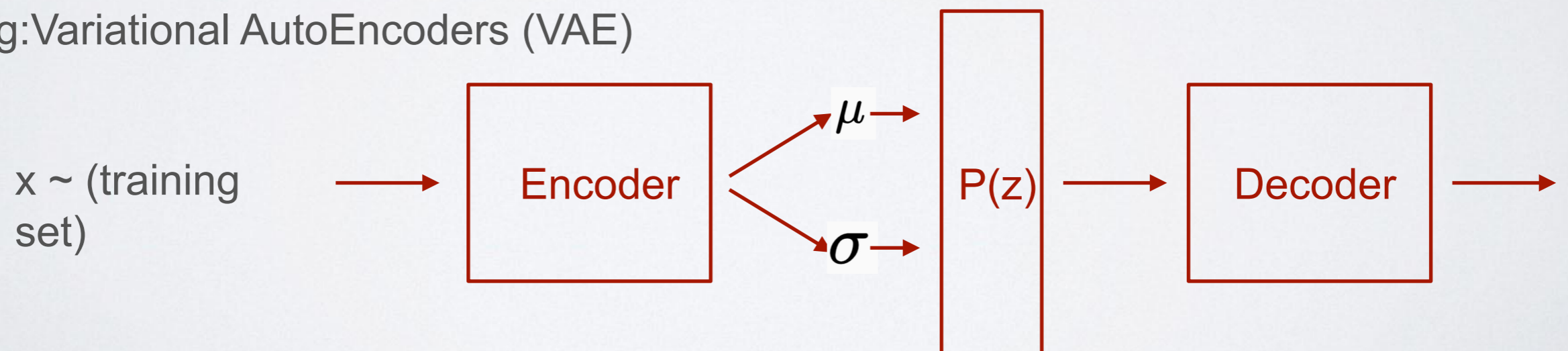
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Generative Adversarial Networks

Generative Models

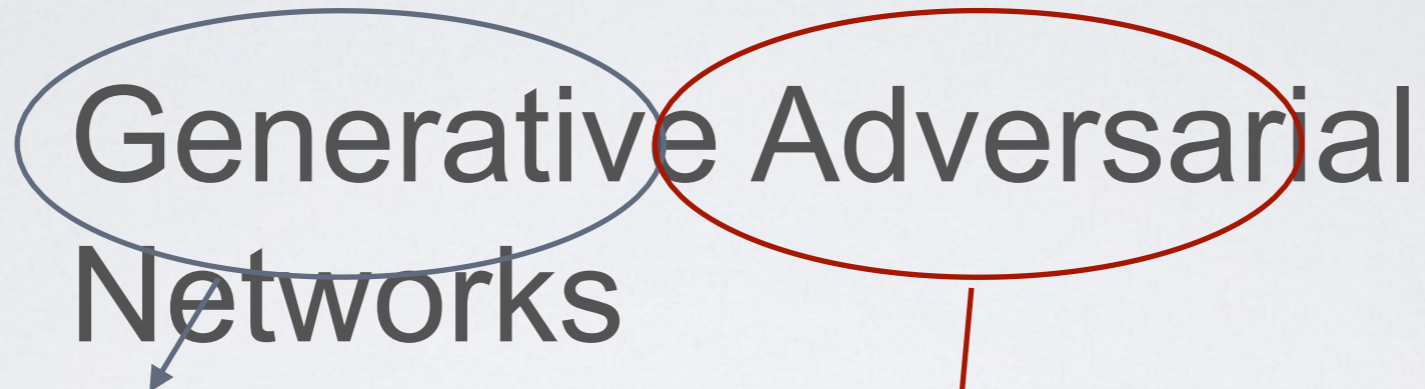
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Adversarial Training

GANS are made up of two competing networks (adversaries) that are trying beat each other.

WHAT ARE GANS?



