

Coding in AI

Final Project

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Kunch Ringrod 58070501105



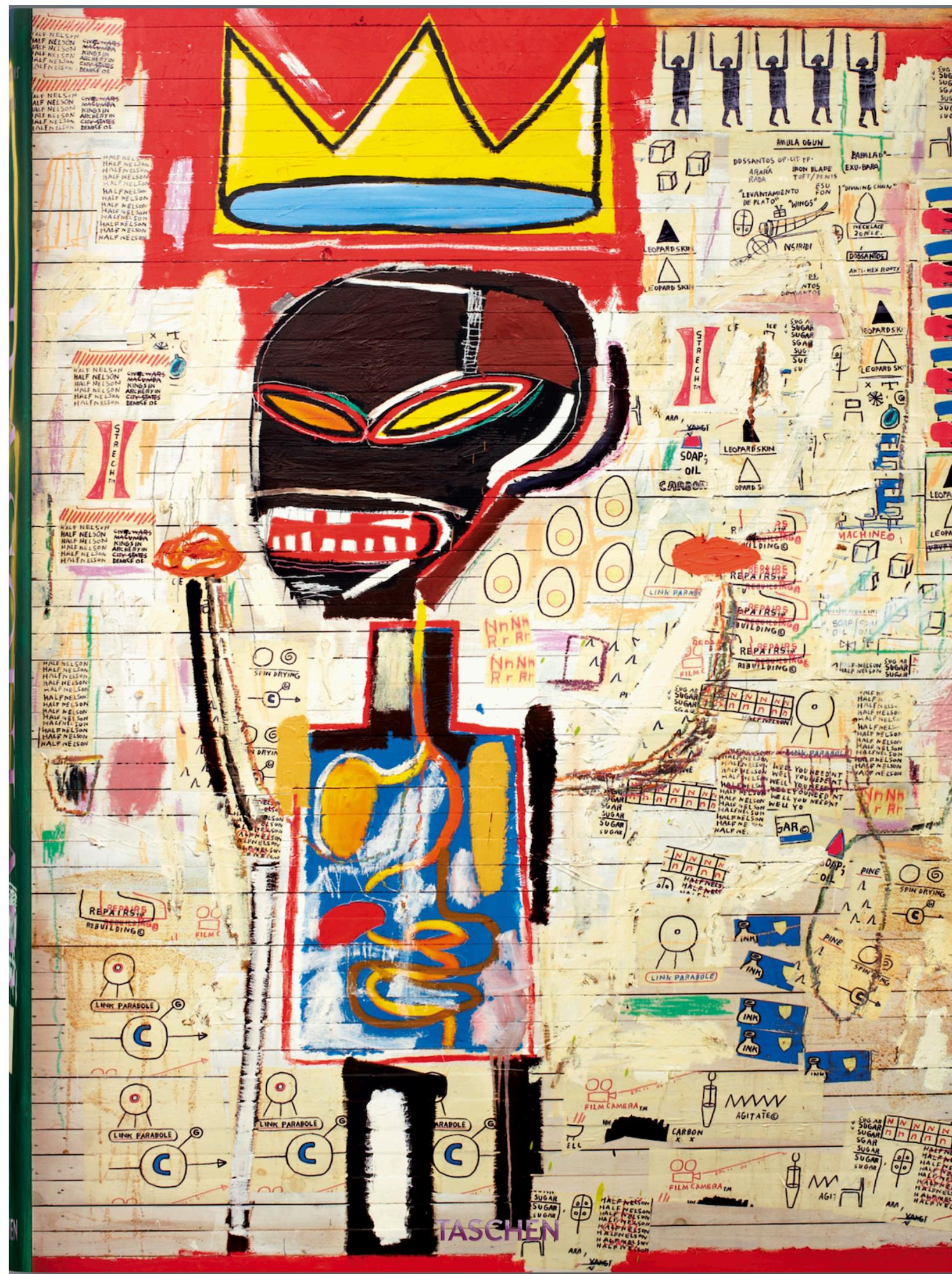
Jean Michel Basquiat

December 22, 1960 – August 12, 1988

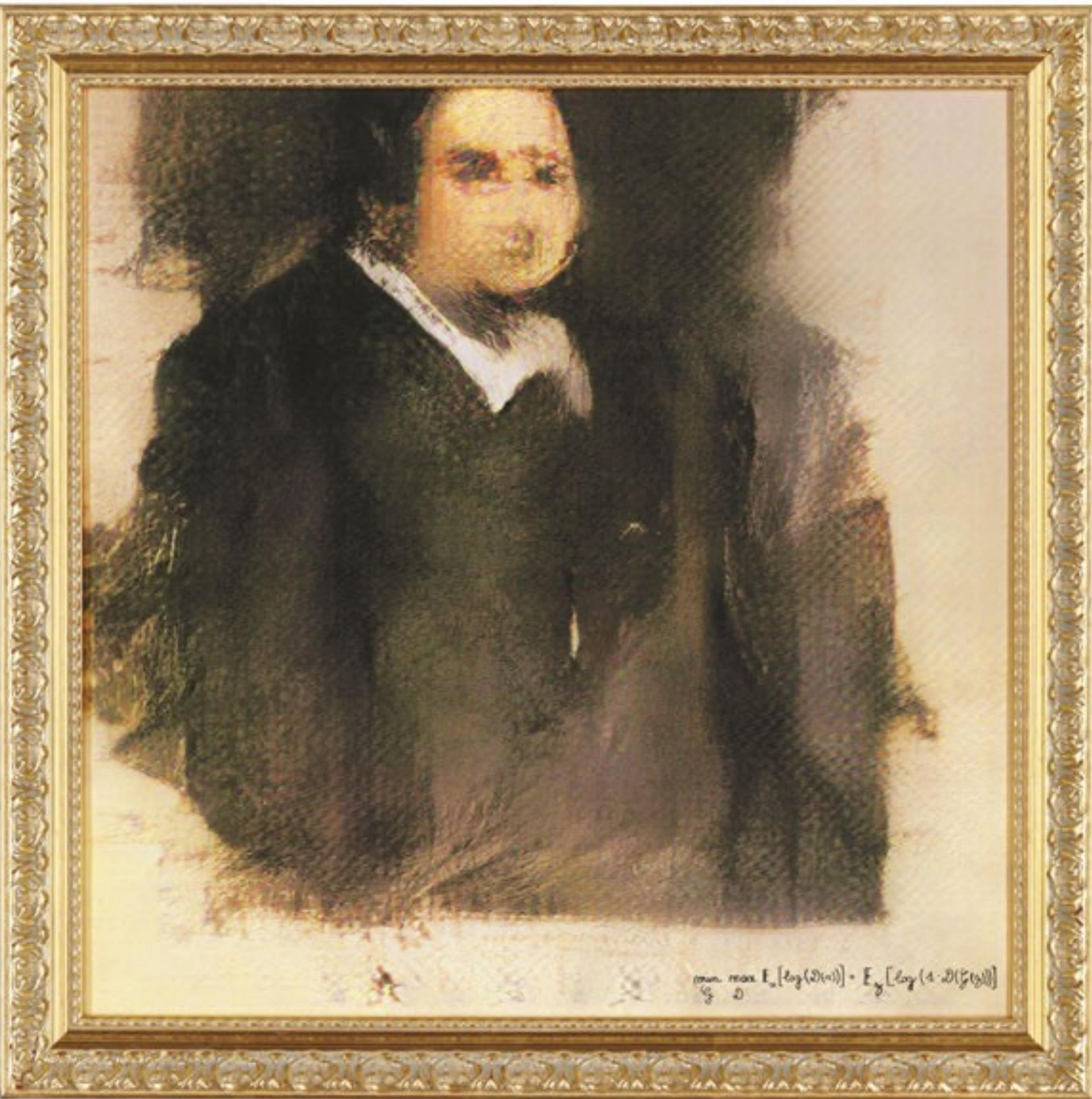
Street art & Neo-Expressionisme

~ 200 paintings

O



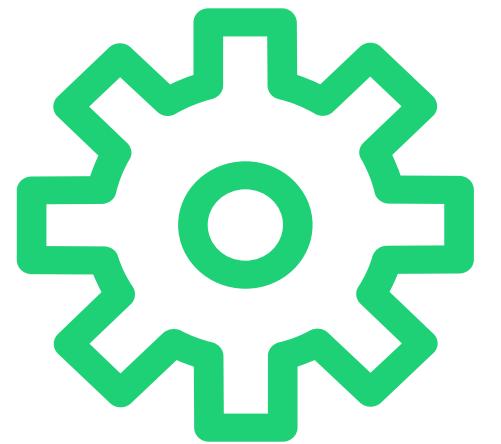
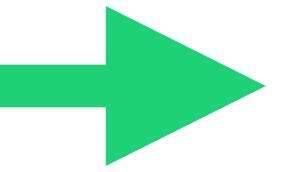
0



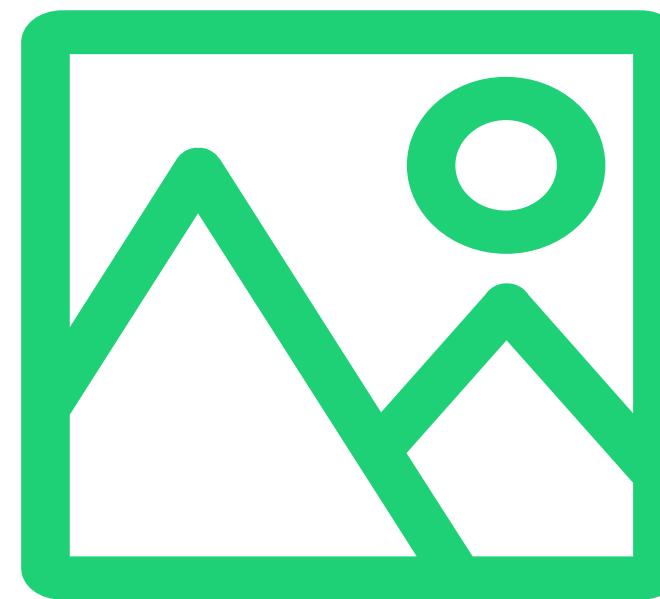
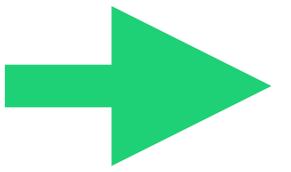
Edmond de Belamy
2018

