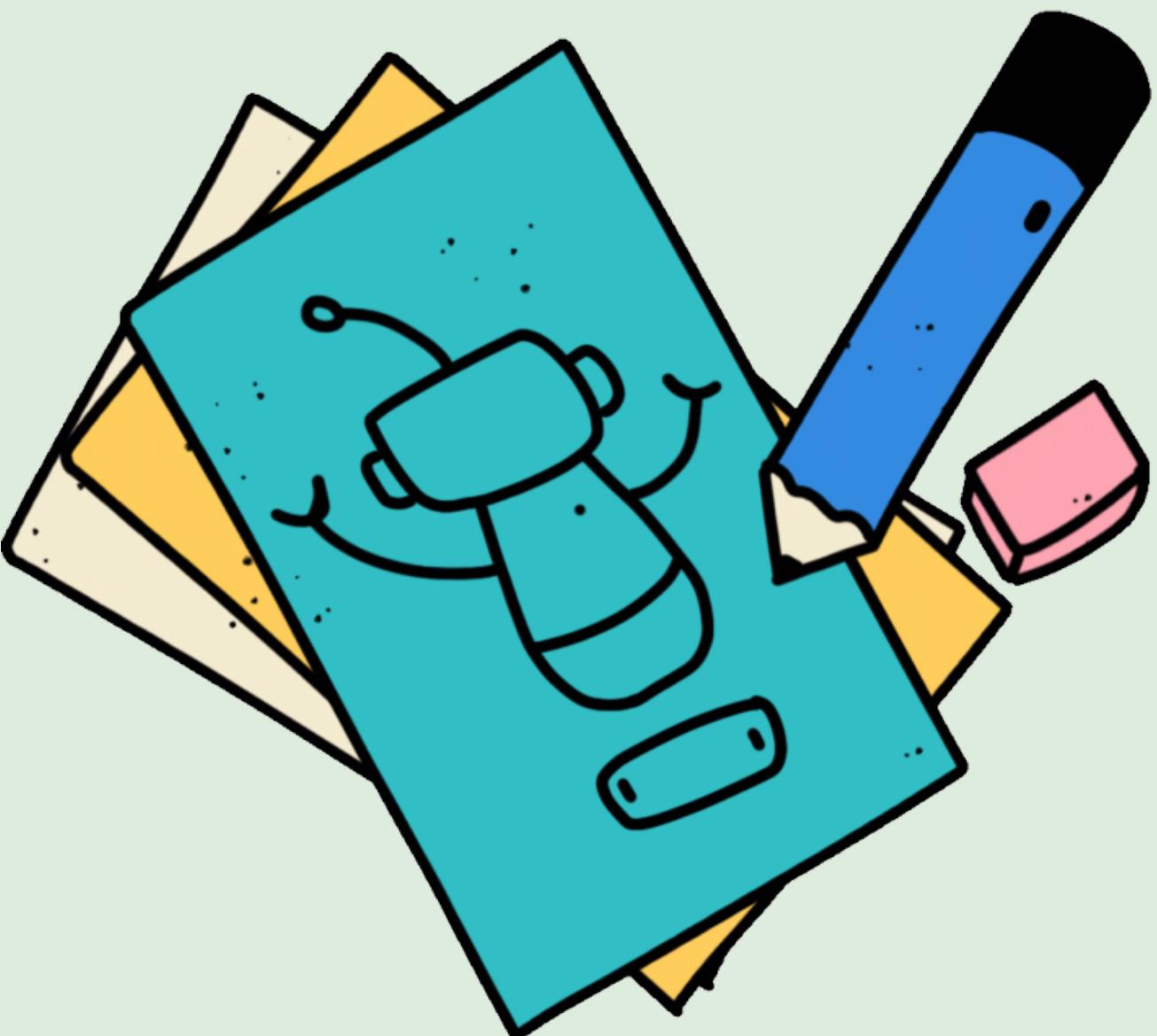


Generating Photorealistic image From Monocharm image



B6201920

นายพัชรชาติ จิรศรีสกุล
อาจารย์ที่ปรึกษาโครงงาน
ผู้ช่วยศาสตราจารย์ ดร.ศรัณญา กาญจนวนนา



วัตถุประสงค์

- 1 เพื่อพัฒนาโมเดล gan ในการใส่สี รูปขาวดำ
- 2 เพื่อกำการทดลองโมเดล gan กับรูปที่ มีขนาดแตกต่างกันในการประเมิน ประสิทธิภาพ

เครื่องมือที่ใช้ในการ สร้าง Model



Google Colaboratory



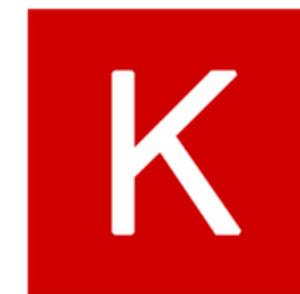
ANACONDA.®



jupyter



TensorFlow



Keras



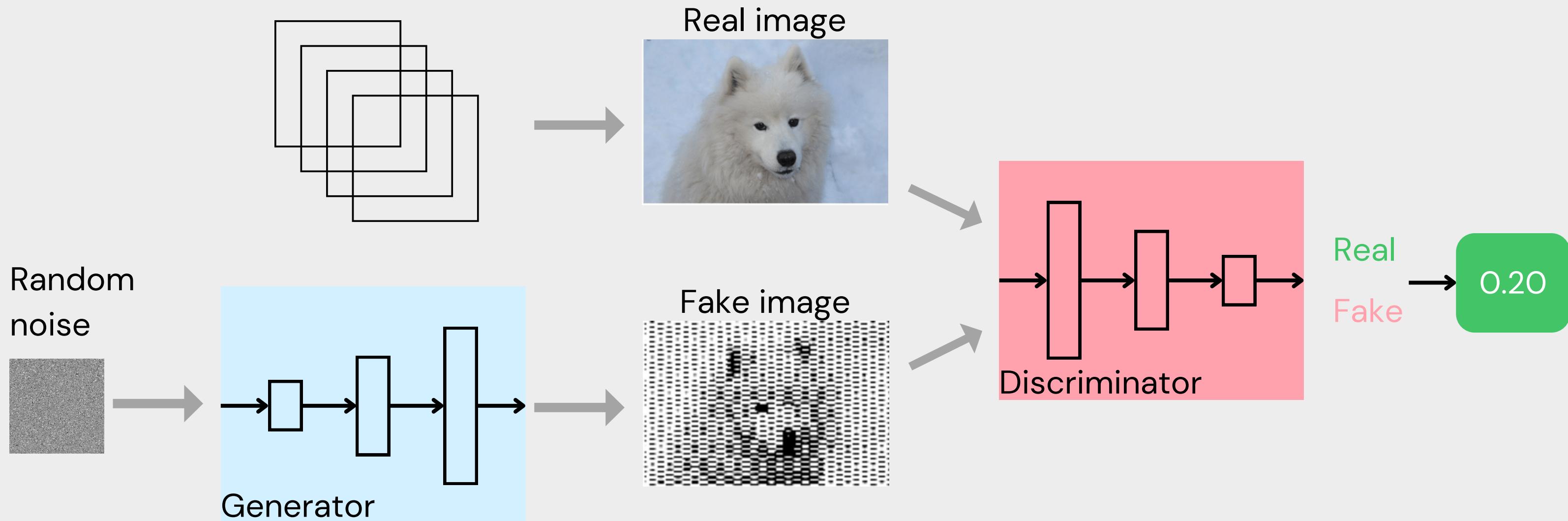
matplotlib

คอมพิวเตอร์
วาดรูปได้อย่างไร?!



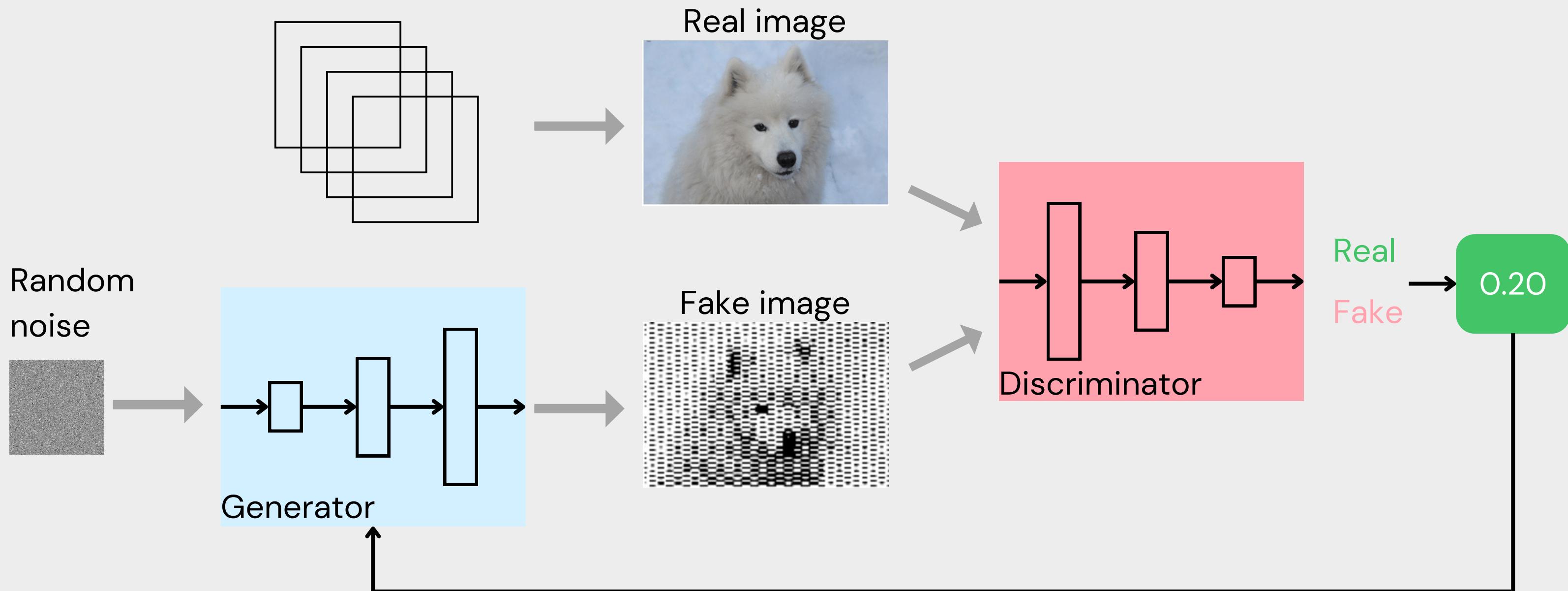
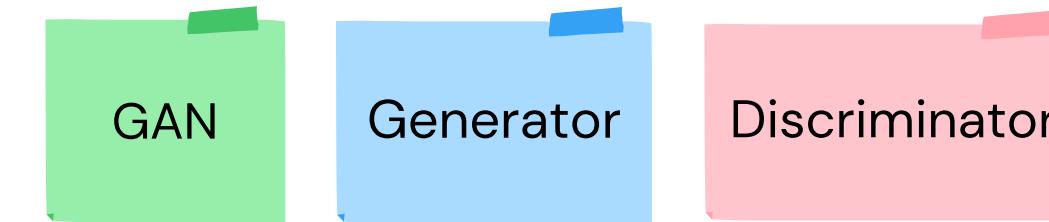
GAN

Generative adversarial network



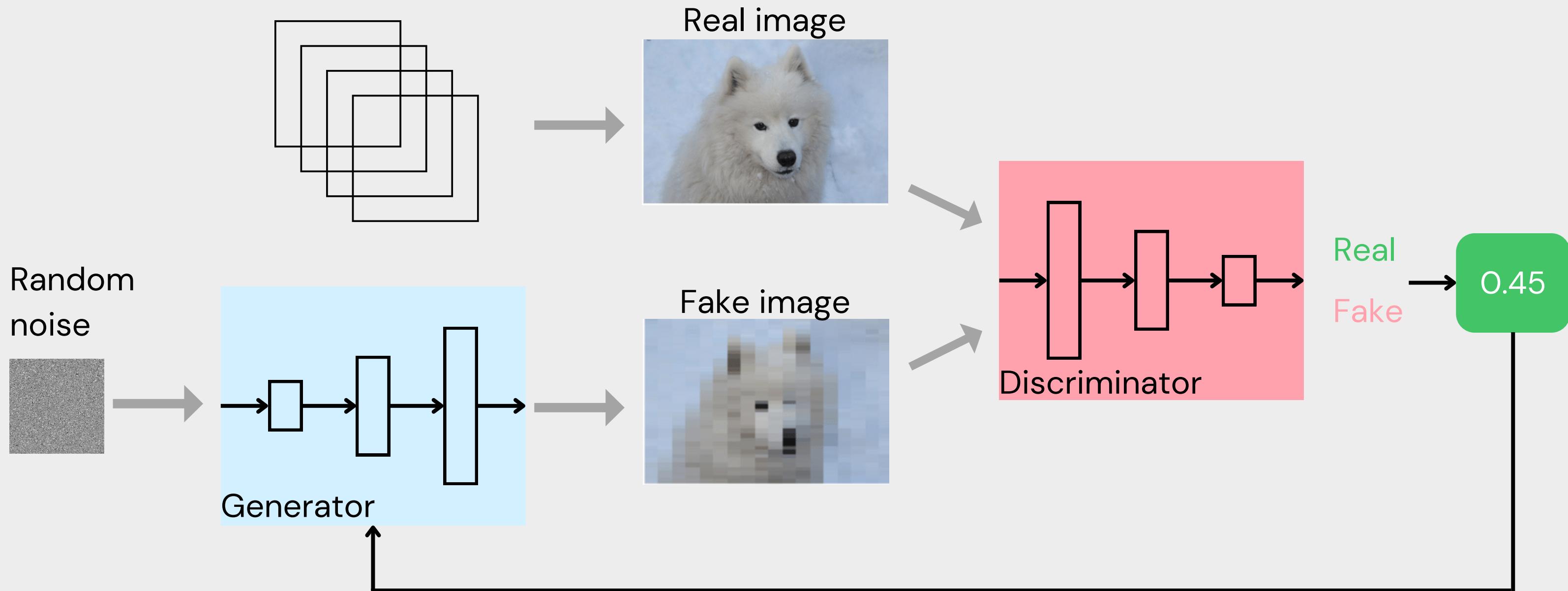
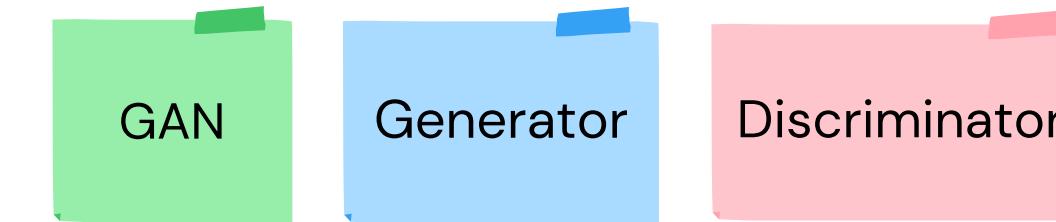
GAN