Generative Networks Adversarial Neural Networks

Generative Models

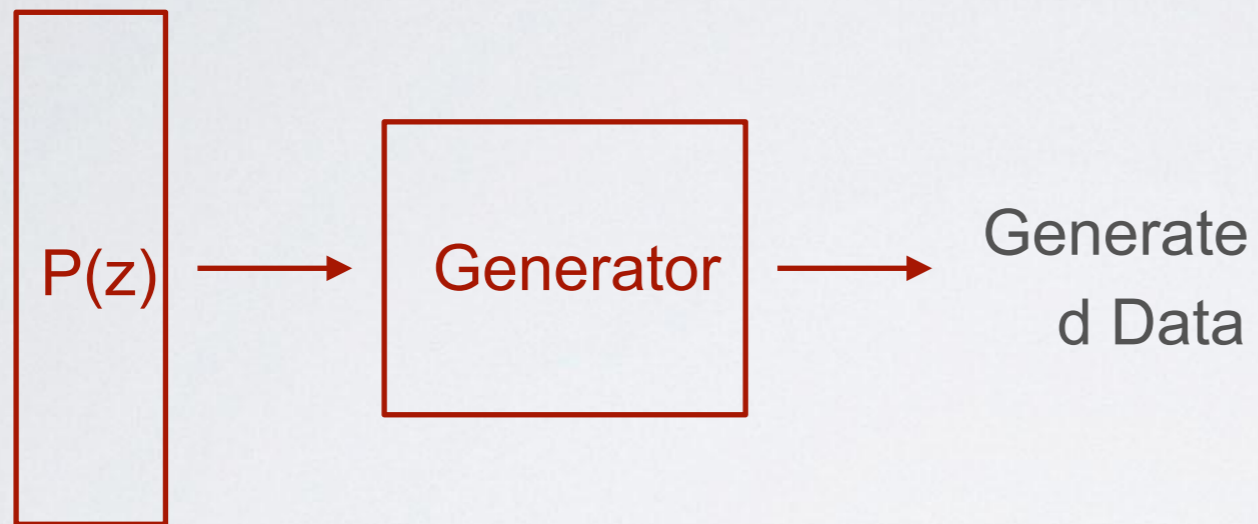
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