15 000 images from different artists

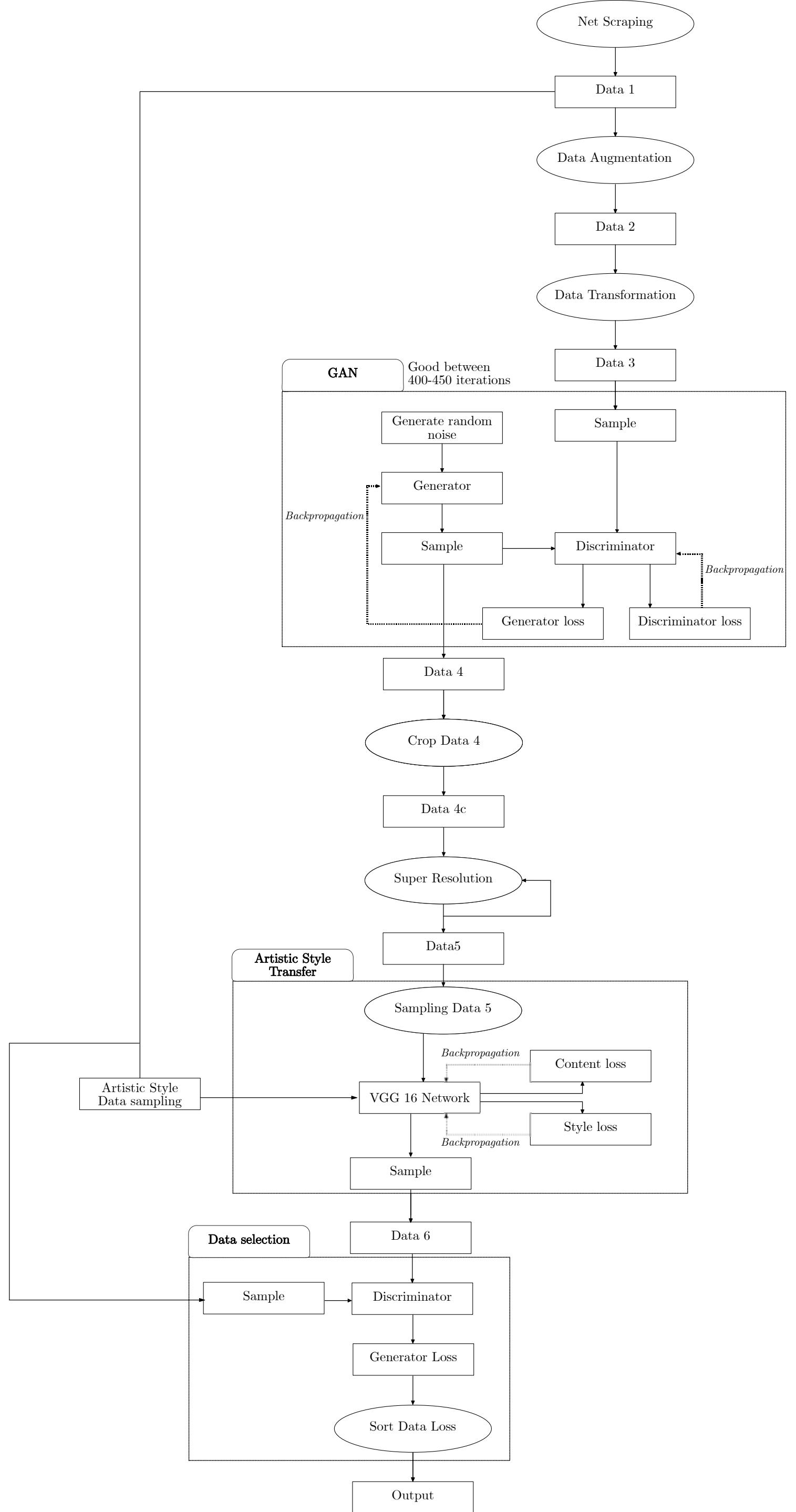
Objectif: Create an algorithm which create art painting and which have Basquiat's Style



Algorithm

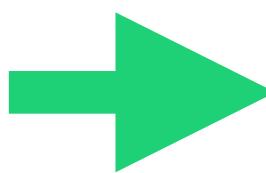
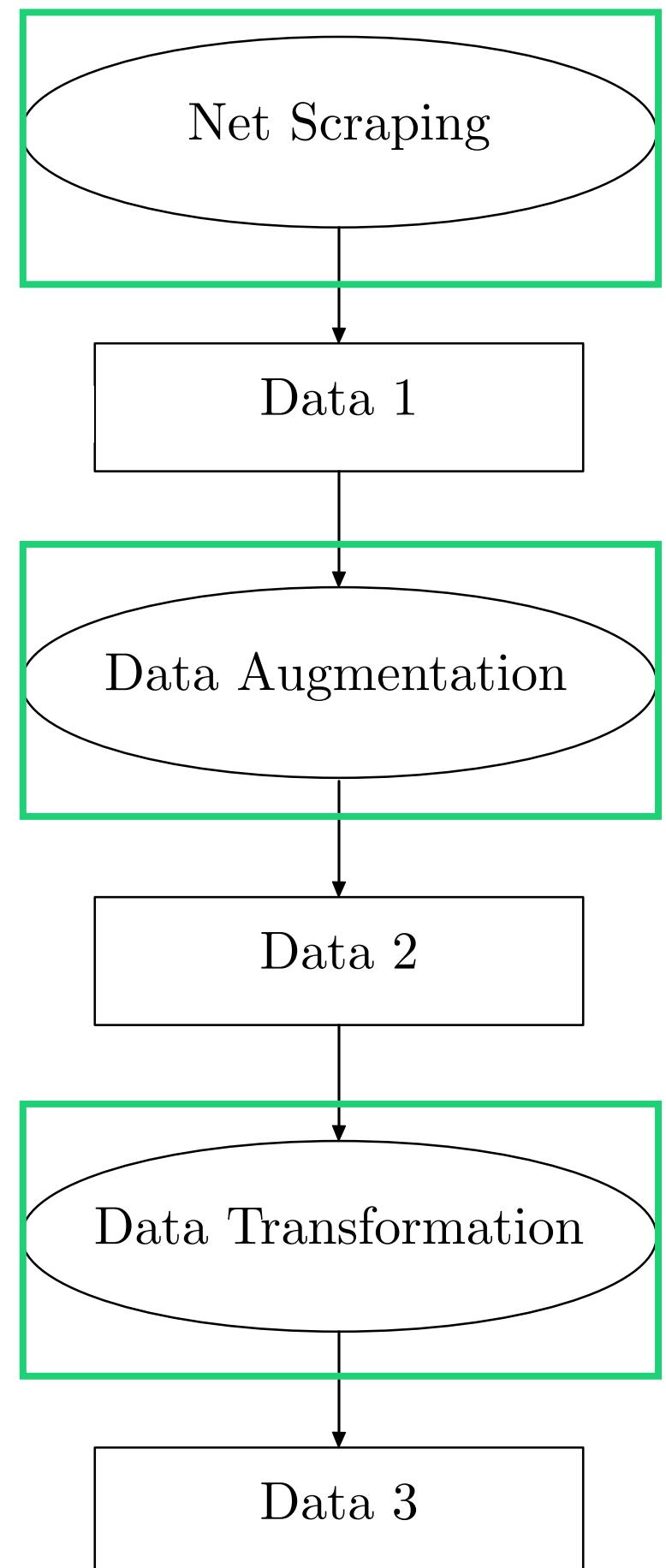


New painting

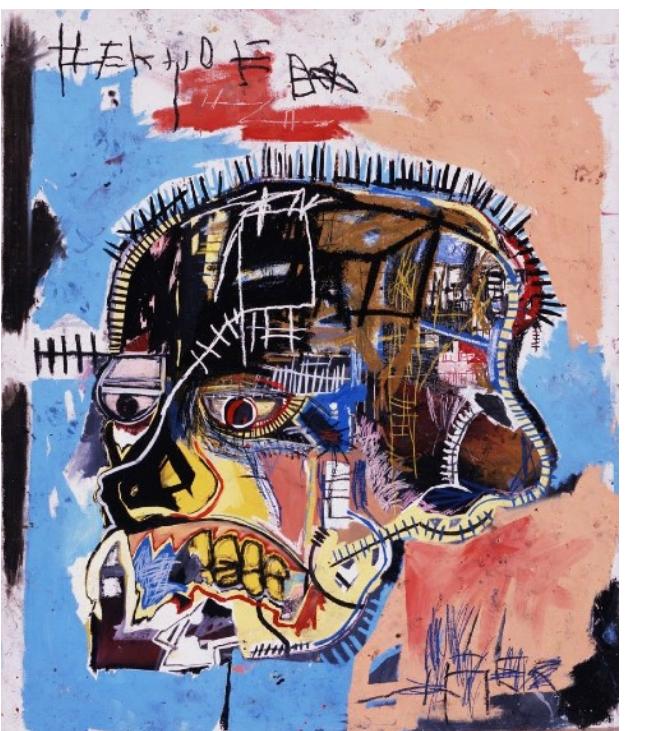


I

Data Preprocessing



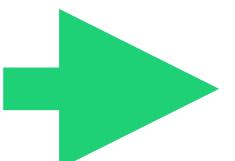
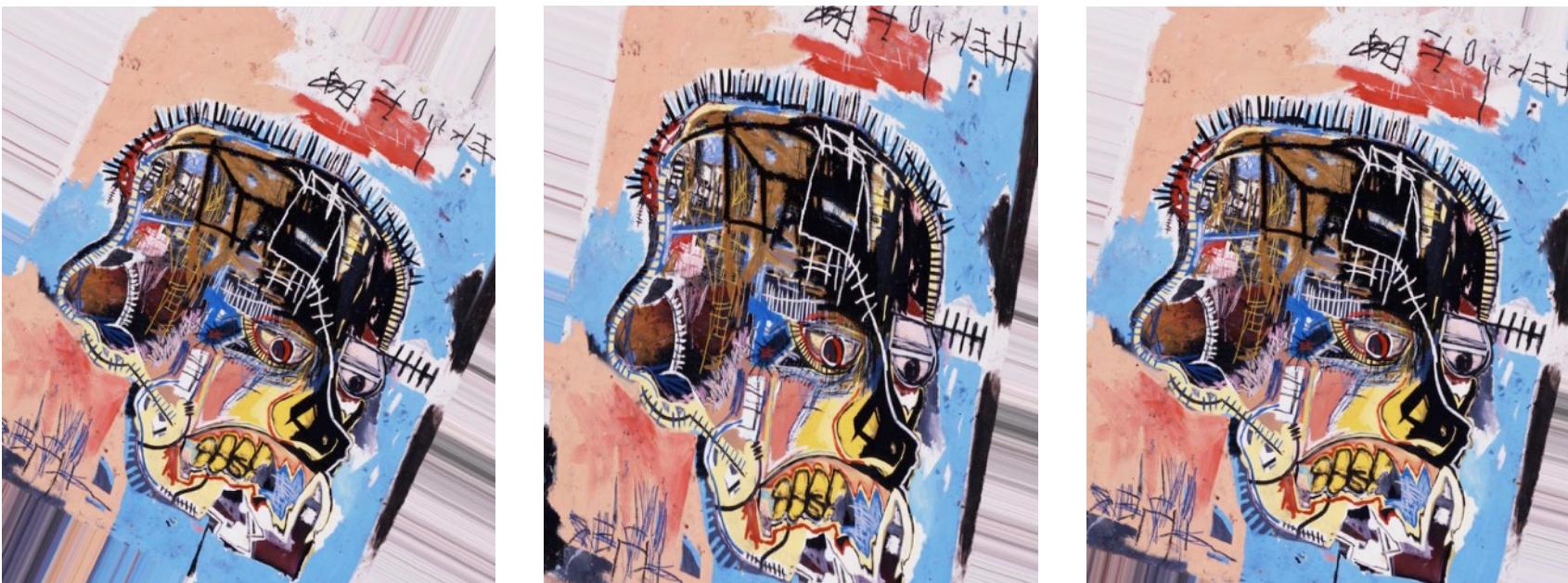
76 Paintings