Generative adversarial network



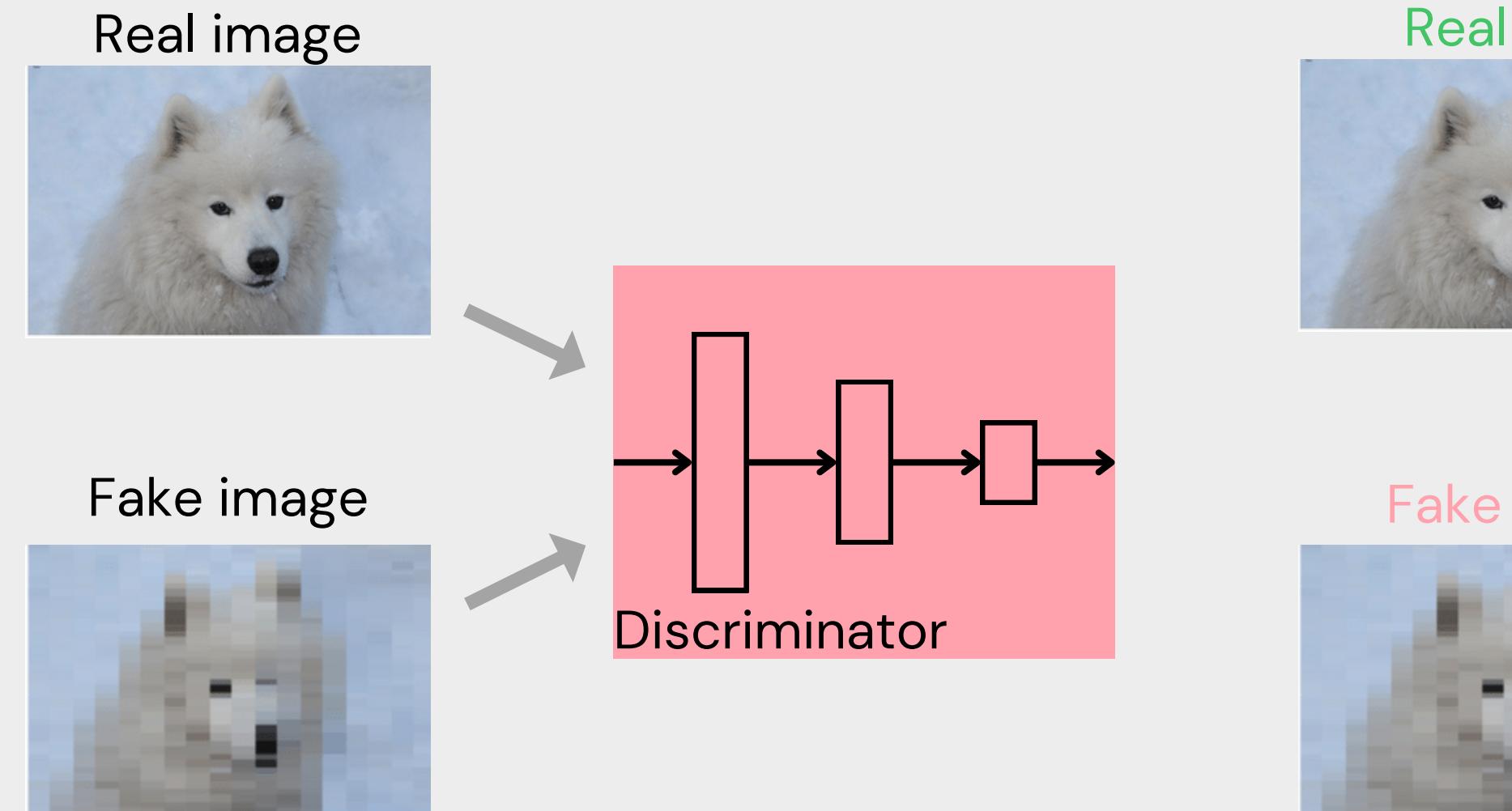
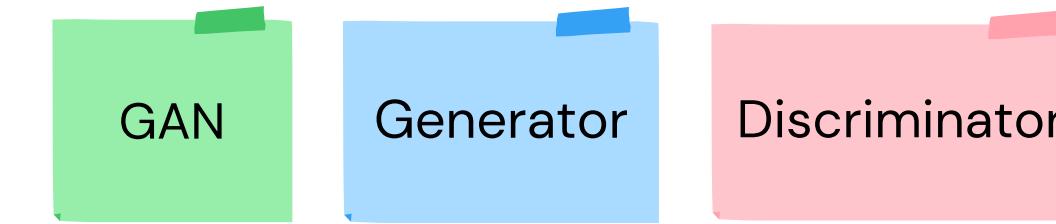
GAN

Generative adversarial network



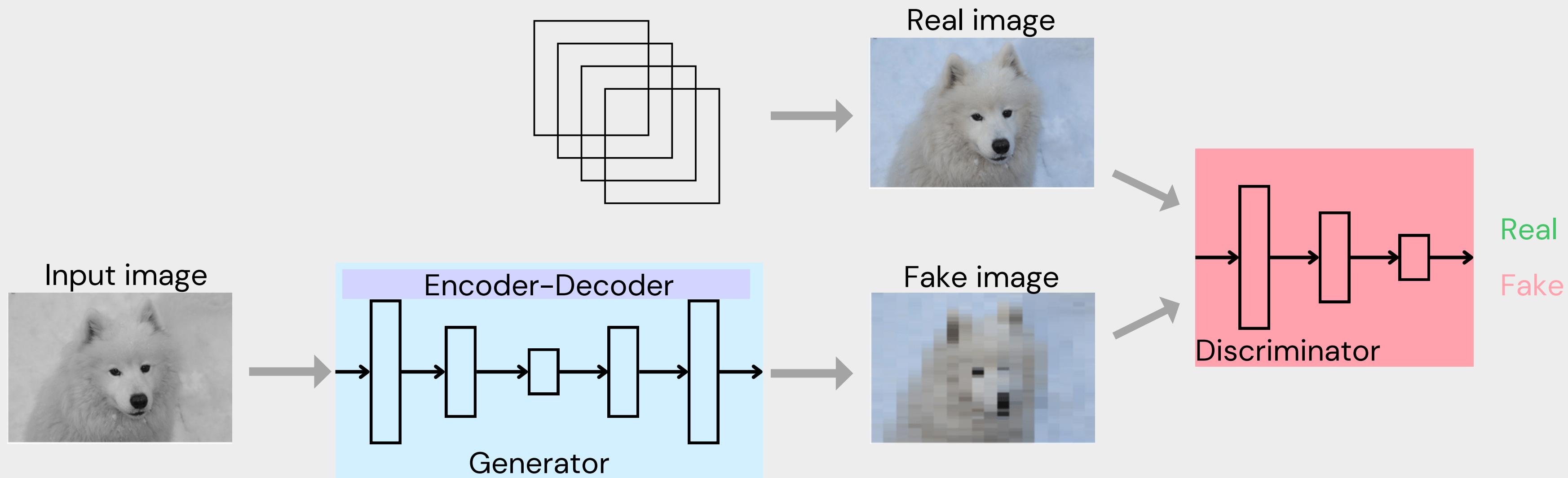
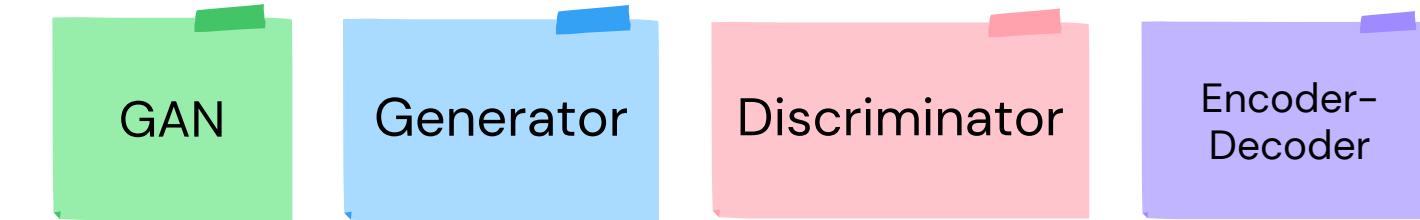
GAN

Generative adversarial network



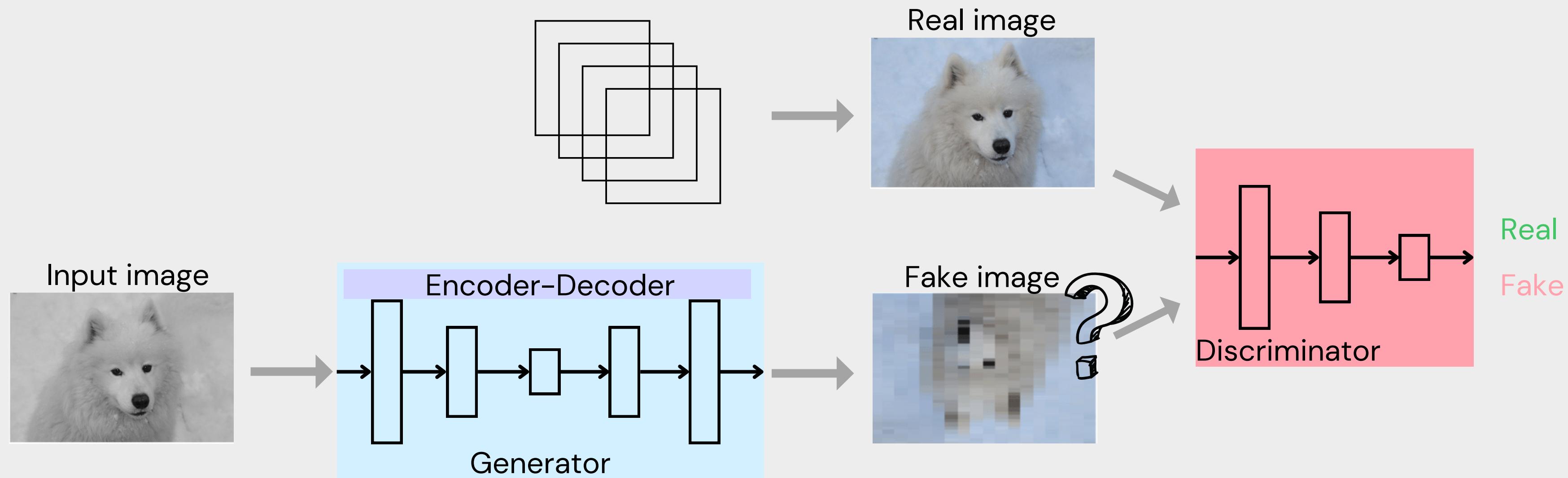
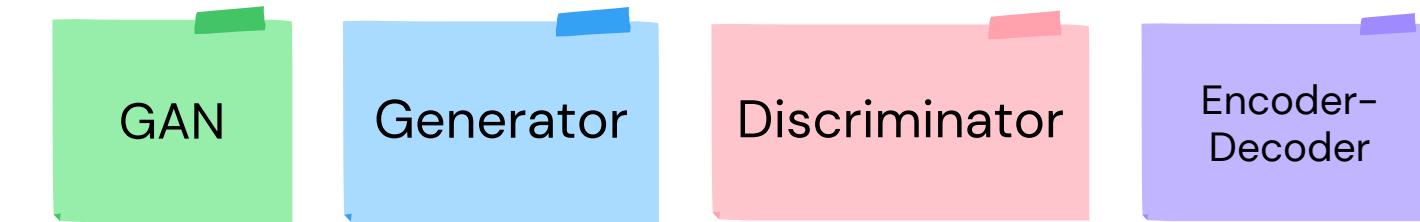
GAN