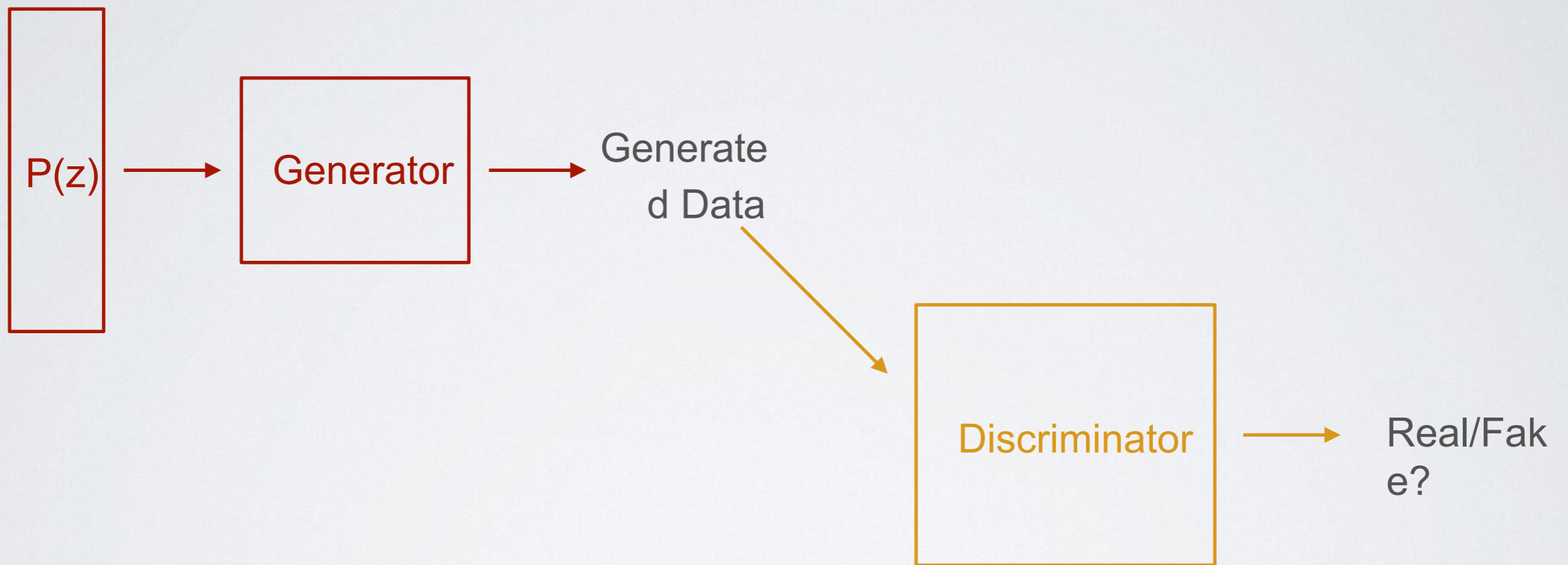
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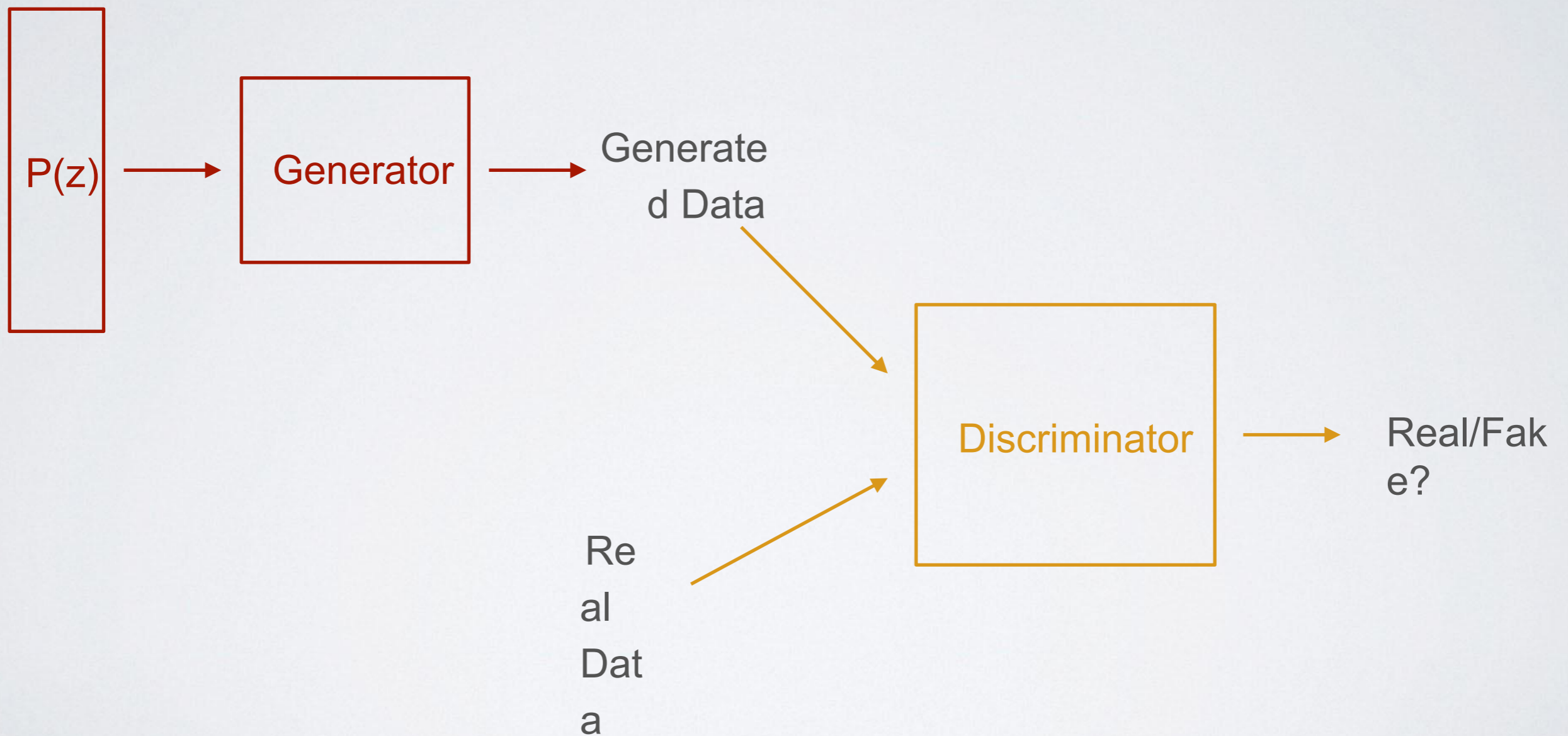
WHAT ARE GANs?