532 Paintings

ImageDataGenerator

`rotation_range = 40,
shear_range = 0.2,
zoom_range = 0.2,
horizontal_flip = True`



Resize



I

Data Preprocessing



532 Paintings

ImageDataGenerator

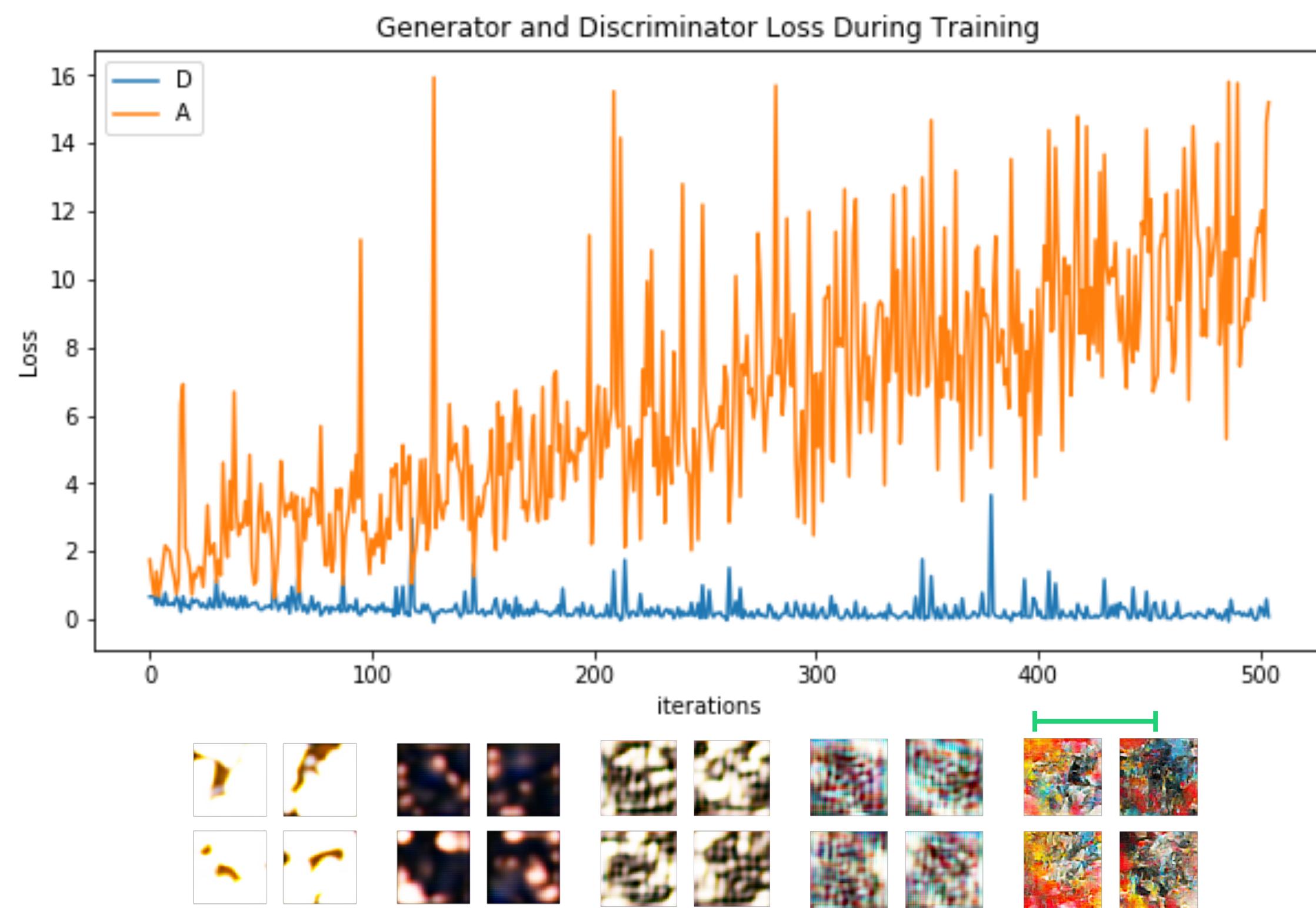
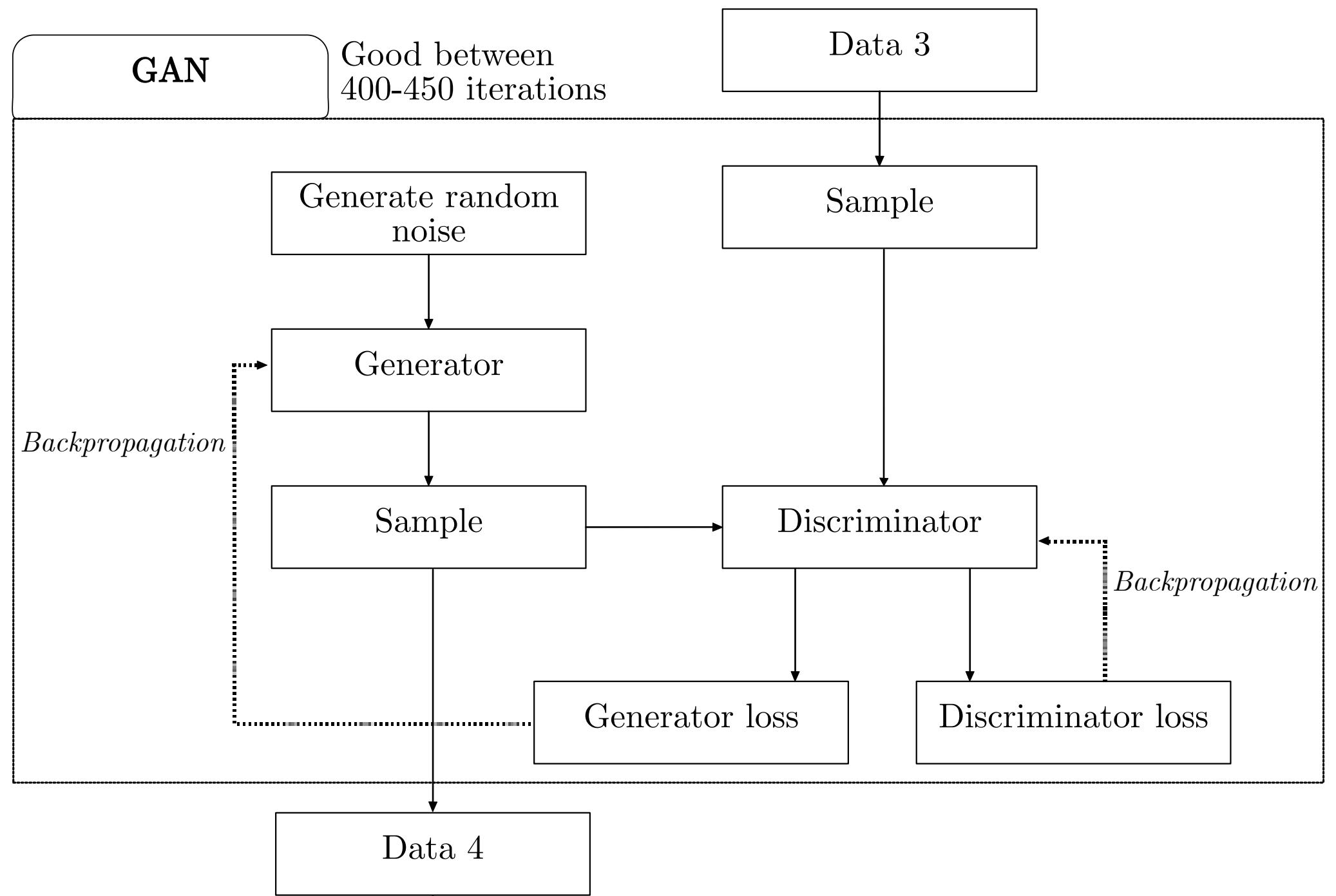
```
rotation_range = 40,  
shear_range = 0.2,  
zoom_range = 0.2,  
horizontal_flip = True
```



11

Create a new Picture

Generative Adversarial Network (GAN)



II

Create a new Picture

Generative Adversarial Network (GAN)

Layer (type)	Output Shape	Param #
<hr/>		
input_2 (InputLayer)	(None, 64, 64, 3)	0
conv2d_5 (Conv2D)	(None, 62, 62, 128)	3584
leaky_re_lu_6 (LeakyReLU)	(None, 62, 62, 128)	0
conv2d_6 (Conv2D)	(None, 30, 30, 128)	262272
leaky_re_lu_7 (LeakyReLU)	(None, 30, 30, 128)	0
conv2d_7 (Conv2D)	(None, 14, 14, 128)	262272
leaky_re_lu_8 (LeakyReLU)	(None, 14, 14, 128)	0
conv2d_8 (Conv2D)	(None, 6, 6, 128)	262272
leaky_re_lu_9 (LeakyReLU)	(None, 6, 6, 128)	0
flatten_1 (Flatten)	(None, 4608)	0
dropout_1 (Dropout)	(None, 4608)	0
dense_2 (Dense)	(None, 1)	4609
<hr/>		
Total params:	795,009	
Trainable params:	795,009	
Non-trainable params:	0	