Generative adversarial network

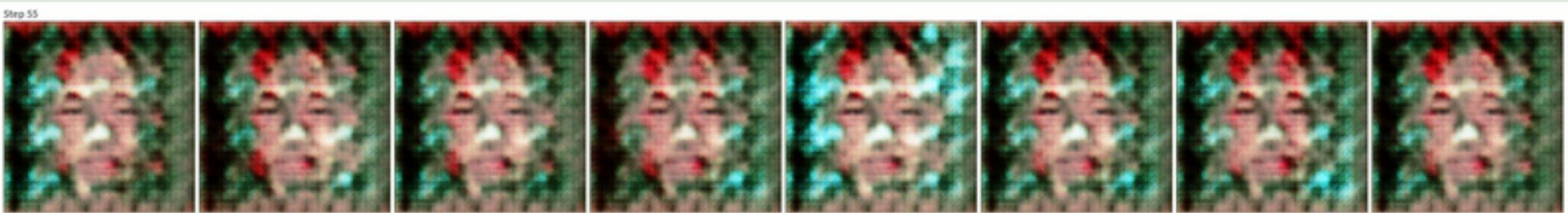


GAN

Generative adversarial network



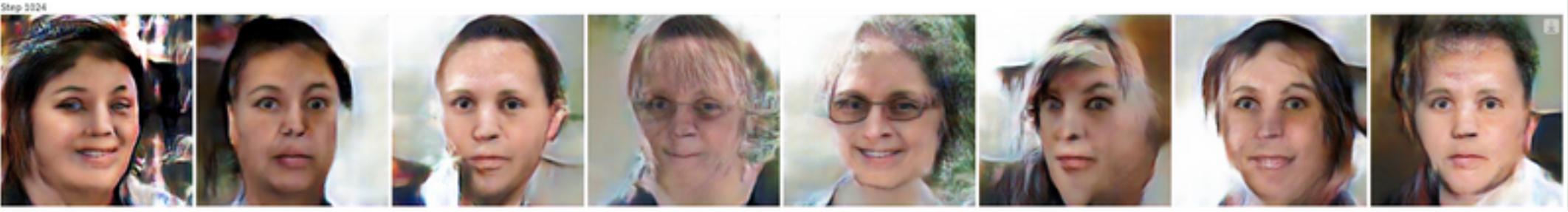
~50 epoch



~500 epoch



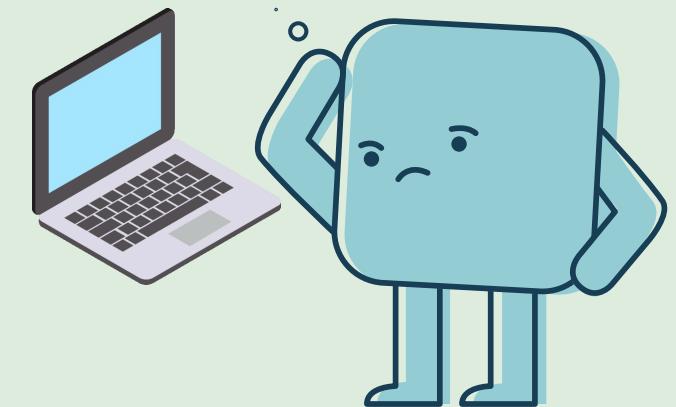
~1000 epoch



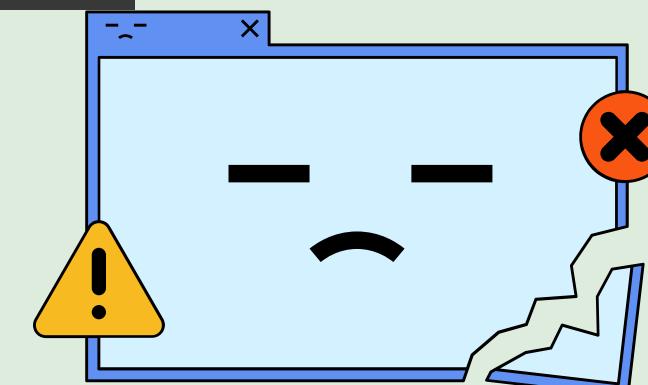
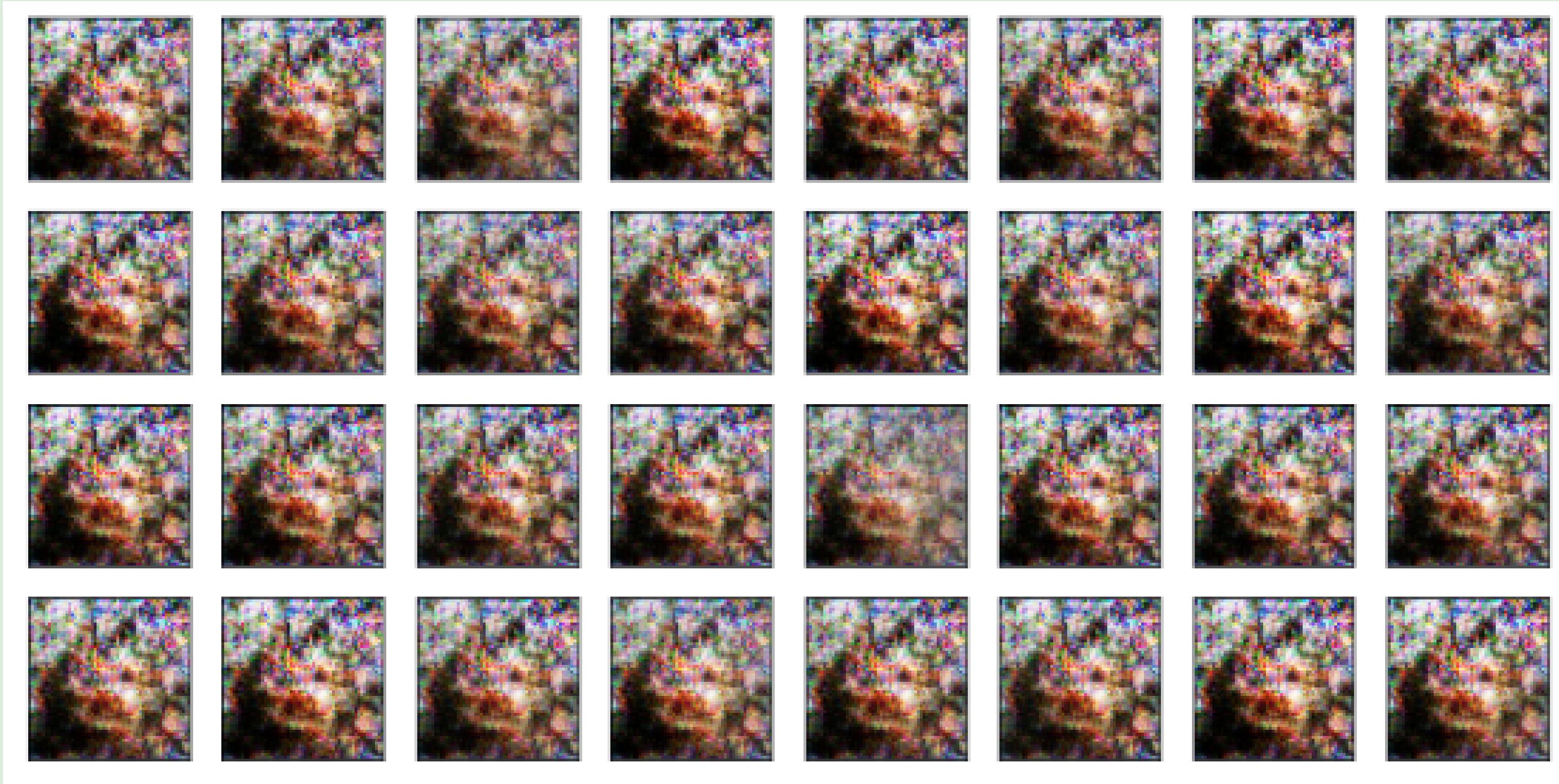
~5000 epoch



~11000 epoch

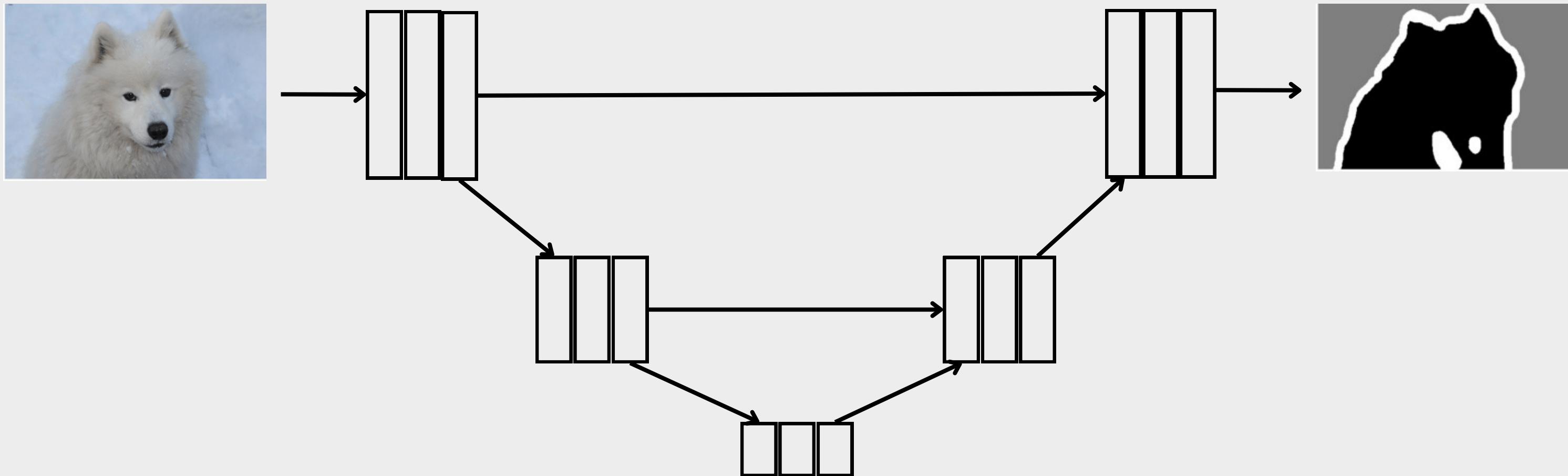
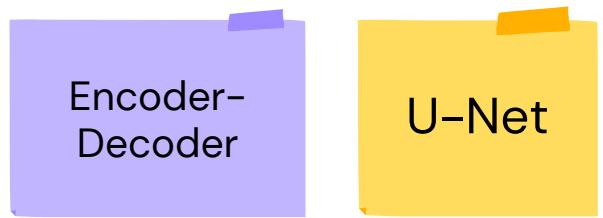


2 epoch
202624 image
1-2 hours by colab



U-Net

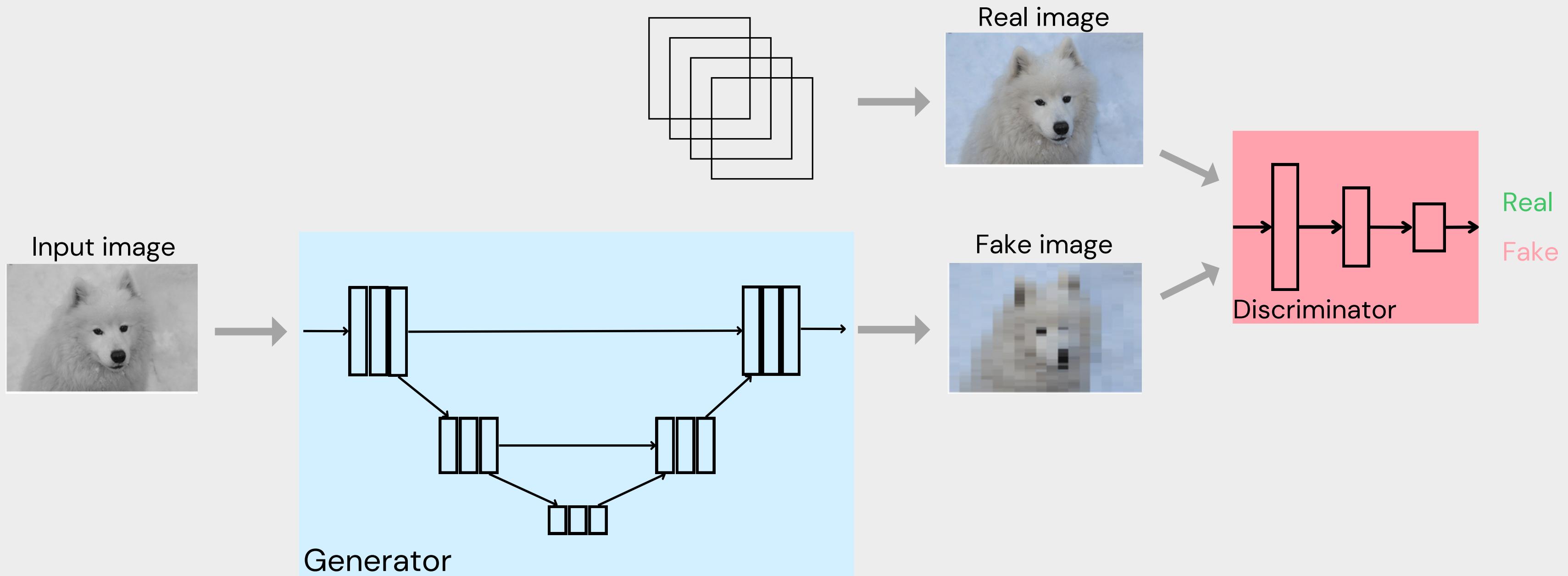
convolutional neural network



U-Net Model

Model

Generating photorealistic image from monocharm image



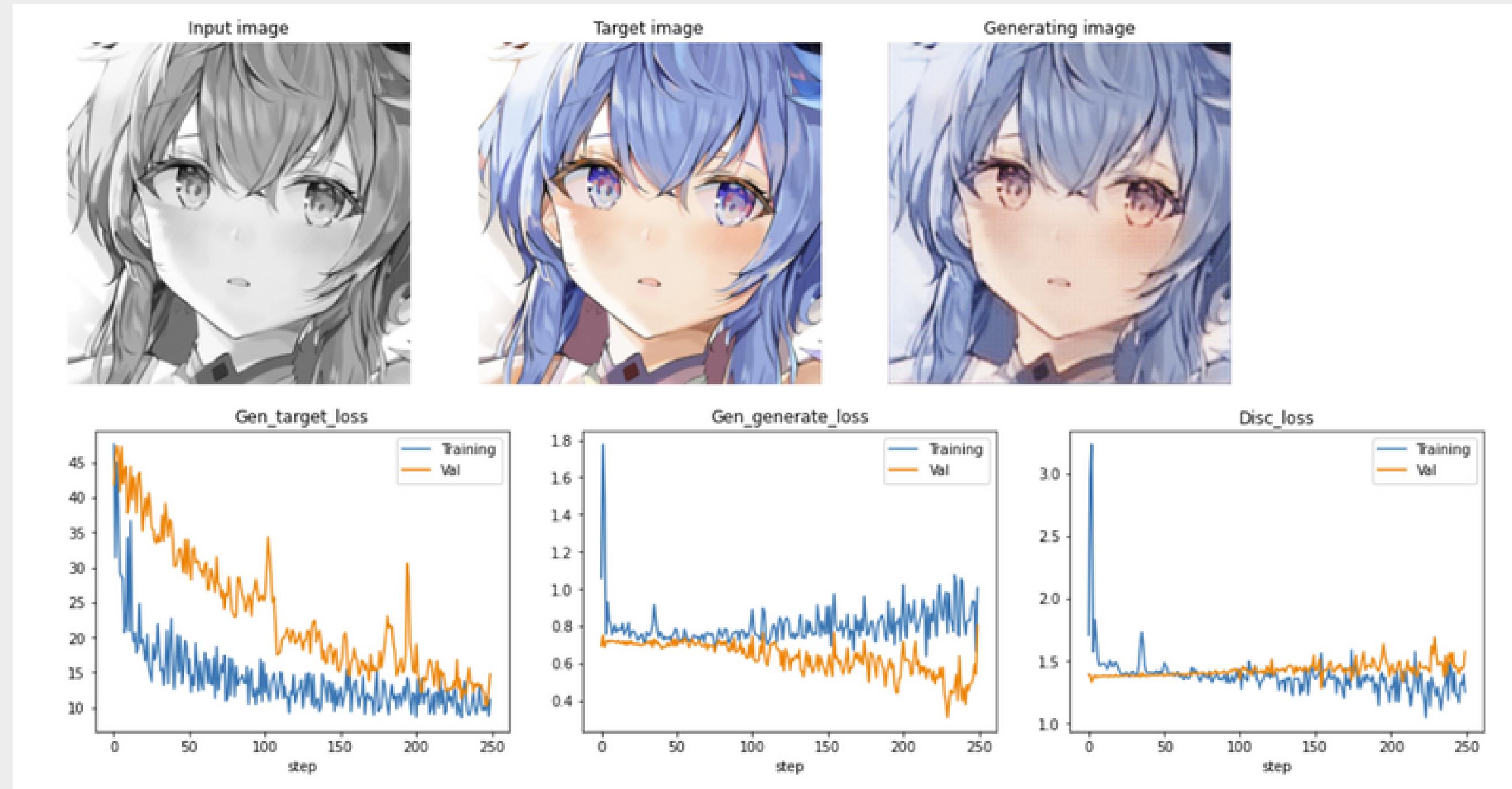
Result

Training by using different epoch

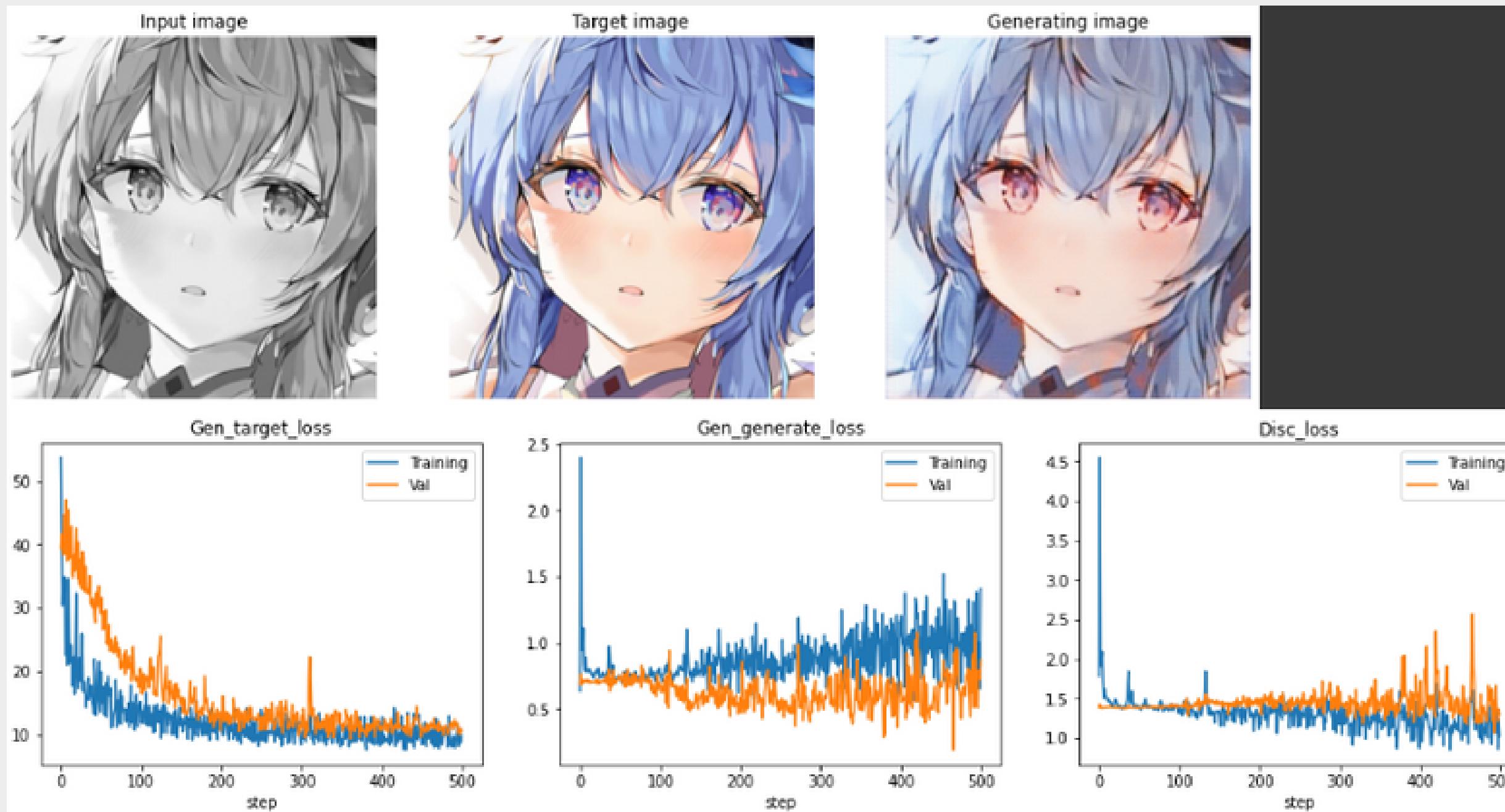
Let's go!