WHAT ARE GANS?



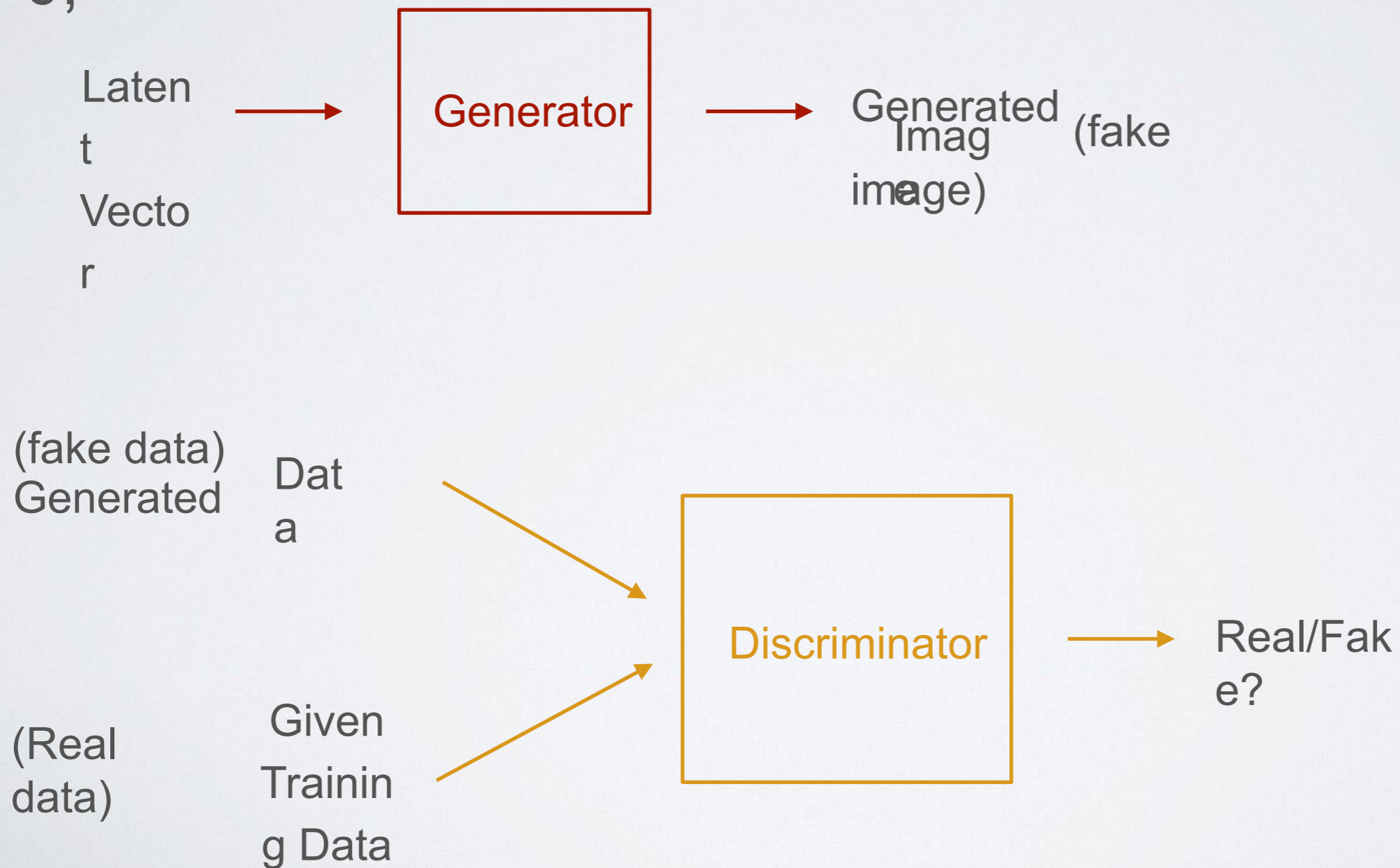
WHAT ARE GANS?



HOW TO TRAIN A
GAN?