Discriminator

Layer (type)	Output Shape	Param #
<hr/>		
input_1 (InputLayer)	(None, 100)	0
dense_1 (Dense)	(None, 131072)	13238272
leaky_re_lu_1 (LeakyReLU)	(None, 131072)	0
reshape_1 (Reshape)	(None, 32, 32, 128)	0
conv2d_1 (Conv2D)	(None, 32, 32, 256)	819456
leaky_re_lu_2 (LeakyReLU)	(None, 32, 32, 256)	0
conv2d_transpose_1 (Conv2DTr)	(None, 64, 64, 256)	1048832
leaky_re_lu_3 (LeakyReLU)	(None, 64, 64, 256)	0
conv2d_2 (Conv2D)	(None, 64, 64, 256)	1638656
leaky_re_lu_4 (LeakyReLU)	(None, 64, 64, 256)	0
conv2d_3 (Conv2D)	(None, 64, 64, 256)	1638656
leaky_re_lu_5 (LeakyReLU)	(None, 64, 64, 256)	0
conv2d_4 (Conv2D)	(None, 64, 64, 3)	37635
<hr/>		
Total params:	18,421,507	
Trainable params:	18,421,507	
Non-trainable params:	0	

Generator

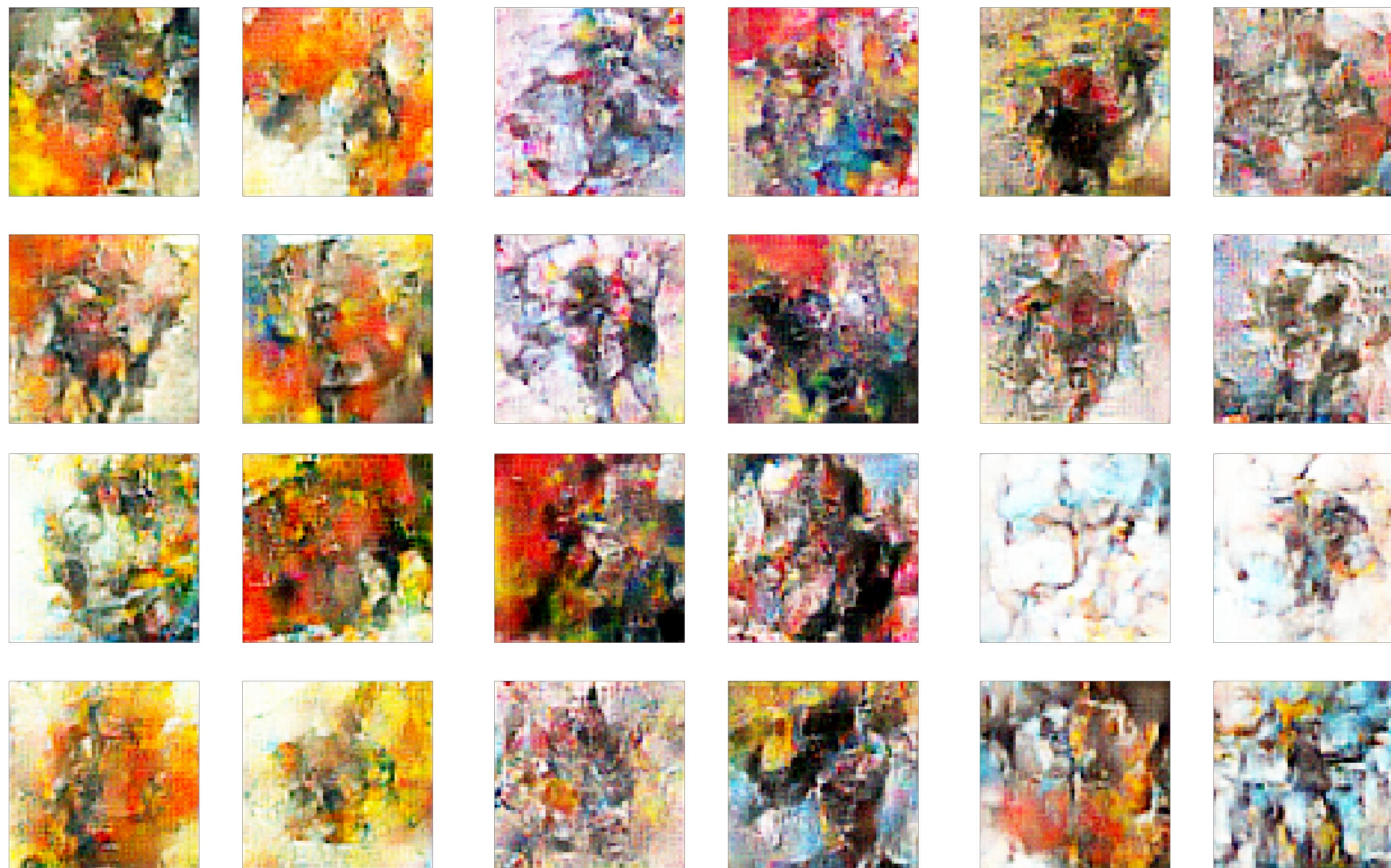
Layer (type)	Output Shape	Param #
<hr/>		
input_3 (InputLayer)	(None, 100)	0
model_1 (Model)	(None, 64, 64, 3)	18421507
model_2 (Model)	(None, 1)	795009
<hr/>		
Total params:	19,216,516	
Trainable params:	18,421,507	
Non-trainable params:	795,009	