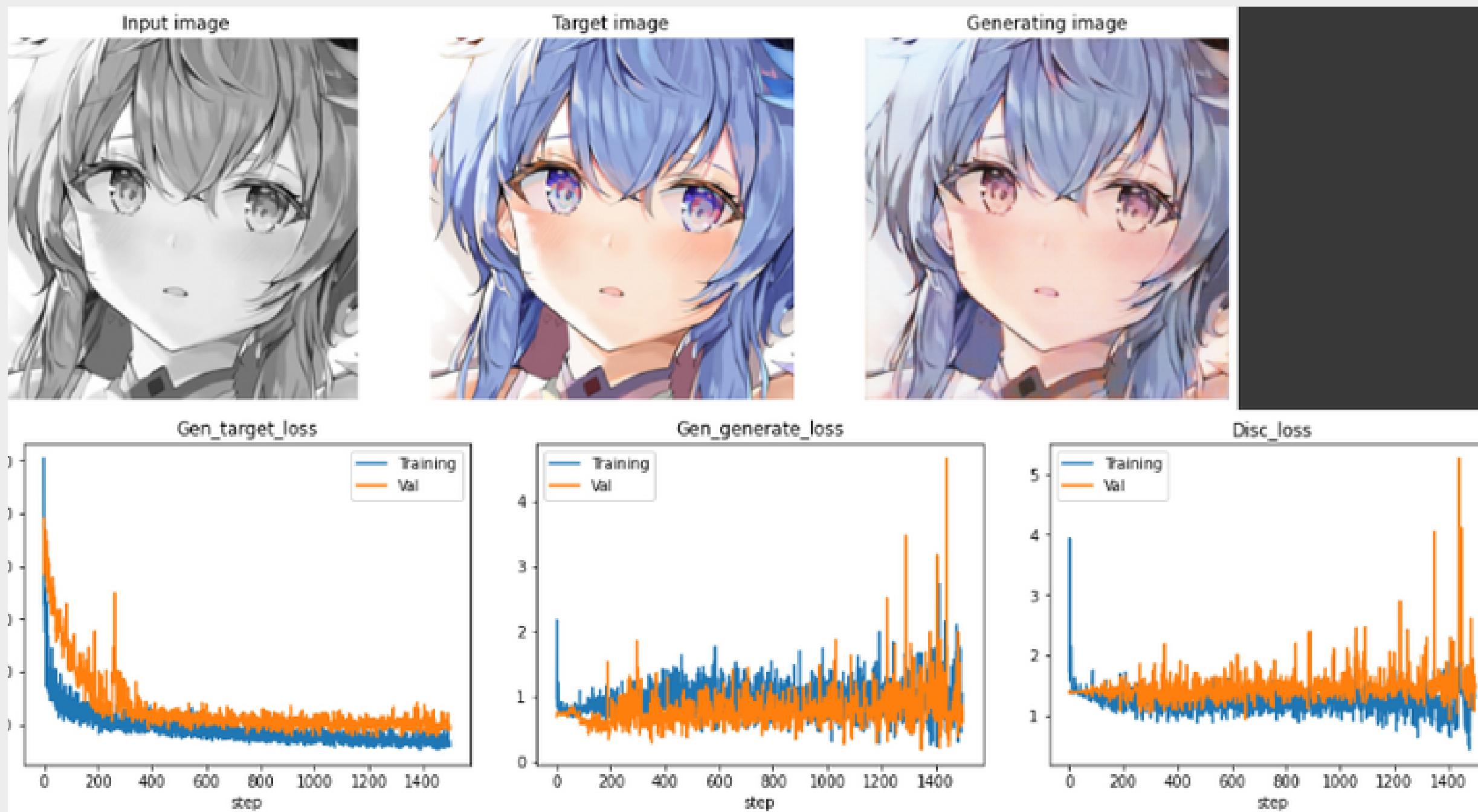
256 pixel
50 epoch



256 pixel
100 epoch

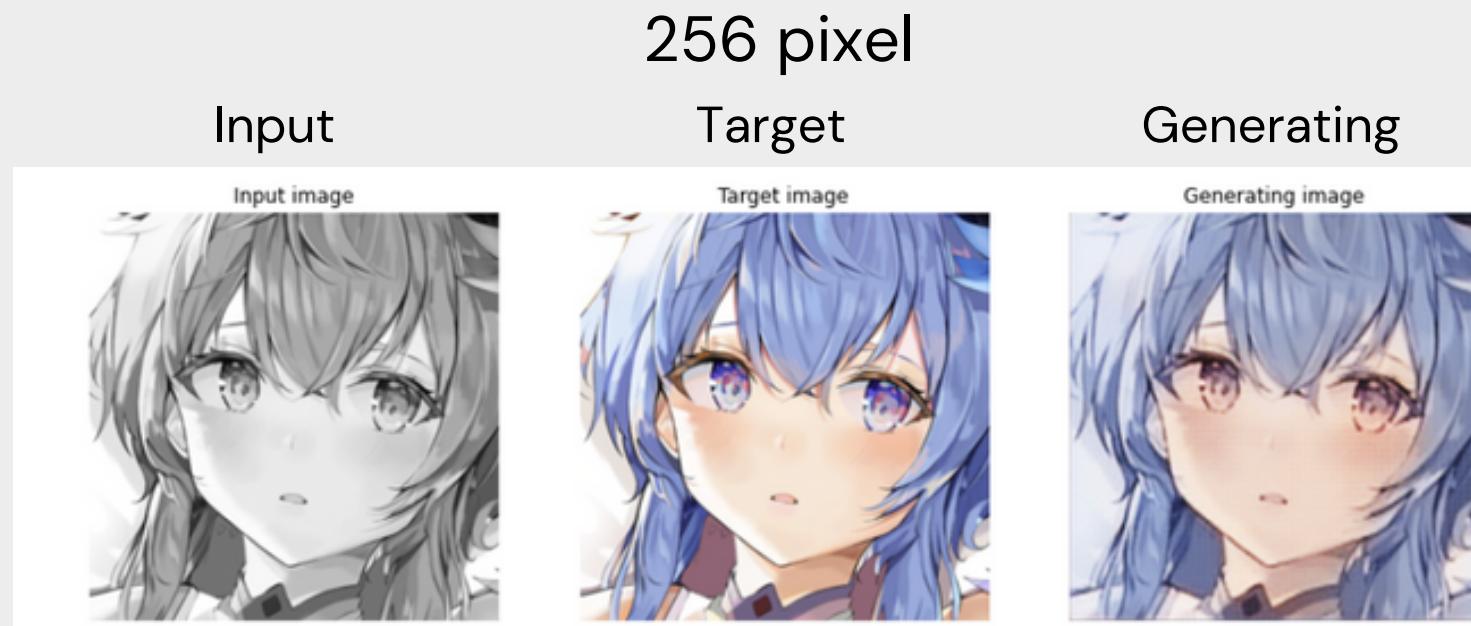


256 pixel
300 epoch



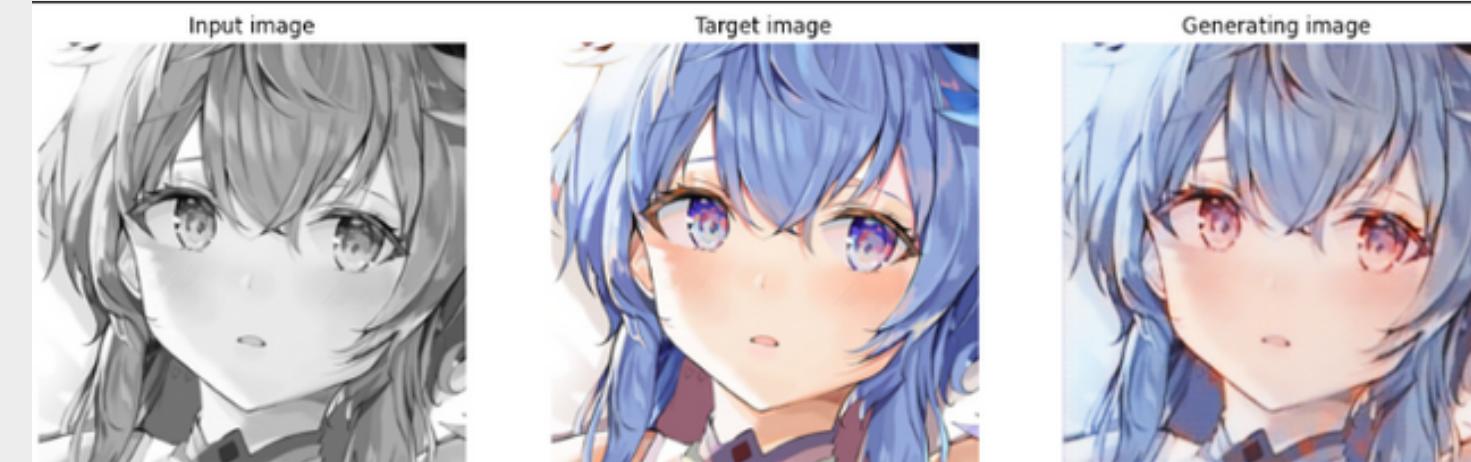
1

50 epoch



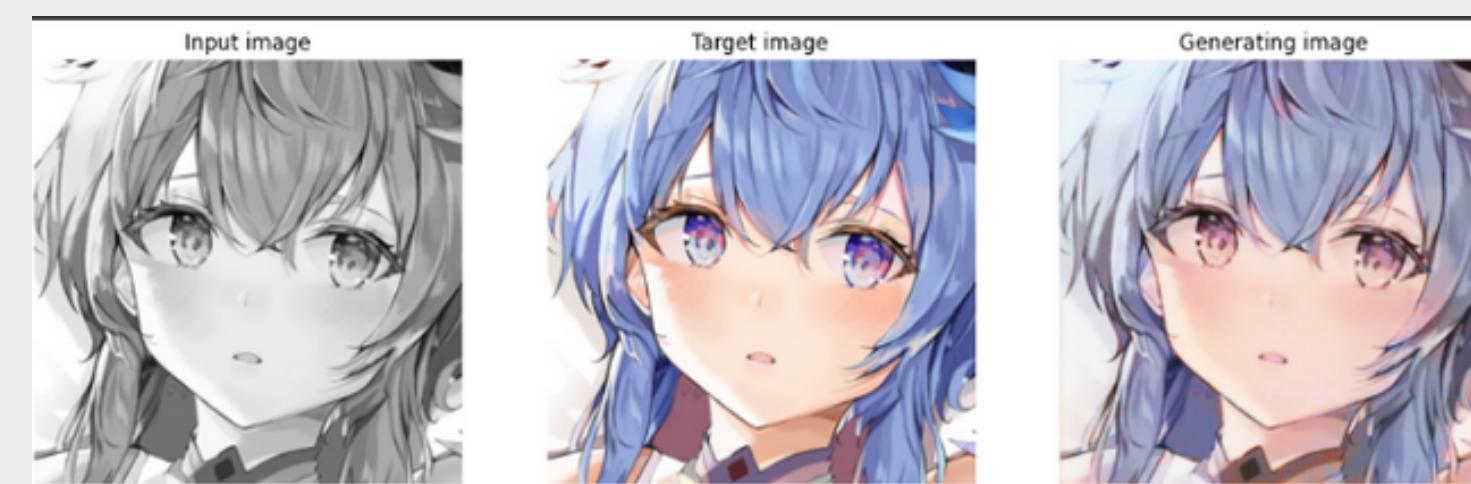
2

100 epoch



3

300 epoch