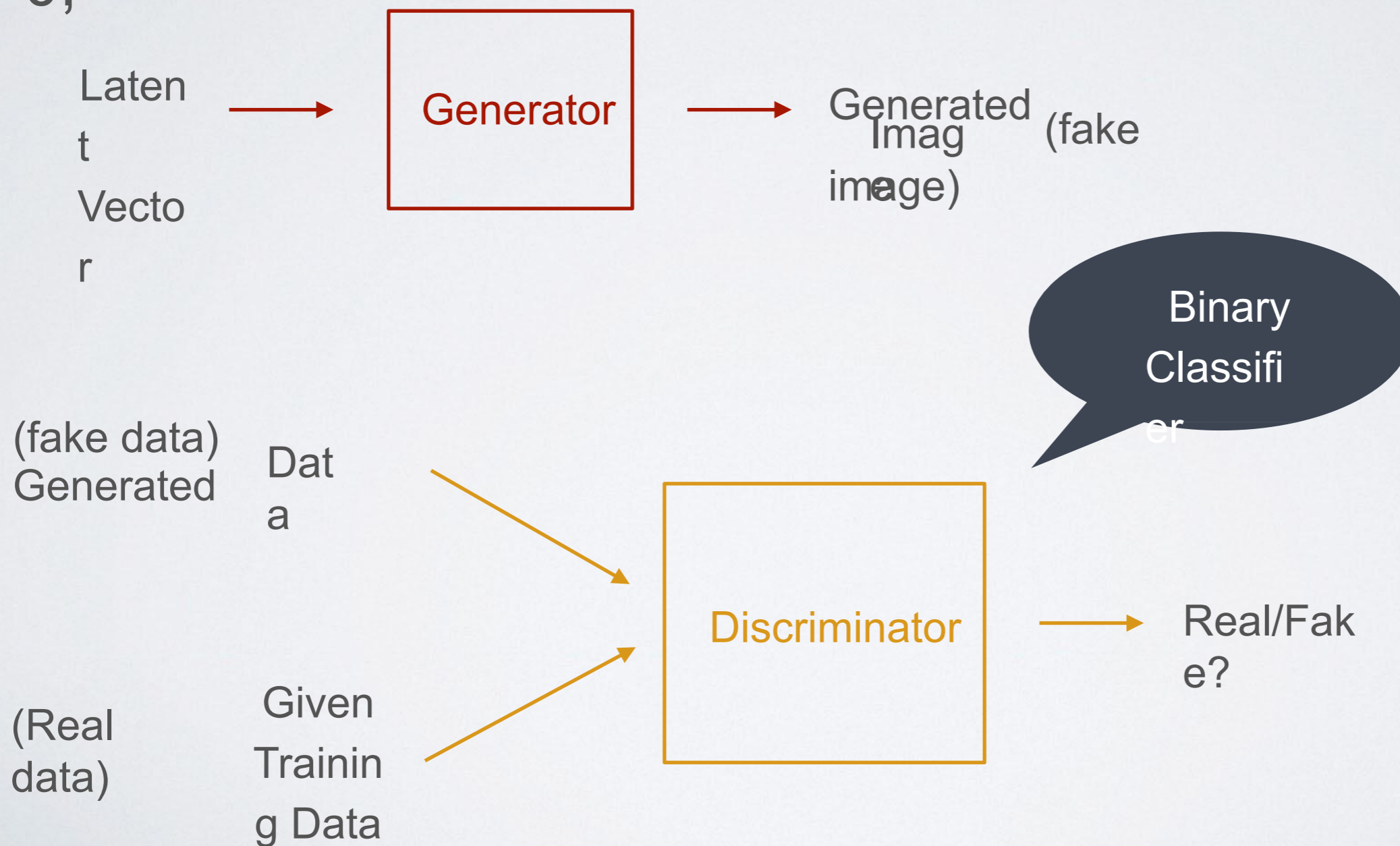
HOW TO TRAIN A

At $t = 0$,
GAN?



HOW TO TRAIN A

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GAN?



HOW TO TRAIN A

GAN?

Which network should I train first?

HOW TO TRAIN A

GAN?

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Discriminator!

HOW TO TRAIN A GAN?

Which network should I train
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Discriminator!

But with what training data?

HOW TO TRAIN A GAN?

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Discriminator!

But with what training data?

The Discriminator is a Binary classifier.

The Discriminator has two class - Real and Fake.

The data for Real class is already given: THE

TRAINING DATA The data for Fake class? -> generate from the Generator

HOW TO TRAIN A

GAN?

What's next? -> Train the Generator

But how? What's our training objective?

HOW TO TRAIN A

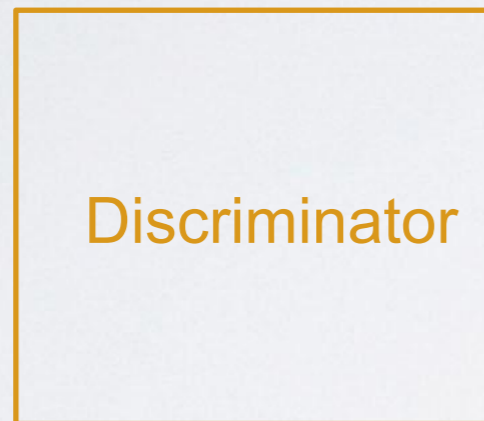
GAN?

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Generate images from the Generator
such that they are classified incorrectly by the Discriminator!

HOW TO TRAIN A GAN?



Step 1:
Train the
Discriminator using
the current ability of
the Generator.

HOW TO TRAIN A GAN?



Discriminator

Step 1:

Train the
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Generator

Step 2:

Train the
Generator to beat
the Discriminator.

HOW TO TRAIN A GAN?



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