GAN

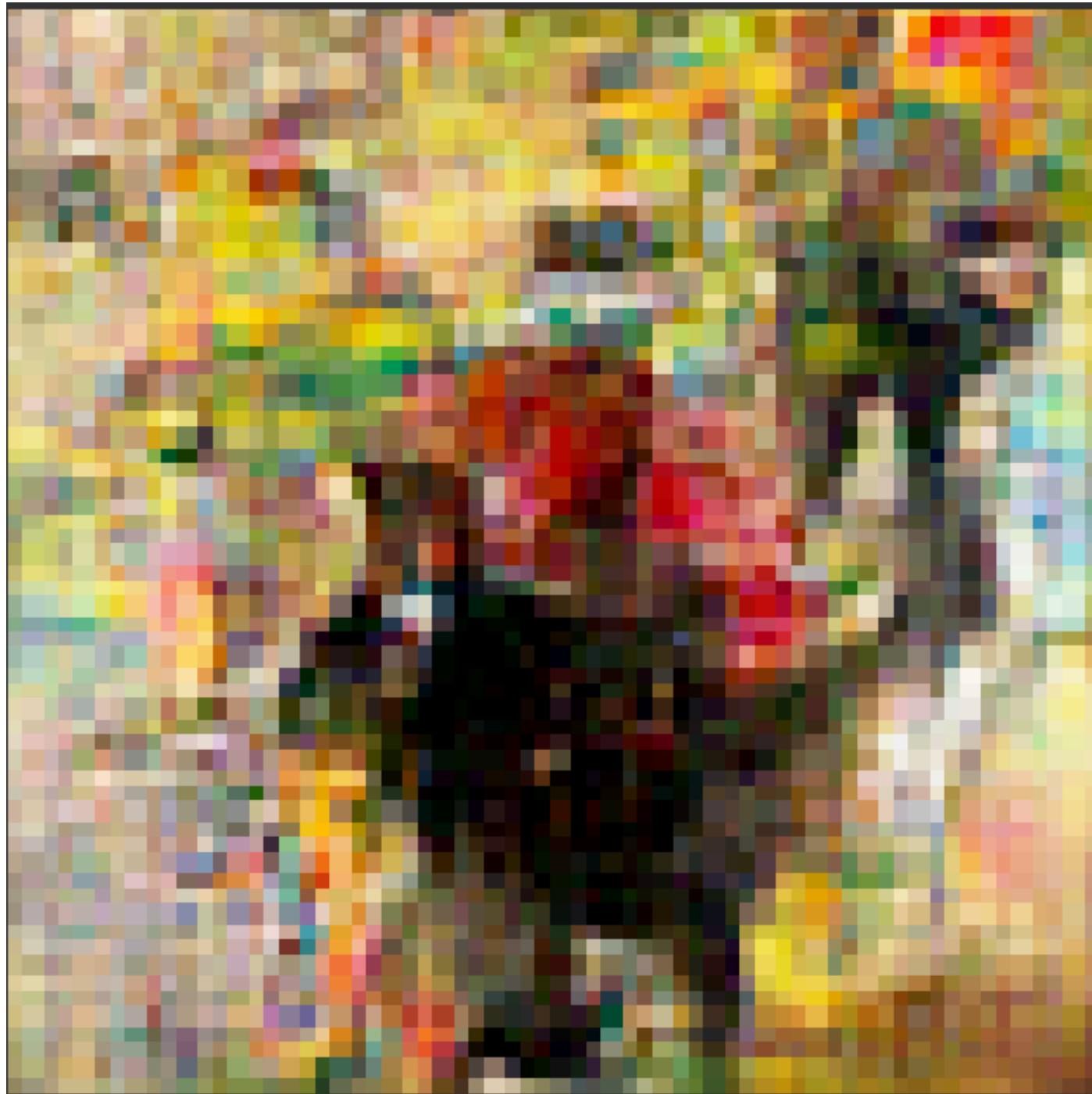
II

Create a new Picture

Generative Adversarial Network (GAN) results



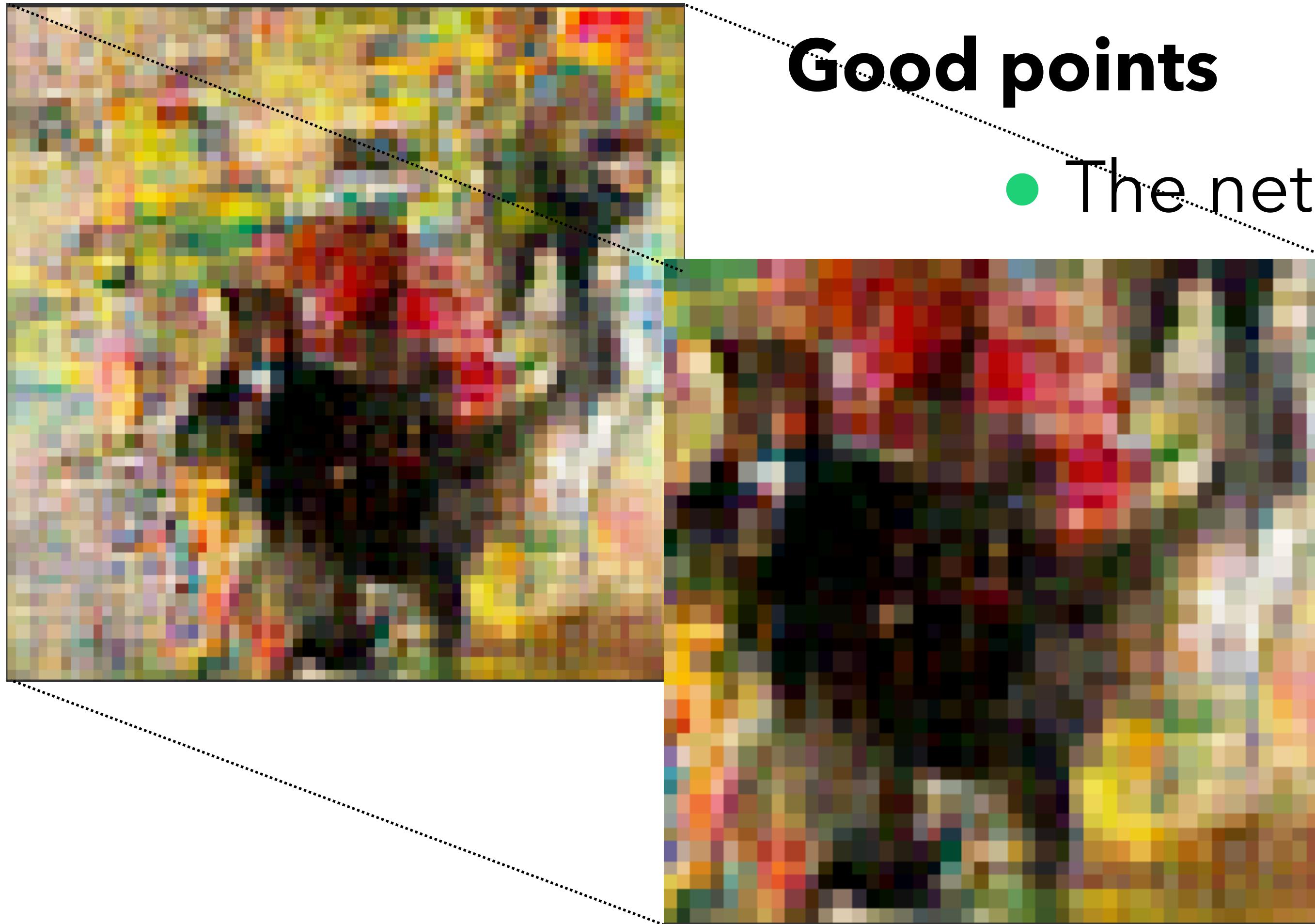
Generative Adversarial Network (GAN)



Good points

- The network create something new
- We have the typical figurative black pattern

Generative Adversarial Network (GAN)



Good points

- The network create something like the typical figurative pattern

Generative Adversarial Network (GAN)