1

50 epoch

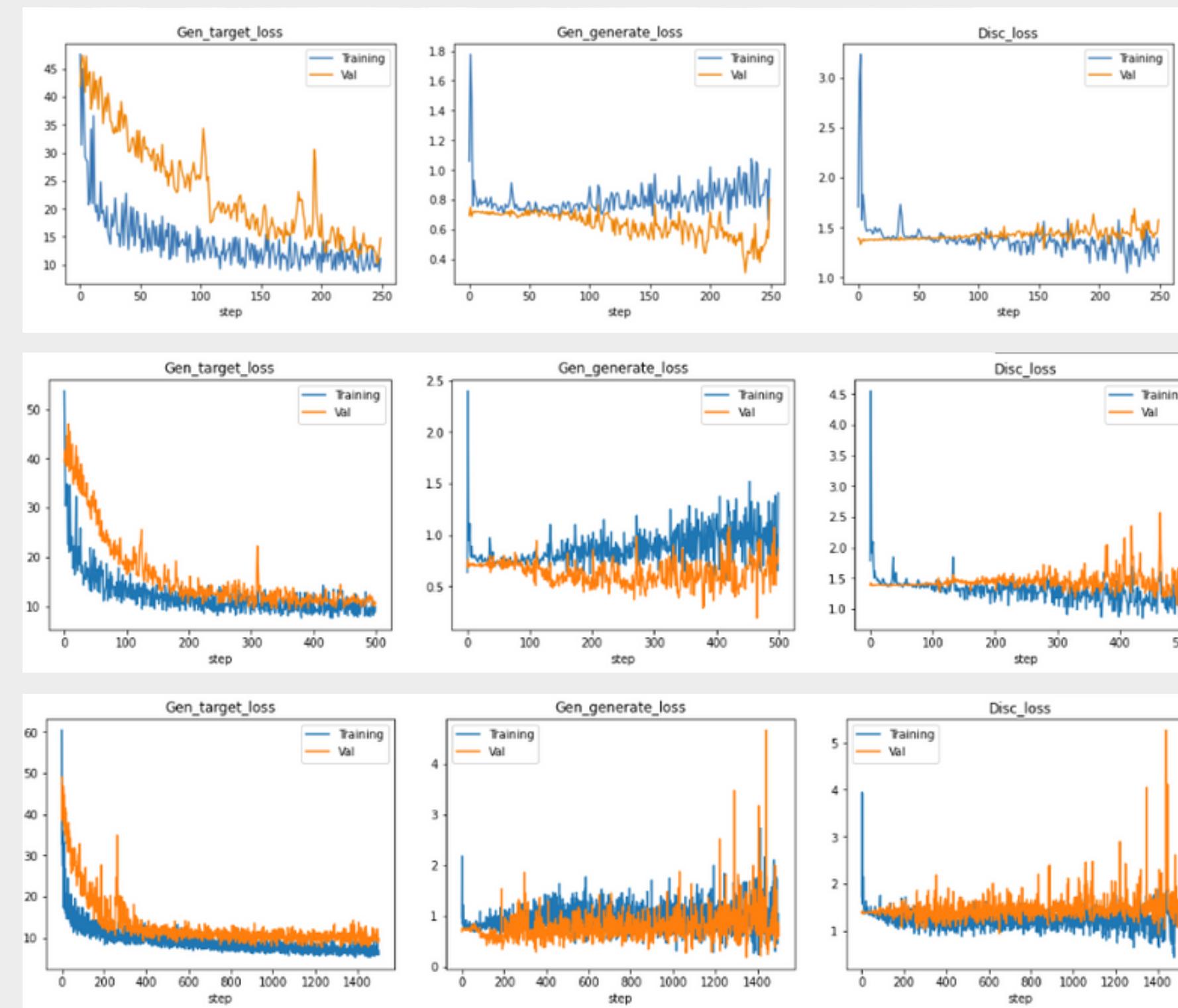
2

100 epoch

3

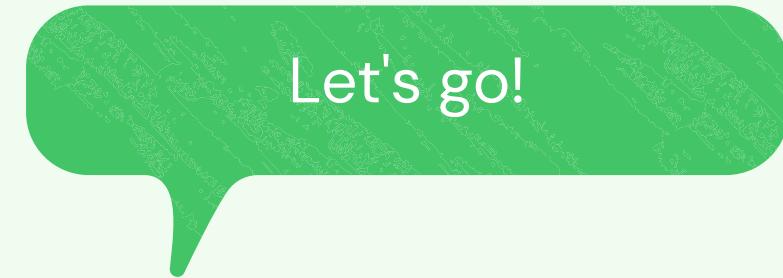
300 epoch

256 pixel

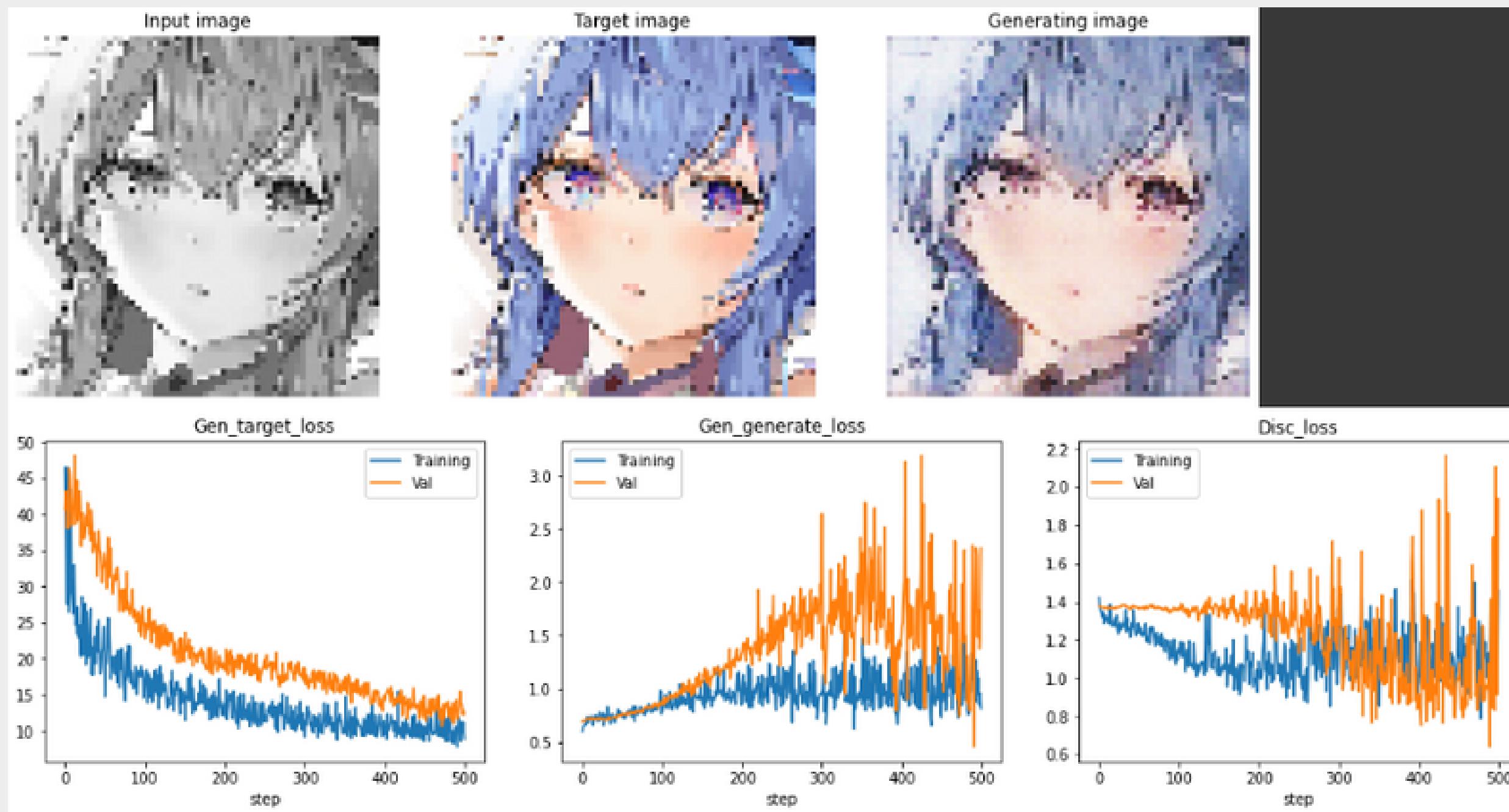


Scale

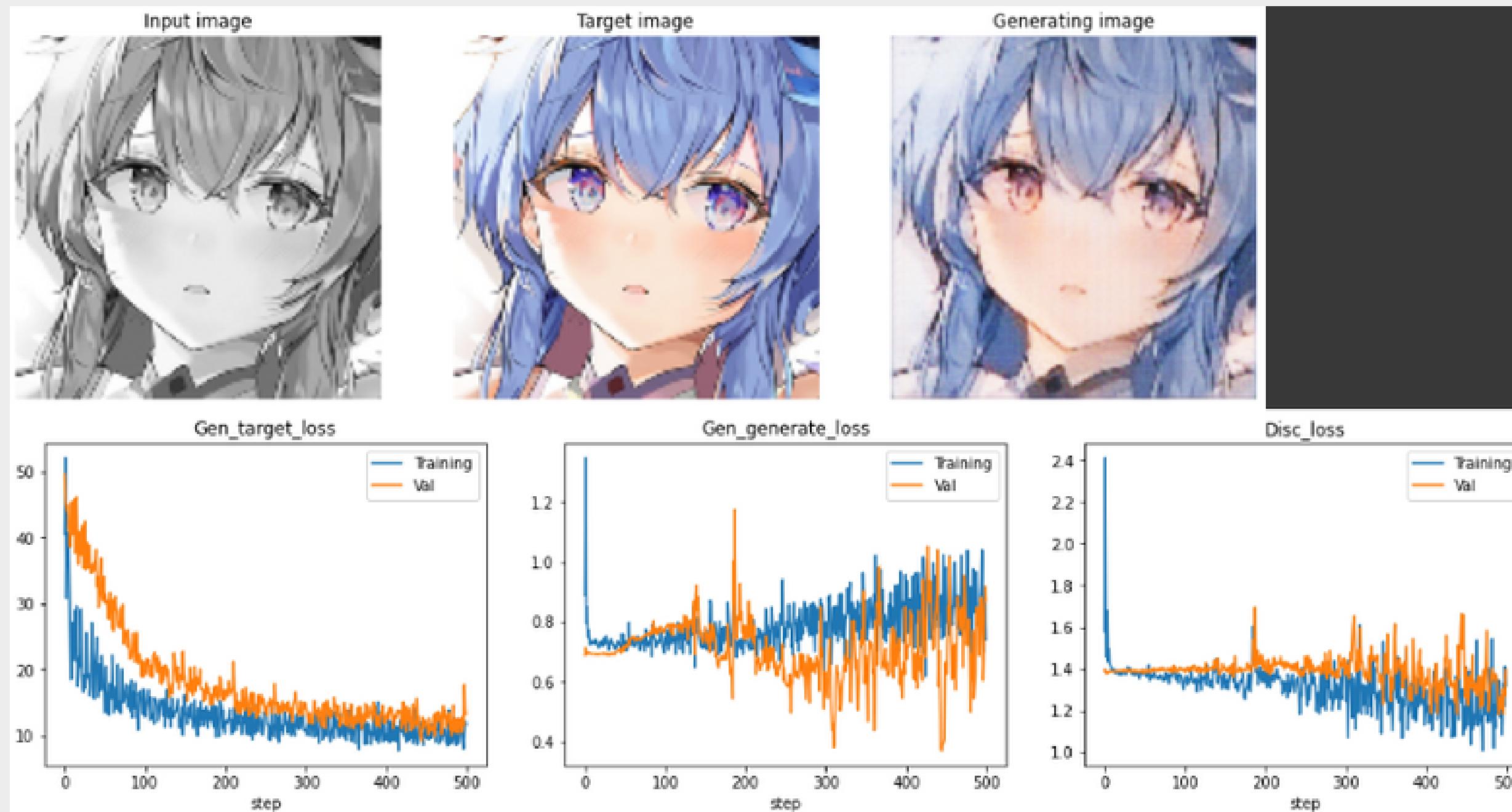
Training by using different
image size input