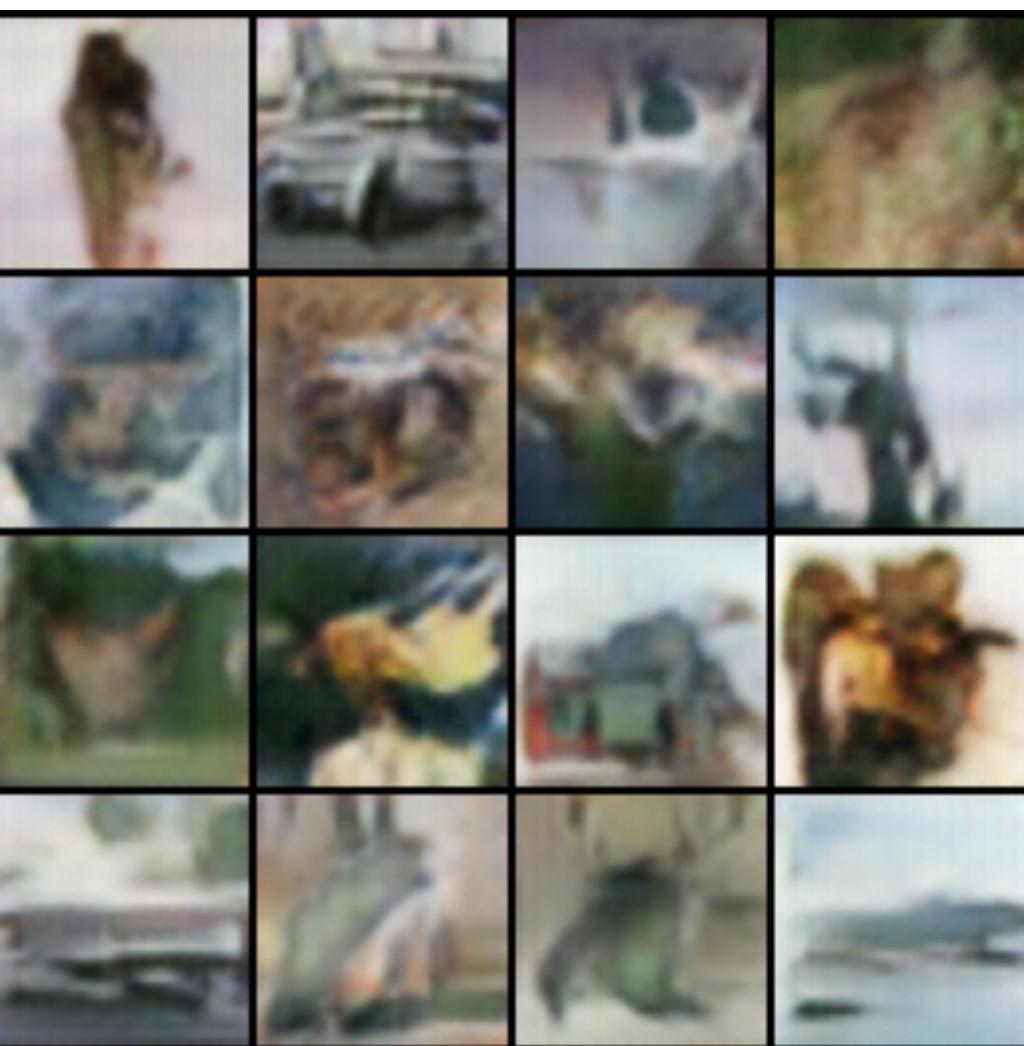
Bad Points

- Bad resolution
- We don't have Basquiat's style

III

Optimise the results

GAN Resolution Problem state of the art

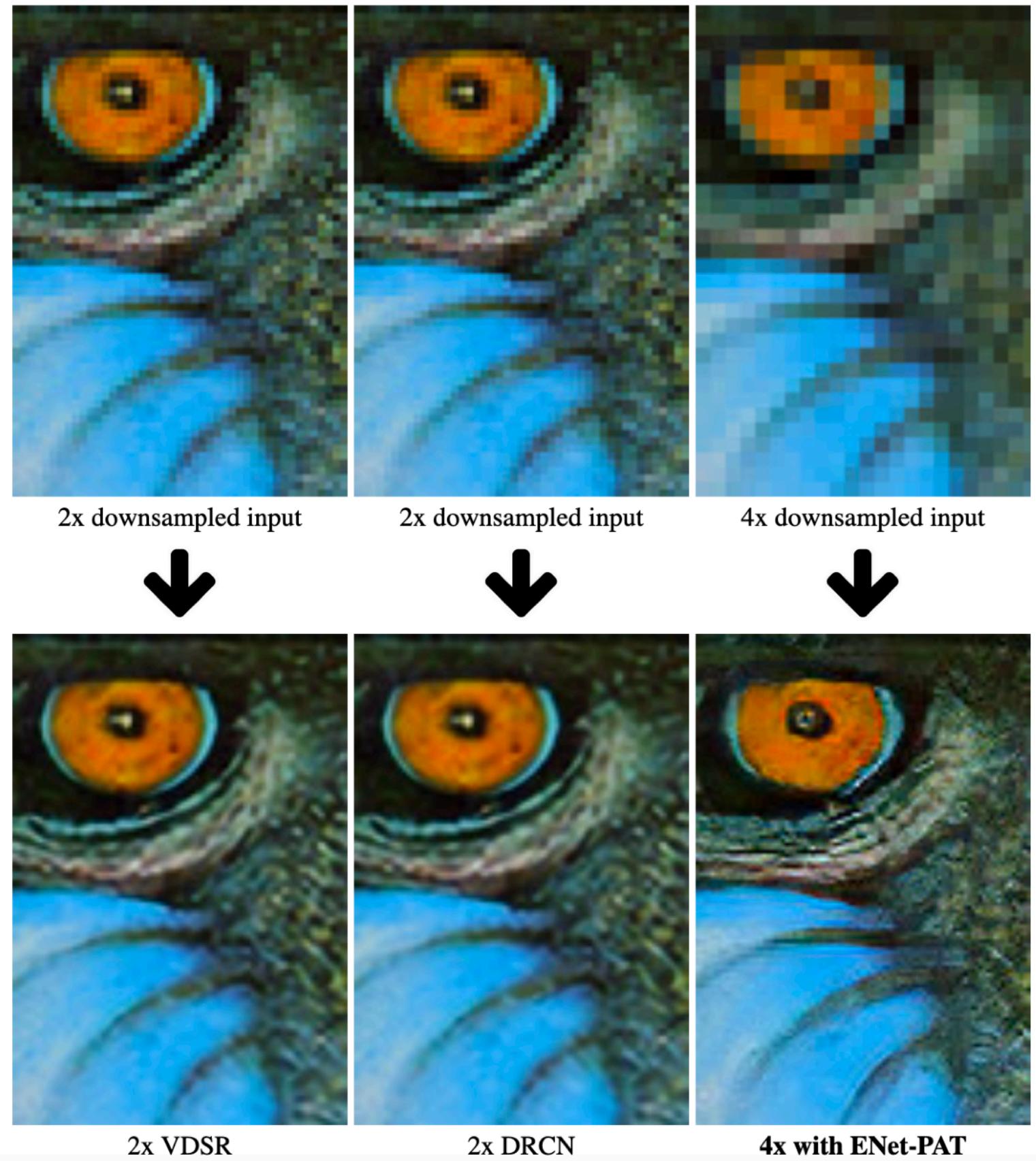


III

Optimise the results

Super resolution

EnhanceNet

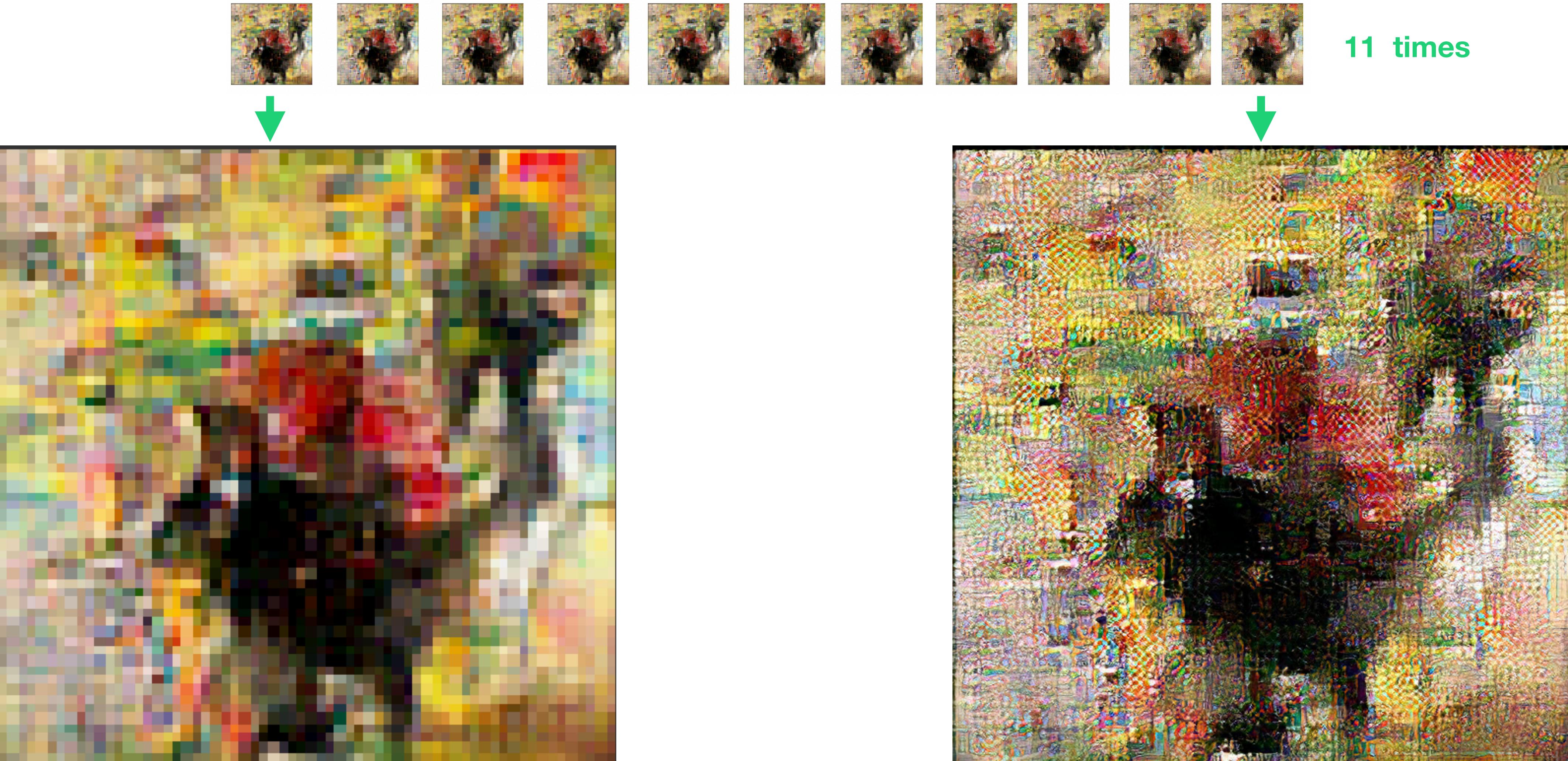


Output size	Layer
$w \times h \times c$	Input I_{LR}
	Conv, ReLU
$w \times h \times 64$	Residual: Conv, ReLU, Conv
	...
$2w \times 2h \times 64$	2x nearest neighbor upsampling Conv, ReLU
$4w \times 4h \times 64$	2x nearest neighbor upsampling Conv, ReLU
	Conv, ReLU
$4w \times 4h \times c$	Conv
	Residual image I_{res}
	Output $I_{est} = I_{bicubic} + I_{res}$

By using feed-forward fully convolutional neural networks in an adversarial training setting, they achieve a significant boost in image quality at high magnification ratios.

III

Optimise the results | Super resolution



III

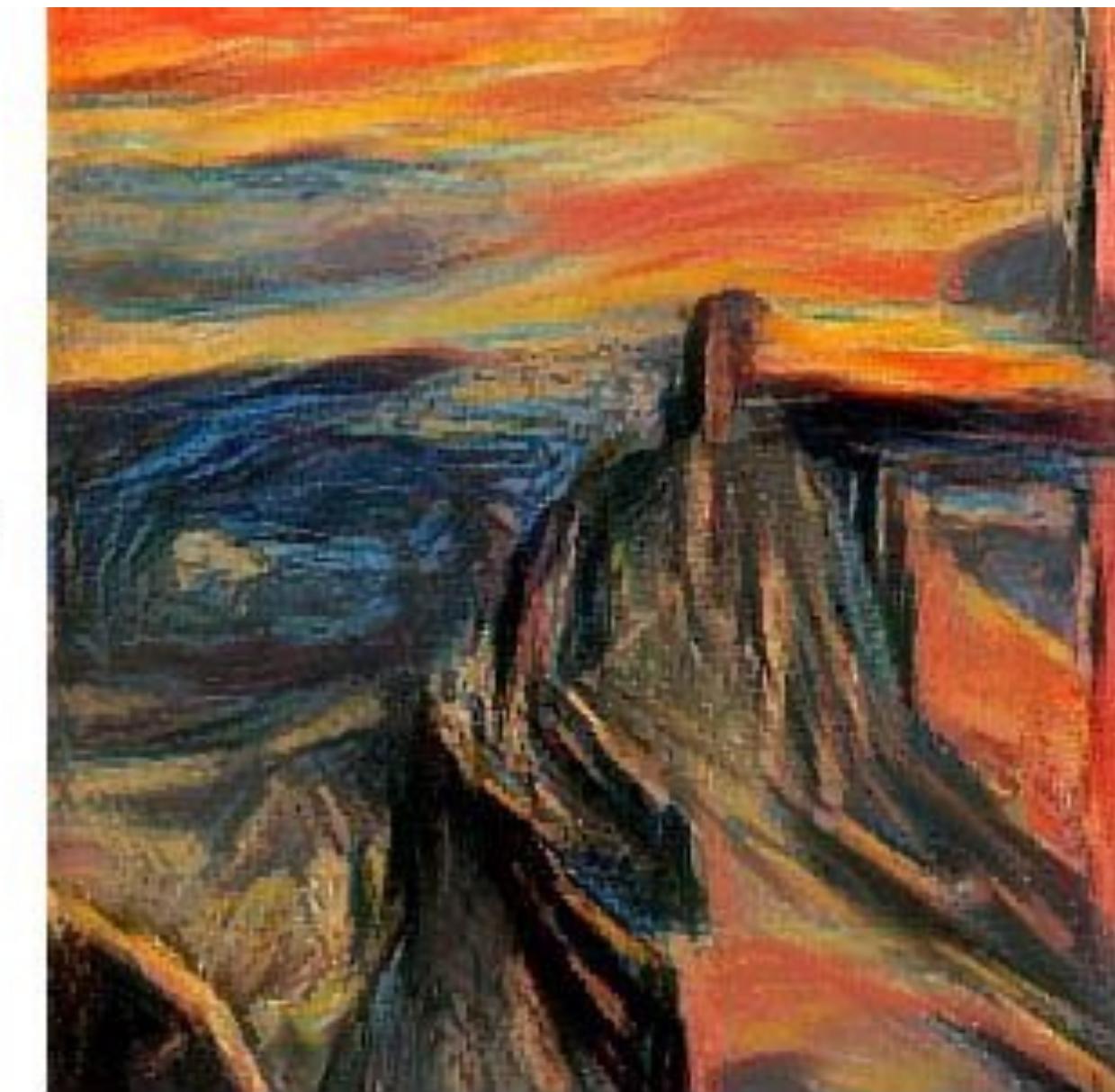
Optimise the results | **Artistic Style Transfer**



+



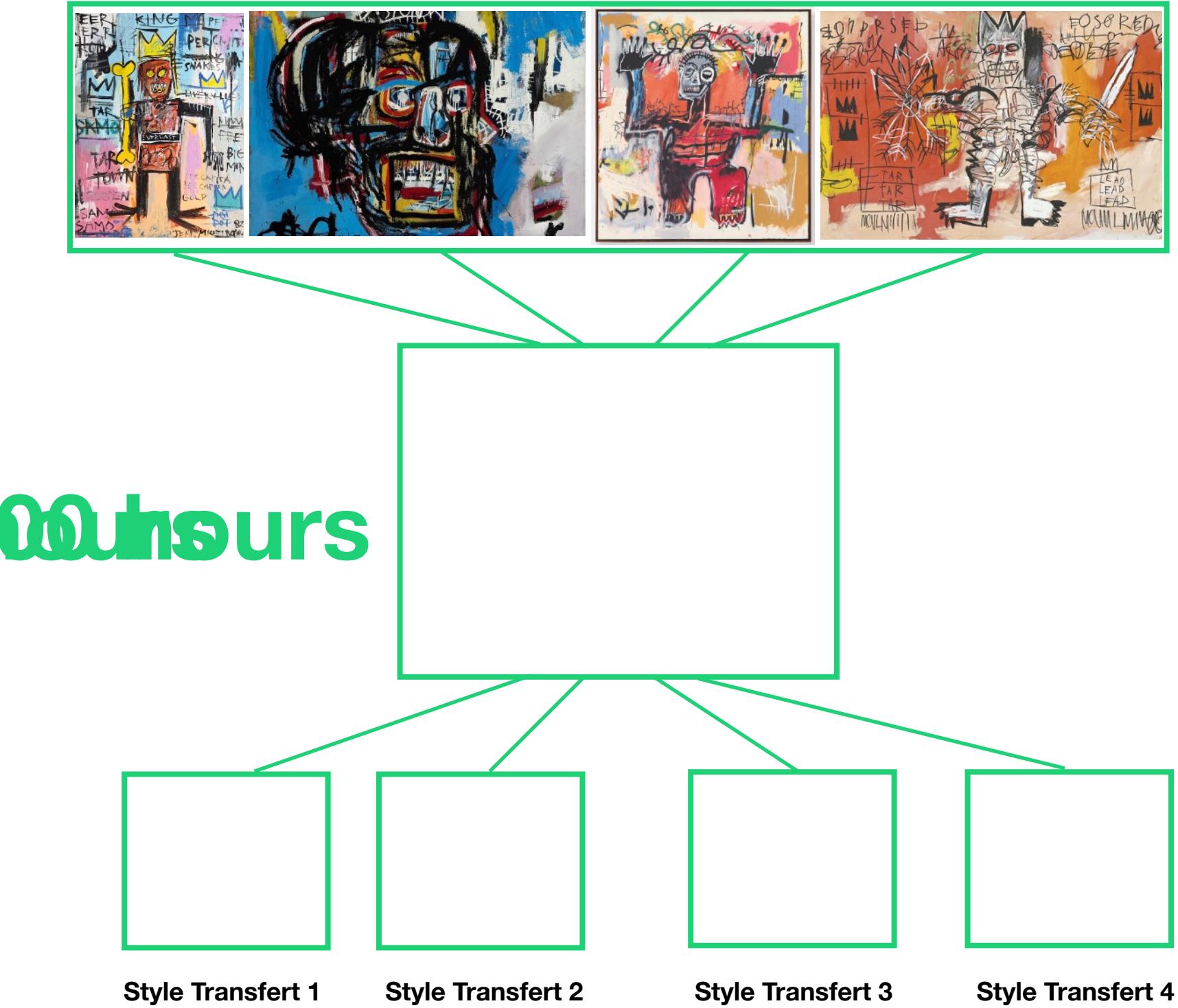
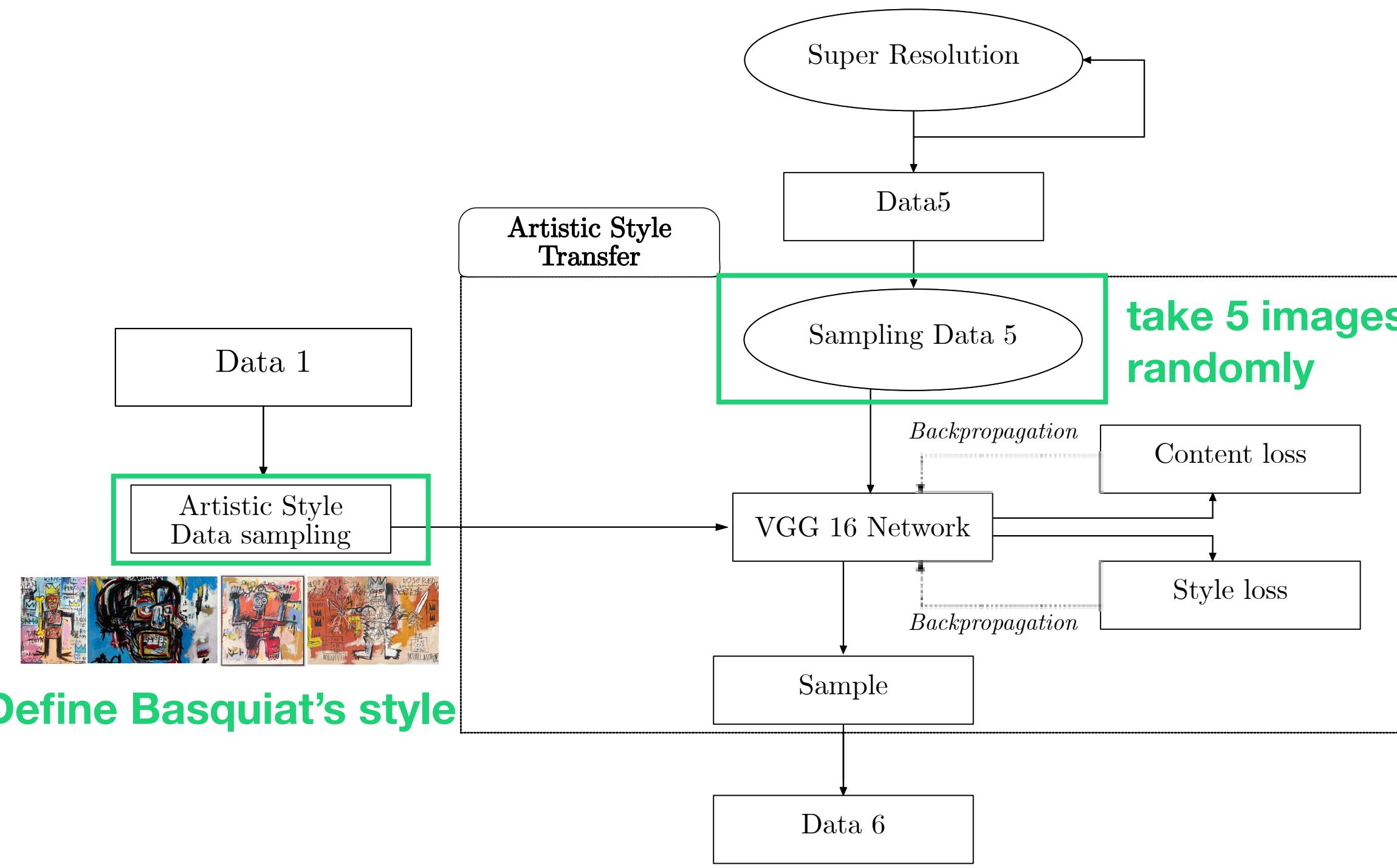
=



III

Optimise the results

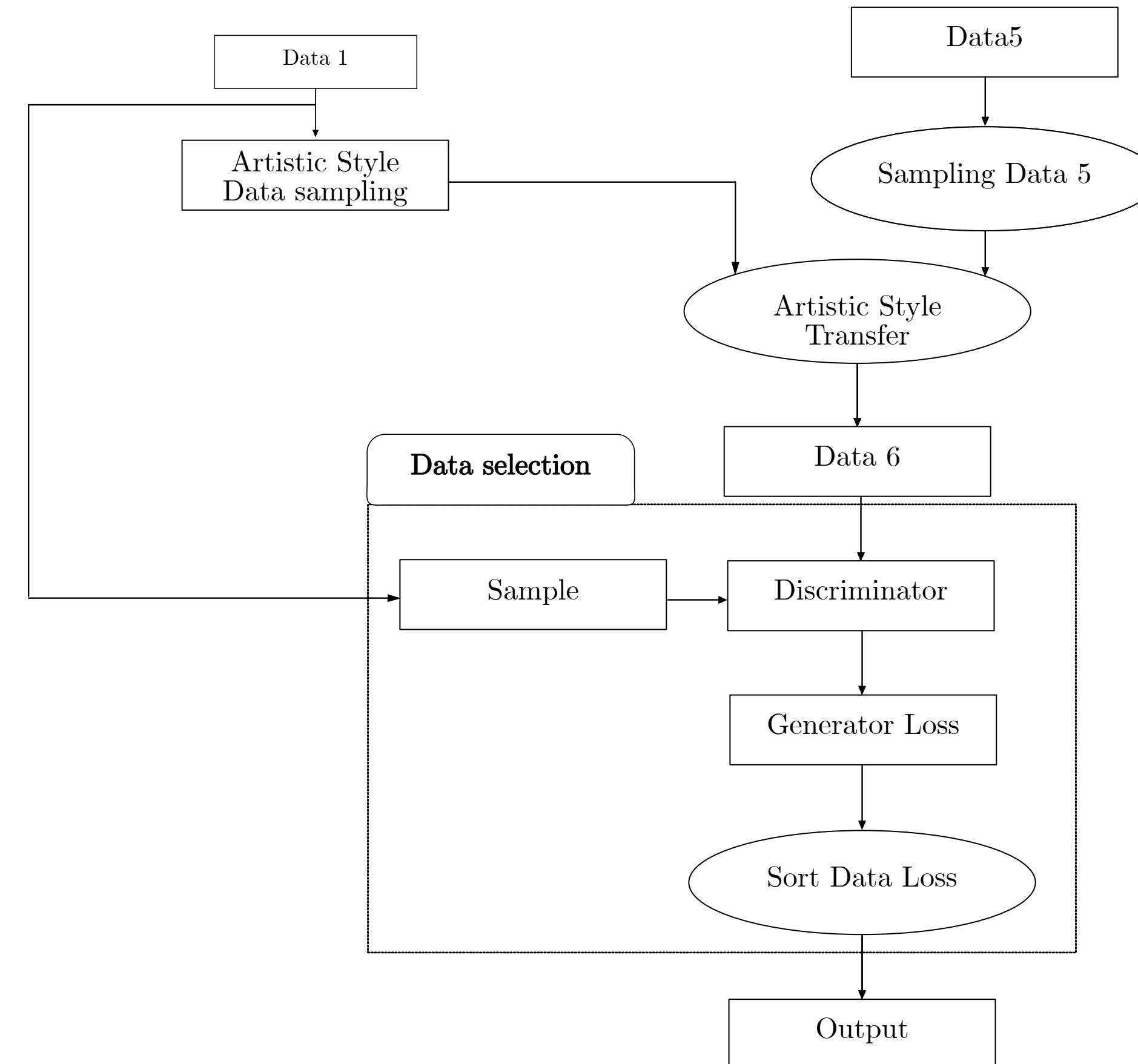
Artistic Style Transfer



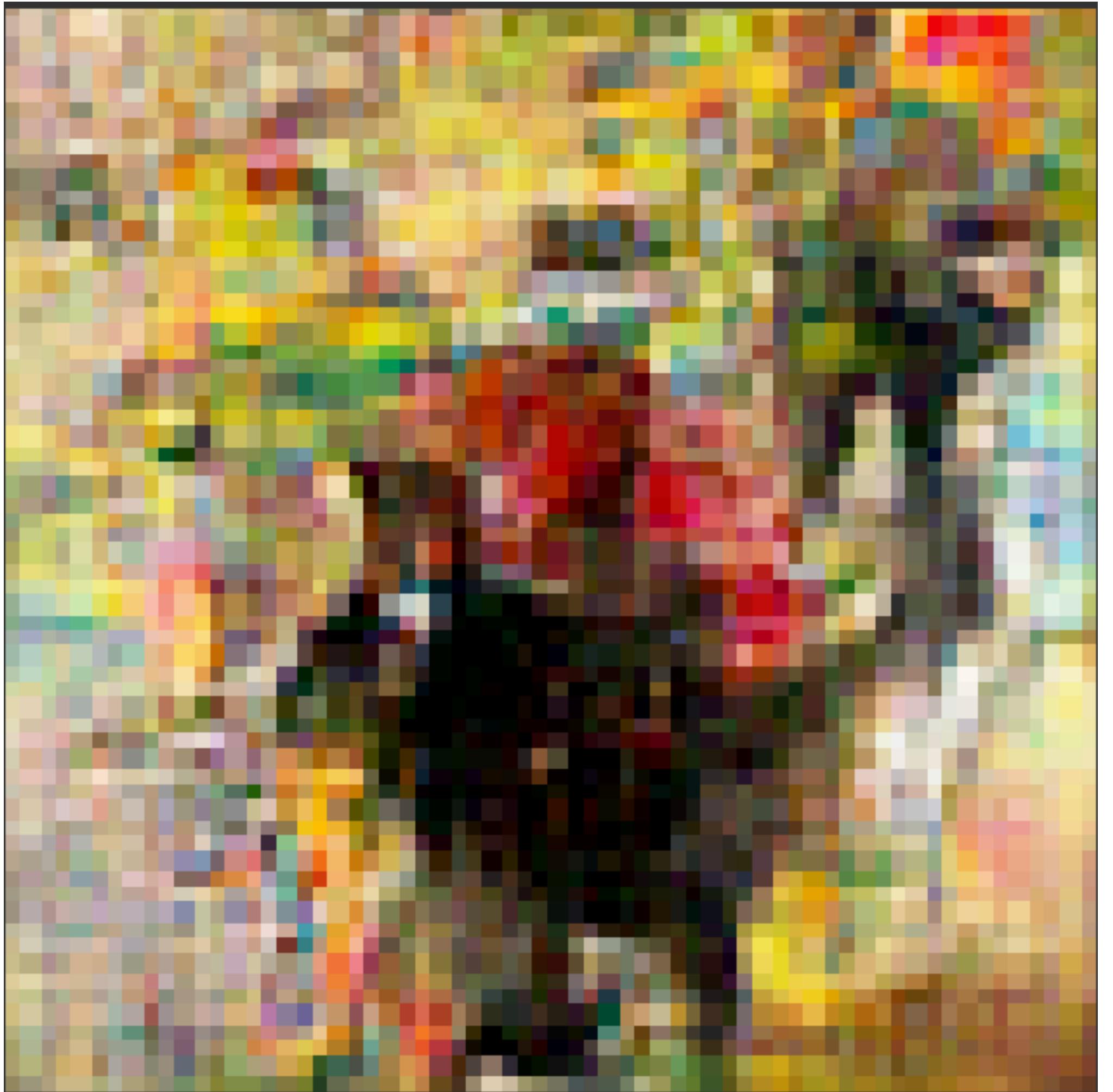
Note: if we want to have a perfect result we should do the artistic style transfer with all Basquiat's art works but this would take too much time.