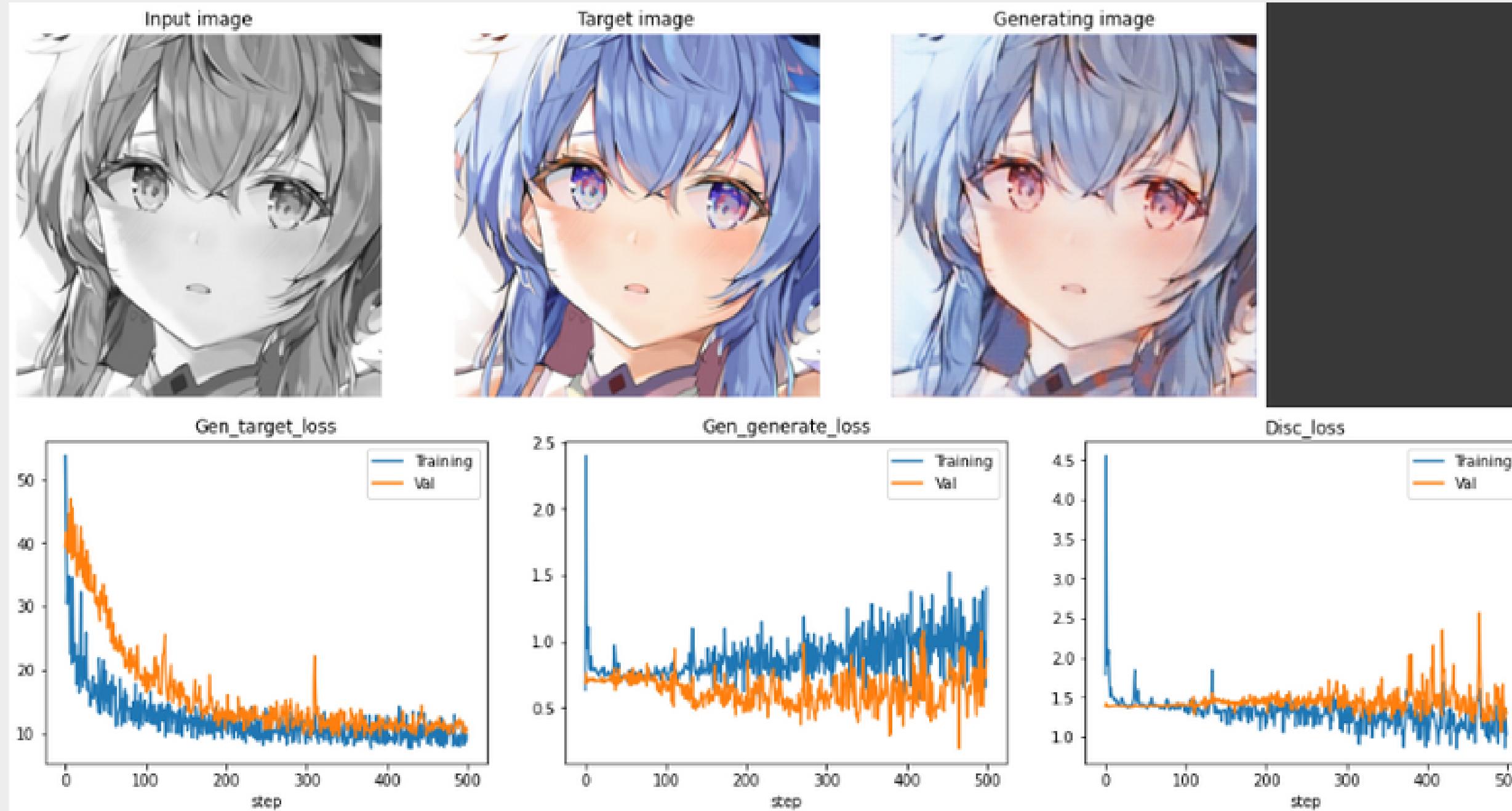
64 pixel
100 epoch



128 pixel
100 epoch

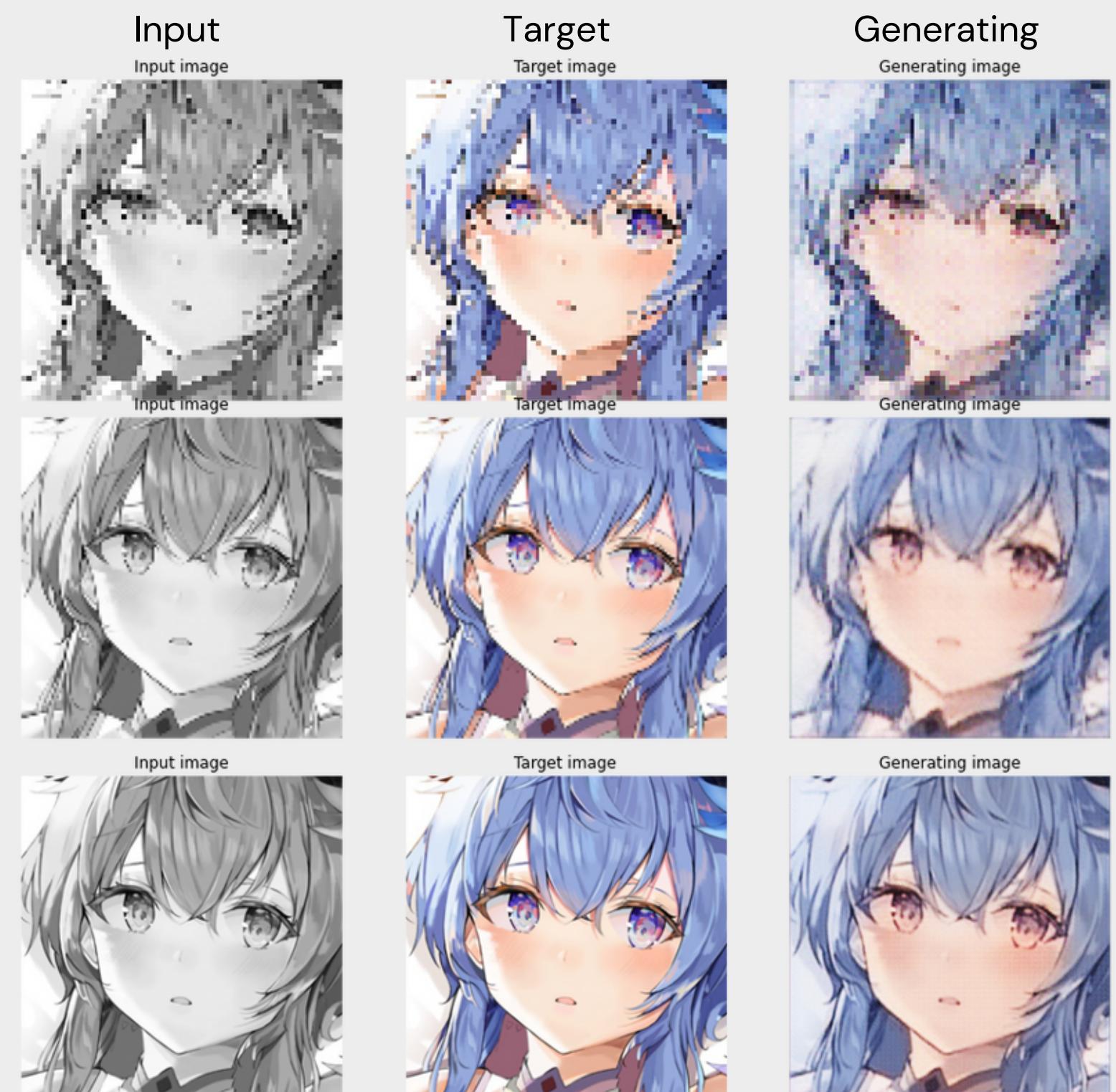


256 pixel
100 epoch



1

64 pixel



2

128 pixel

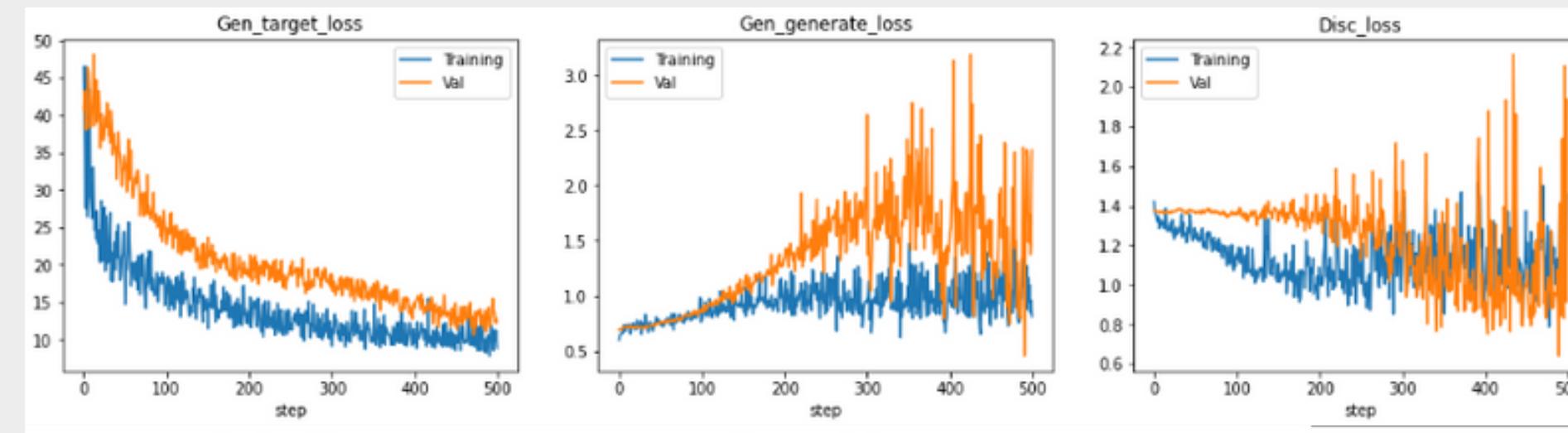
3

256 pixel

100 epoch

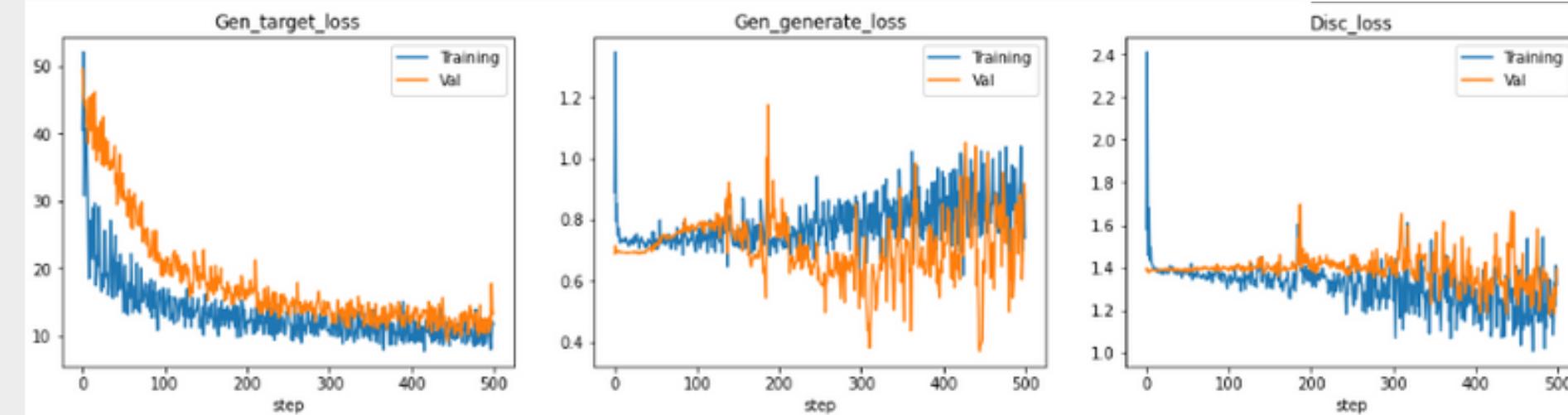
1

64 pixel



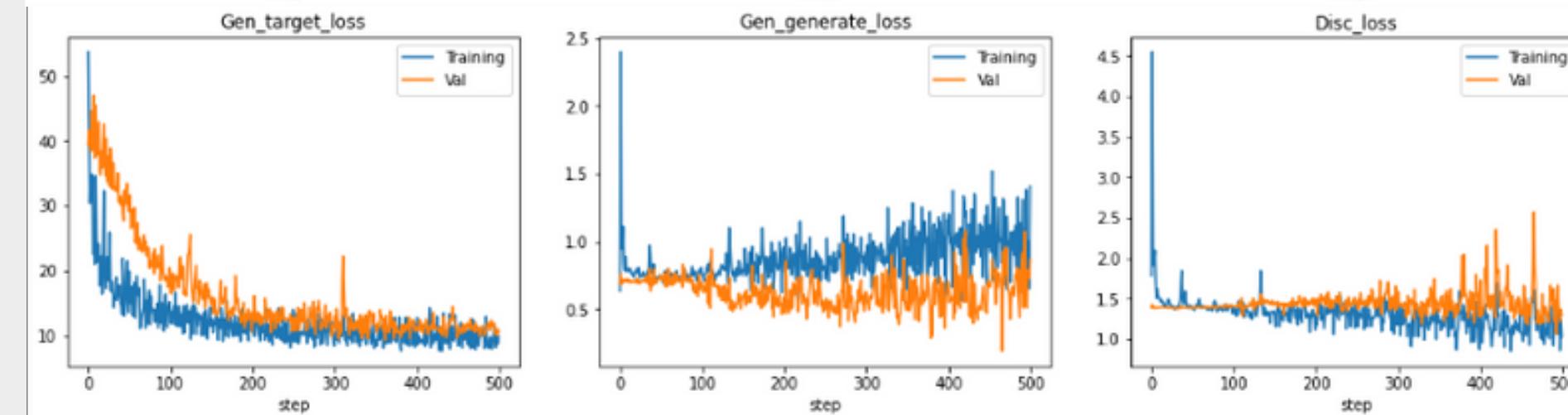
2

128 pixel

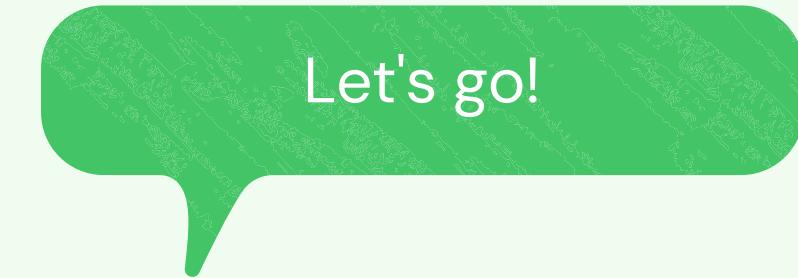


3

256 pixel

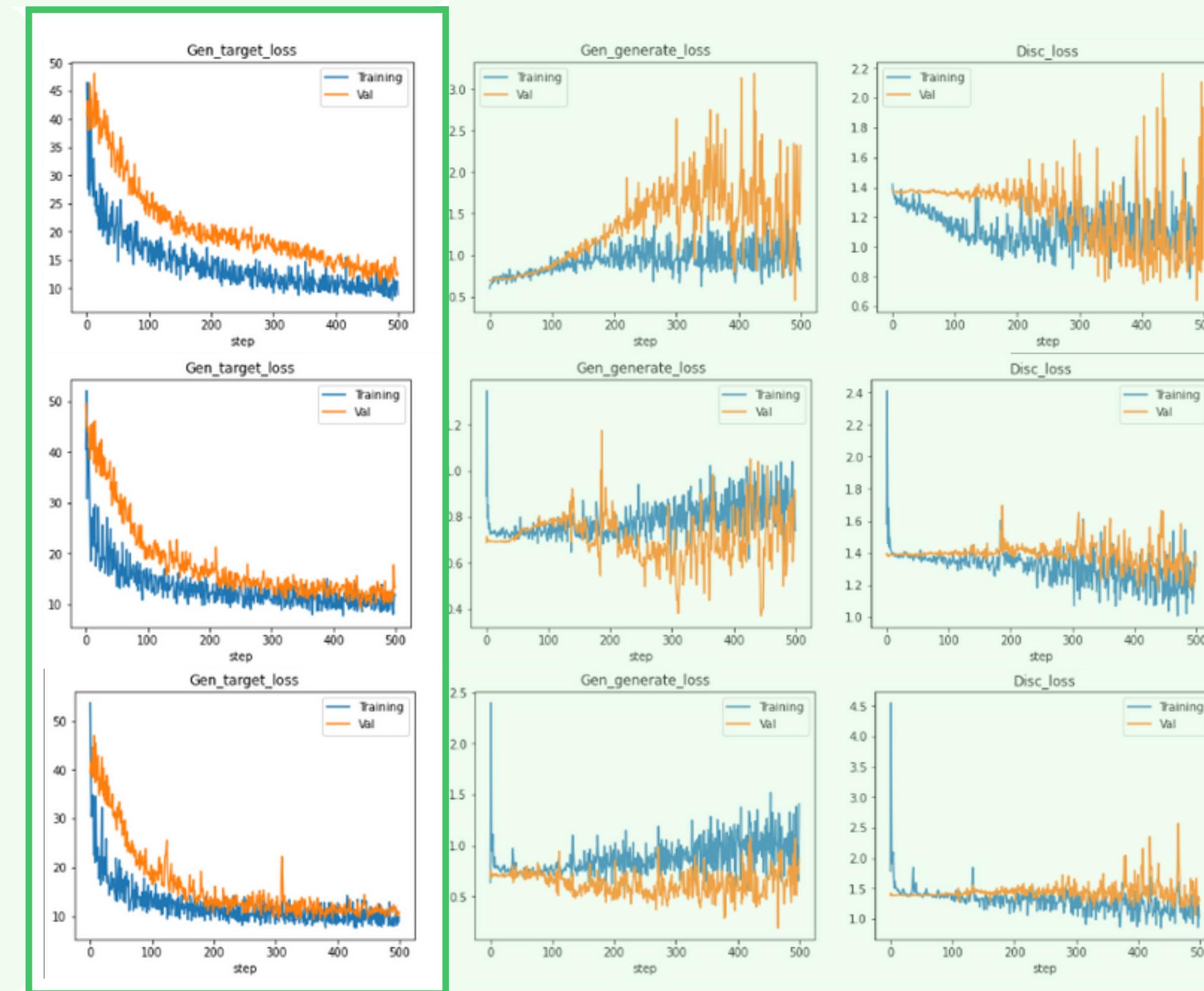


Meaning of error graph



1

64 pixel



2

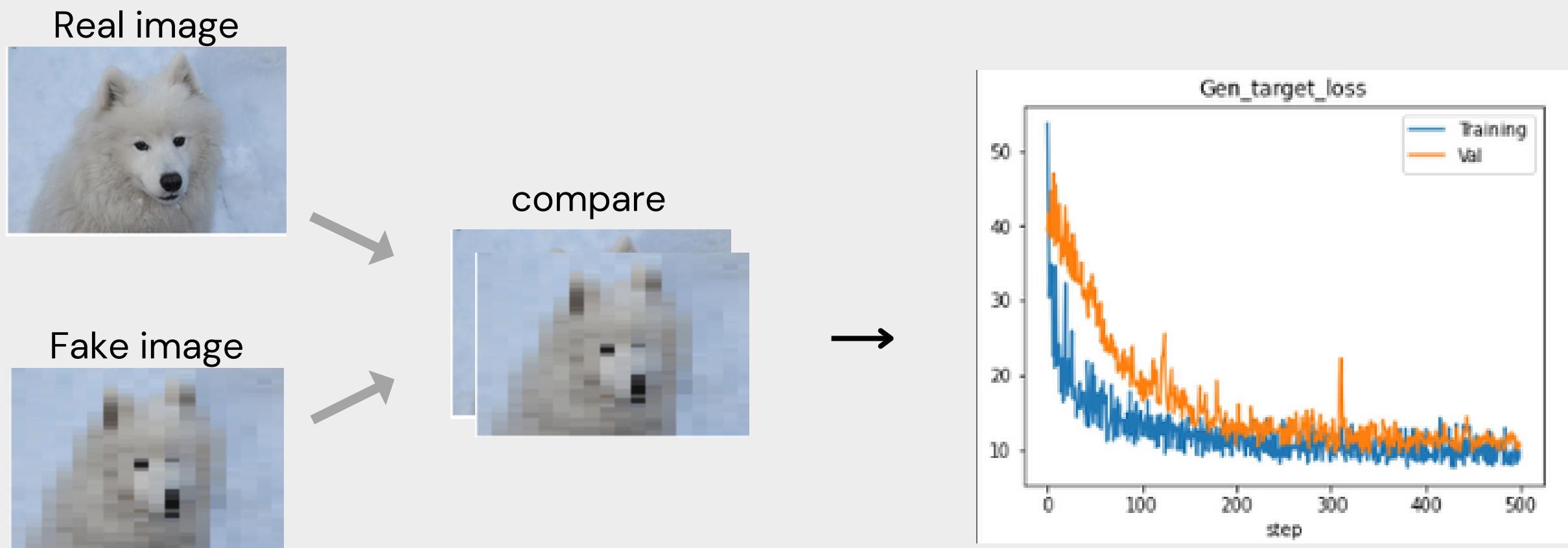
128 pixel

3

256 pixel

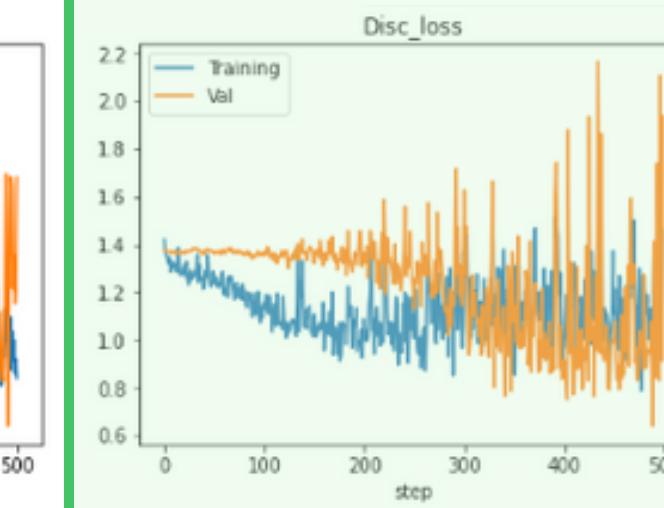
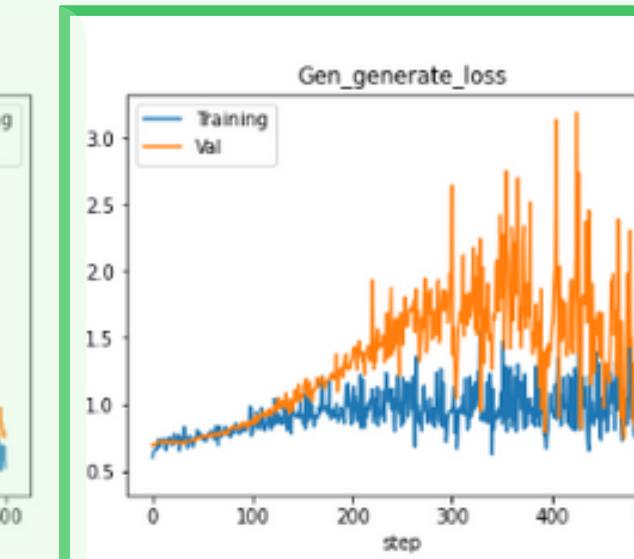
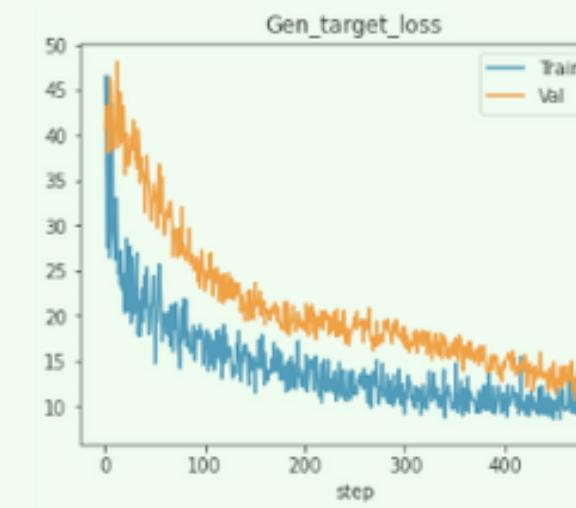
Model

Loss function



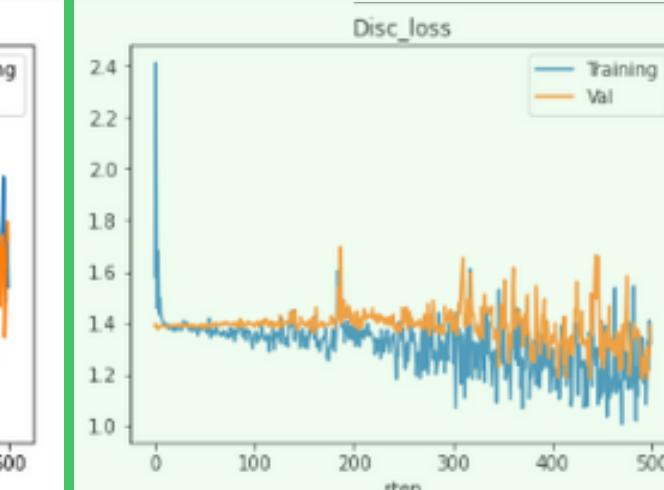
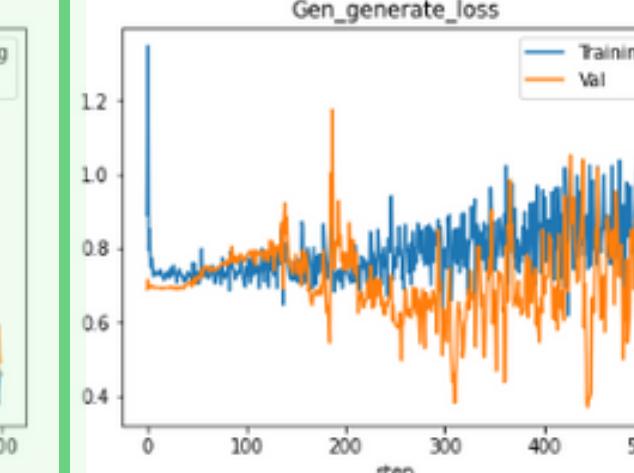
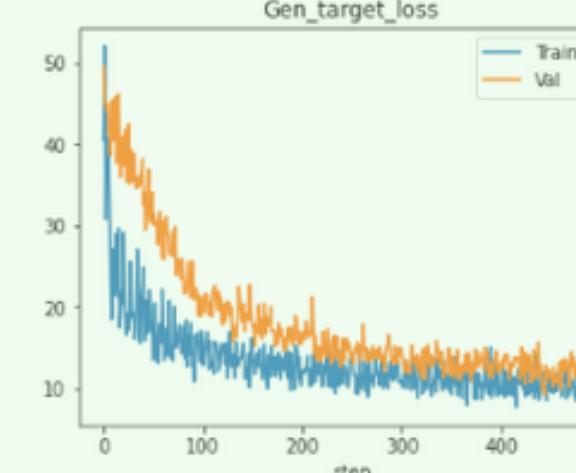
1

64 pixel



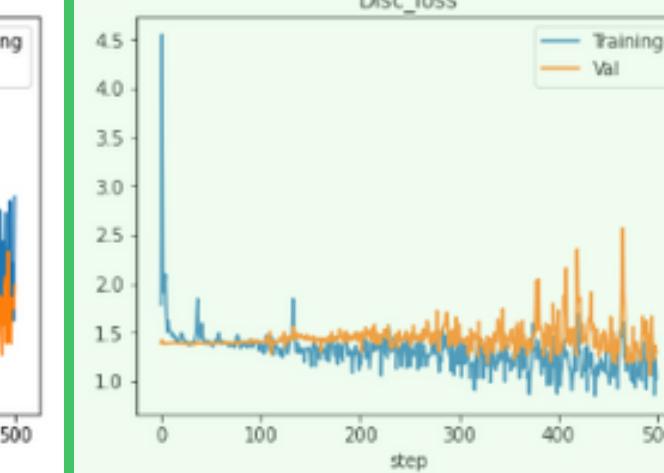
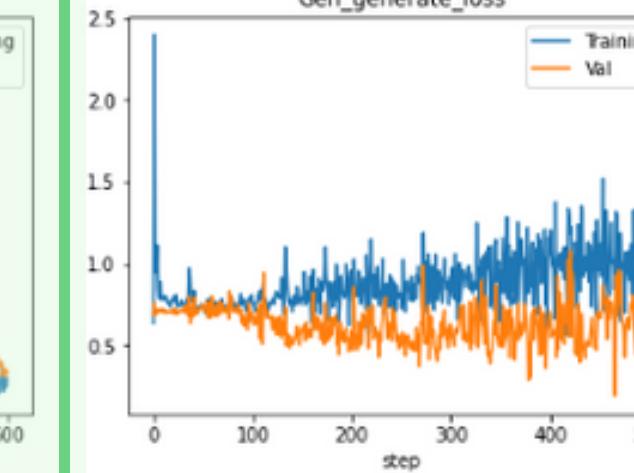
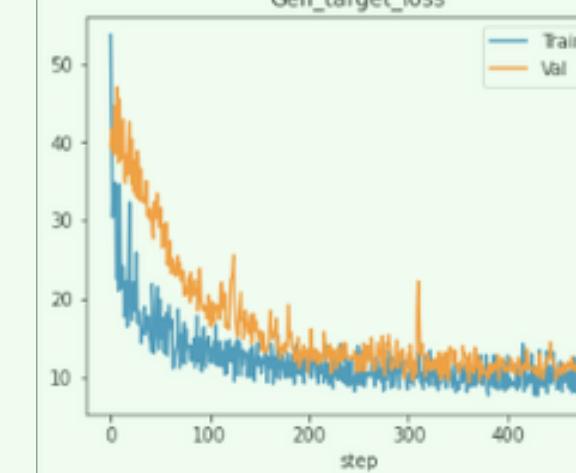
2

128 pixel



3

256 pixel



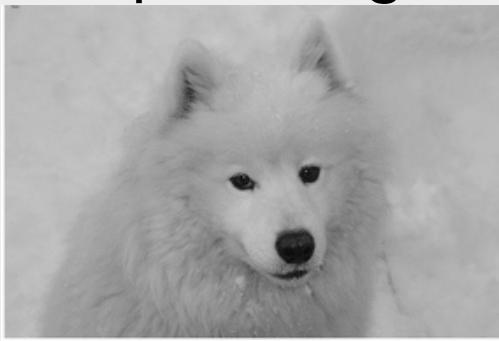
100 epoch

Model

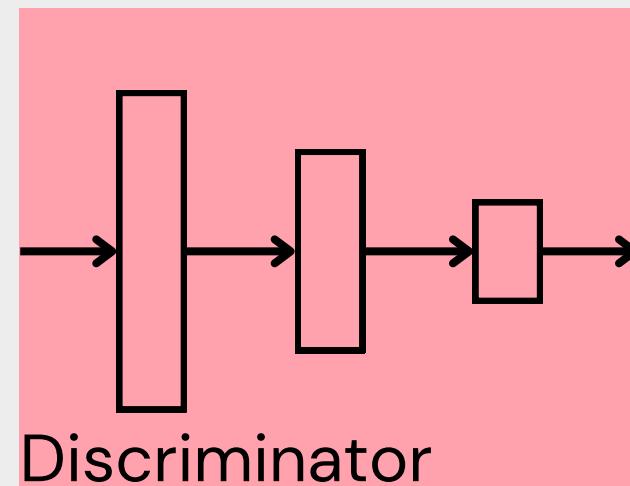
Loss function

Generator

Input image



Fake image



Real
Fake

ค่า 1 หมายถึงรูปนี้เหมือนรูปจริง

generator ต้องการให้ค่าใกล้
เคียง 1 มากที่สุด

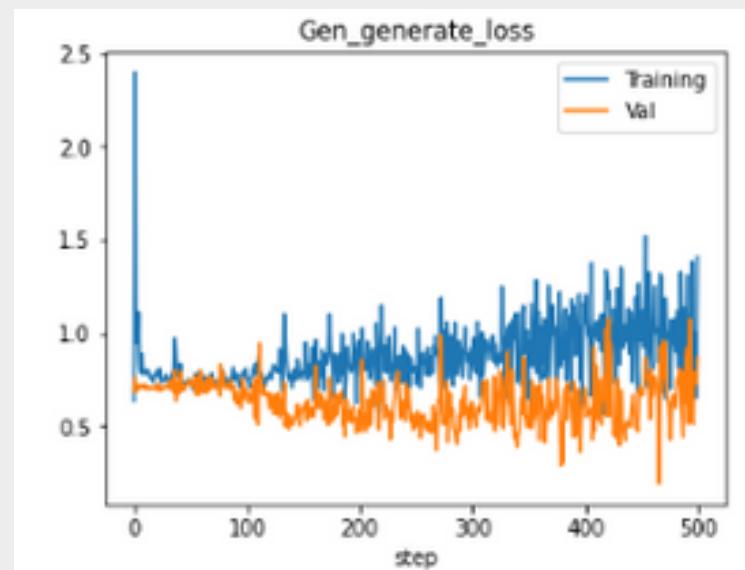
compare

0.45

1

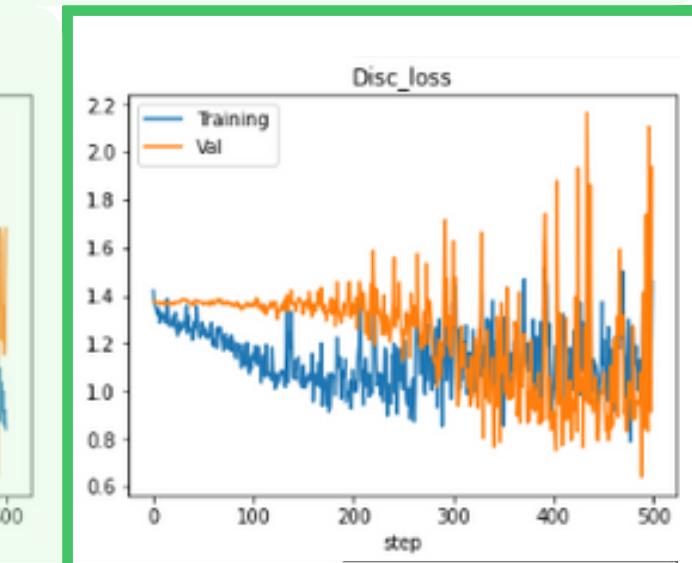
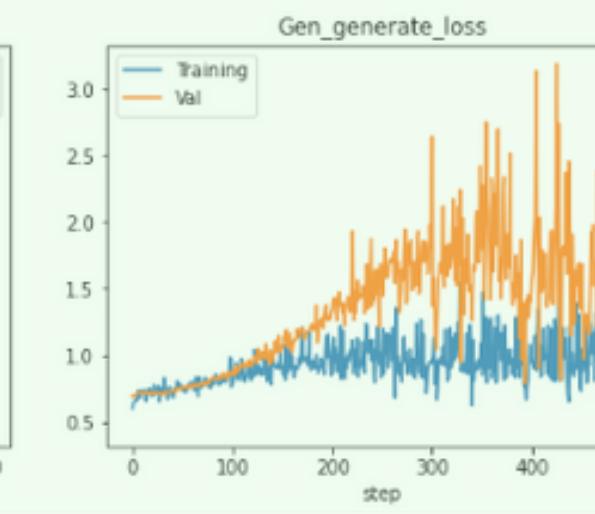
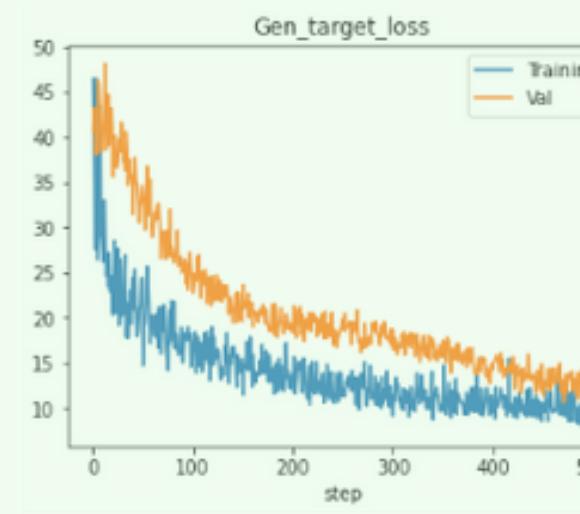
Loss