IV

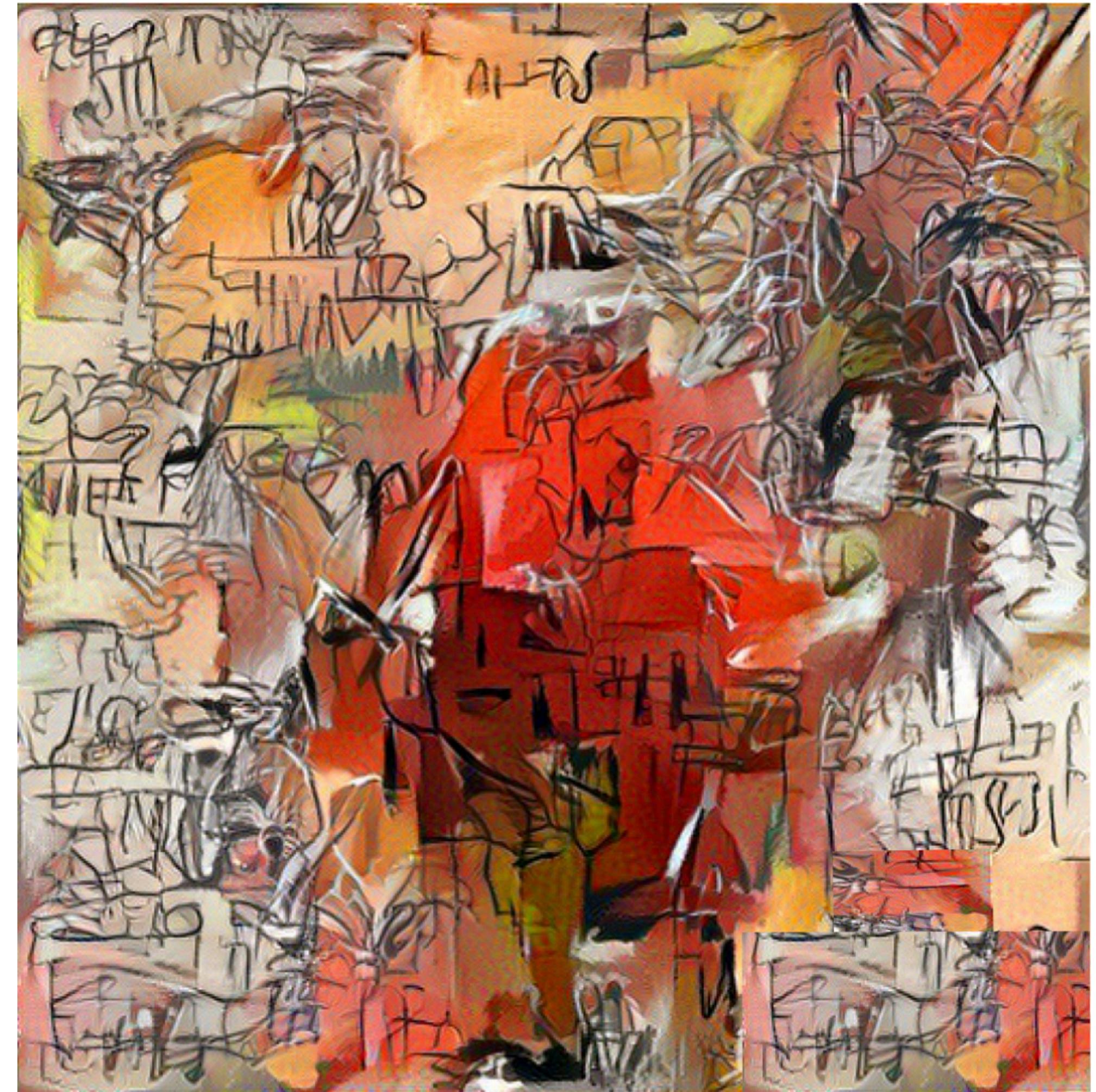
Select the Best Picture



Results



Content



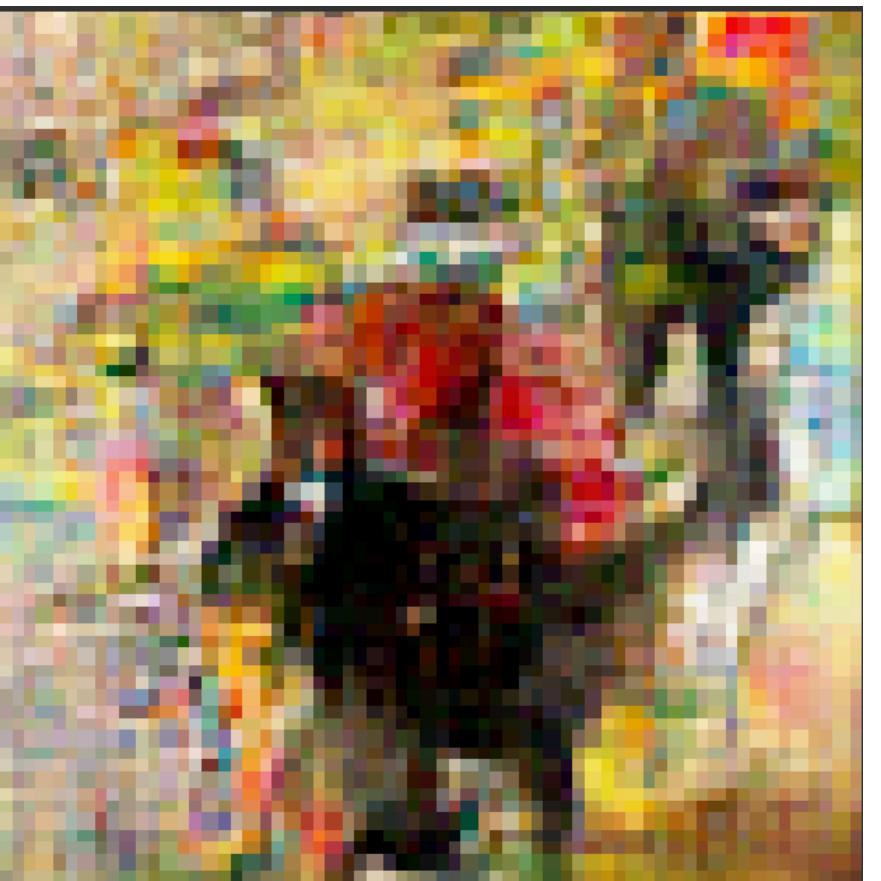
Style

V

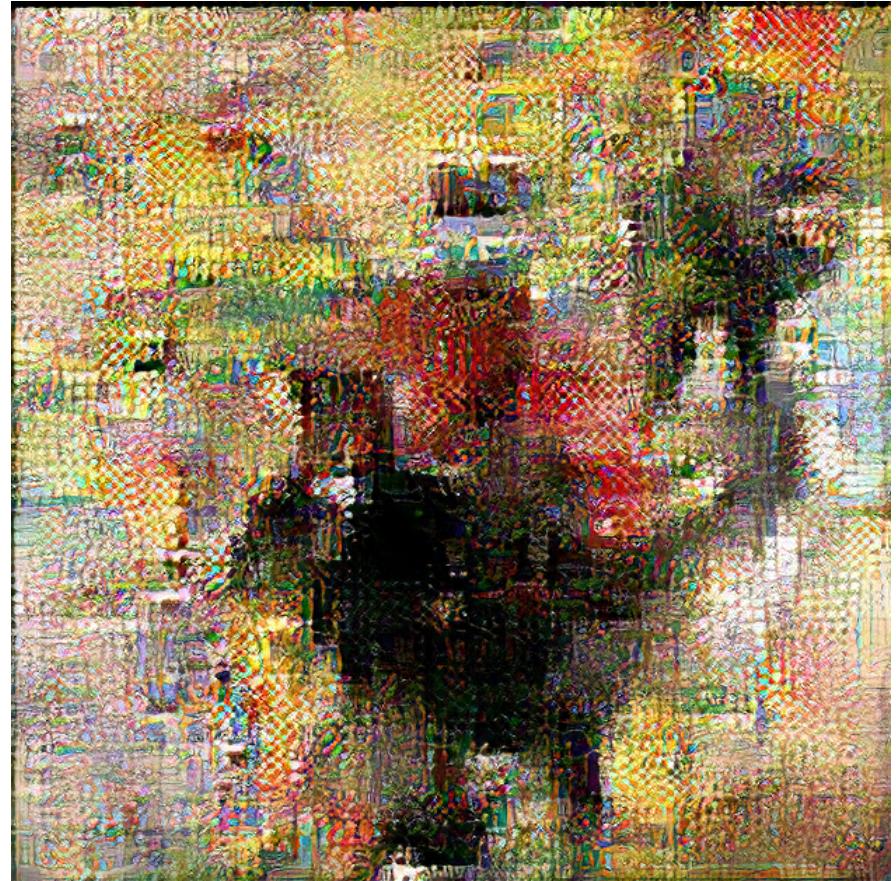
Summary



Data preprocessing



GAN



Super Resolution



Artistic Style Transfer

VII

Conclusion | Results



V

Conclusion | Results

- We arrived to manage small Dataset
- We used 4 Neural Network
- We have a good quality result