ทำ backpropagation
ที่ generator



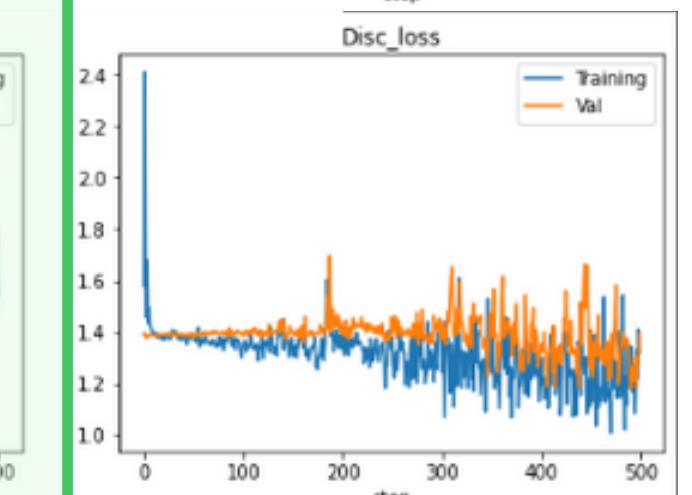
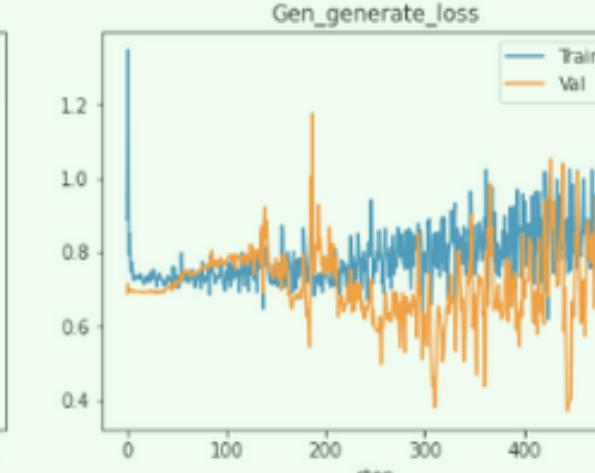
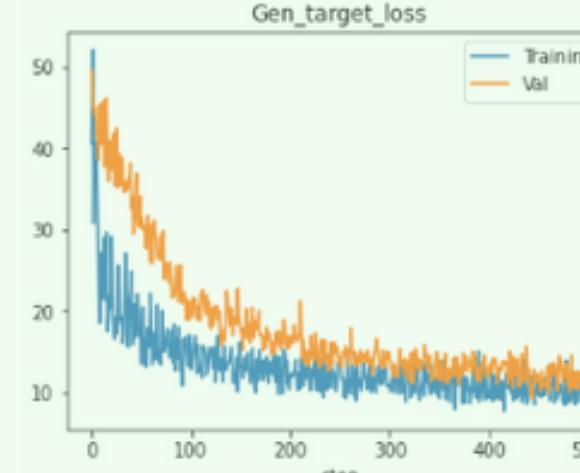
1

64 pixel



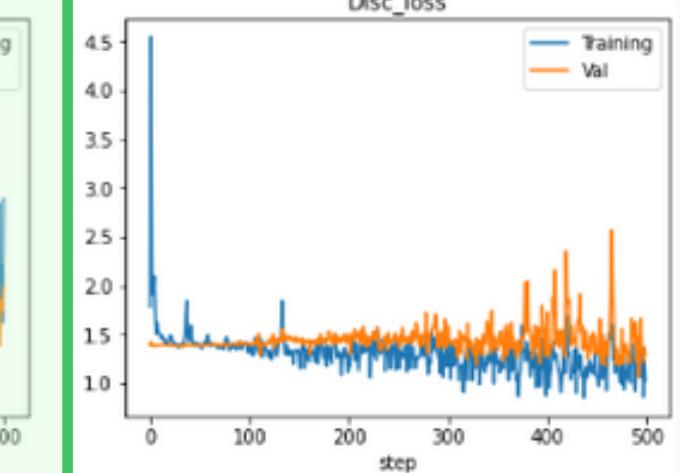
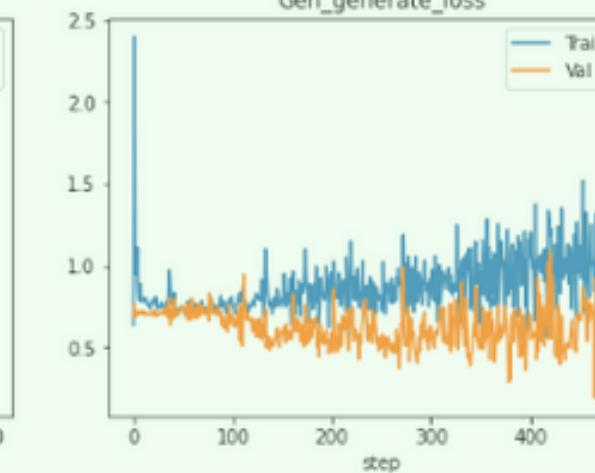
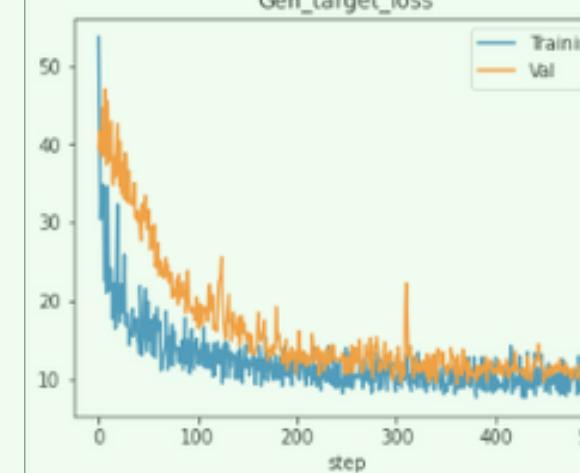
2

128 pixel



3

256 pixel

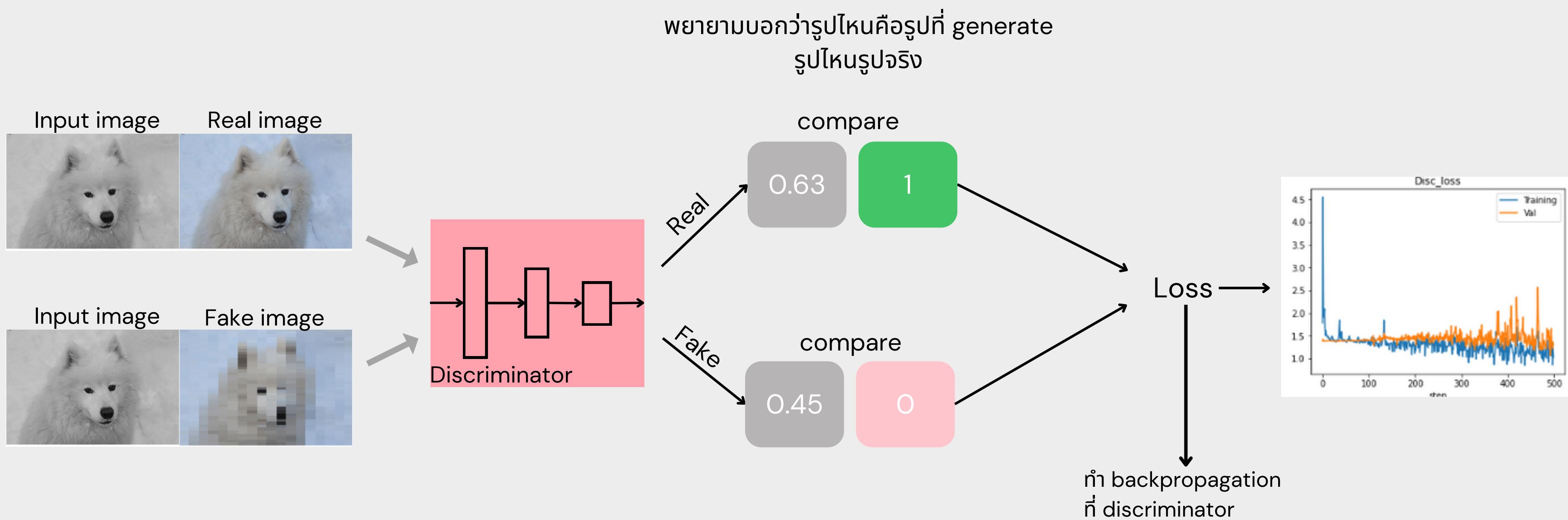


100 epoch

Model

Loss function

Discriminator



Test model

Test a 256-pixel gan model using a variety of images

Let's go!



1 | 128 pixel



2 | 256 pixel



Originel Image (256px)



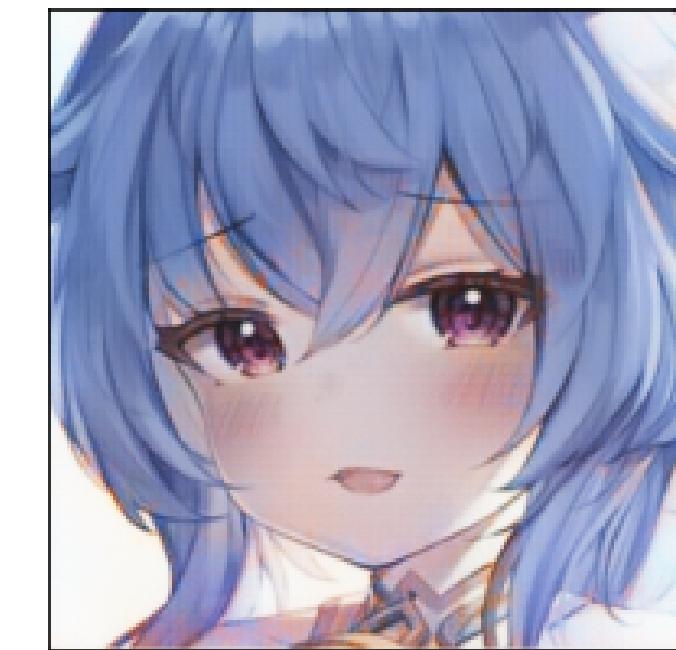
Generate Image



Originel Image (256px)



Generate Image



3 | 512 pixel



Originel Image (512px)



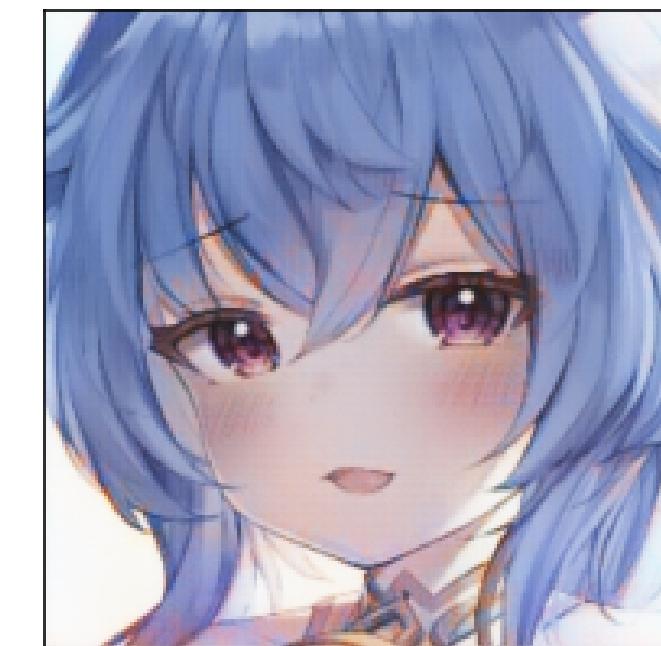
Generate Image



Originel Image (512px)



Generate Image



4 | Cartoon image



Originel Image (cartoon image)



Generate Image



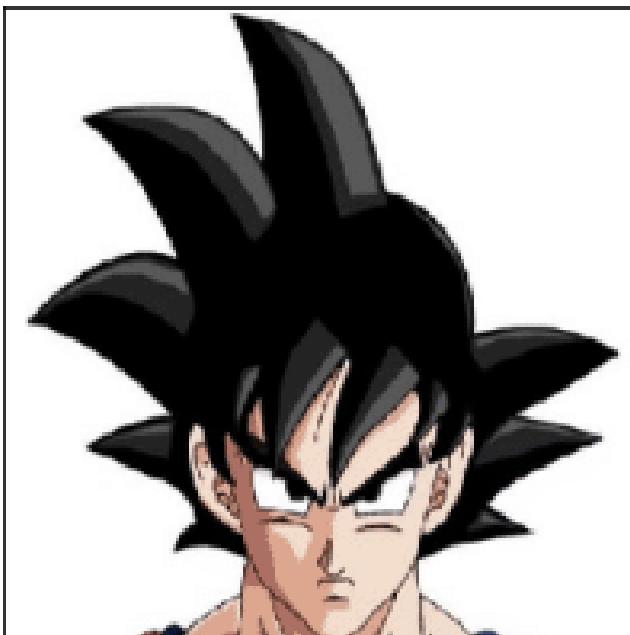
Originel Image (cartoon image2)



Generate Image



Originel Image (cartoon image)



Generate Image



Originel Image (cartoon image2)



Generate Image



5 | Real image



Original Image (real image)



Generate Image

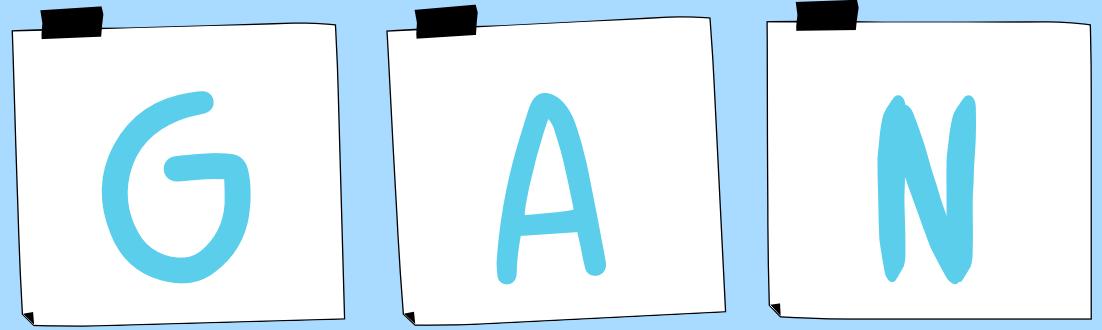


Original Image (real image)



Generate Image

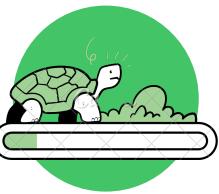




ปัญหาที่พบ



เป็นการกำโนเมเดลแบบ Deep Learning ครั้งแรก
ทำให้ต้องหาความรู้เพิ่มเติมพร้อมกับทดสอบโดยเดลตอลด



Gan เป็นโมเดลที่ต้องใช้กำลังการคำนวณสูงทำให้เกิดความ
ล่าช้าในการพัฒนา



การใช้ platform ฟรีมีข้อจำกัดด้านความเร็วและจำนวนชั่วโมงการใช้งาน
จึงลองใช้บัตรเครดิตสมัคร platform google cloud
ที่มีกำลังการคำนวณสูงแล้วพบว่า cluster เต็ม

สรุปผล โมเดล

G A N



โมเดลสามารถใส่สีรูปได้โดยใช้กรัพยากรณ์อยกว่าโมเดล GAN แบบปกติ



โมเดลสามารถเกรนรูปได้หลายขนาดโดยอาจจะมีค่า error ที่ต่างกันบ้างแต่เมื่อดูผลลัพธ์ด้วยตาเปล่าพบว่าสามารถทำงานได้ปกติโดยมีความคมชัดใกล้เคียงต้นฉบับ



โมเดลใช้ training set ที่มีขนาดเท่ากันทุกรูปยังสามารถใส่สีรูป input ที่มีขนาดต่างกับข้อมูล training set ได้

Q & A

Thank you!

