Discovering GANs

algorithmic aesthetics

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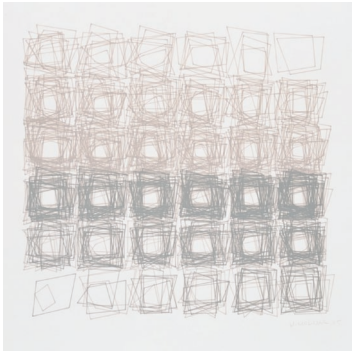
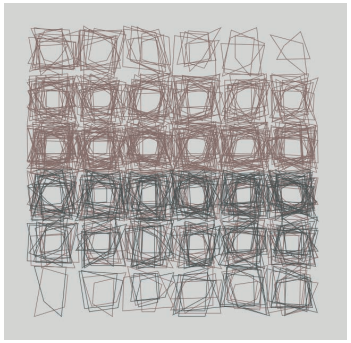
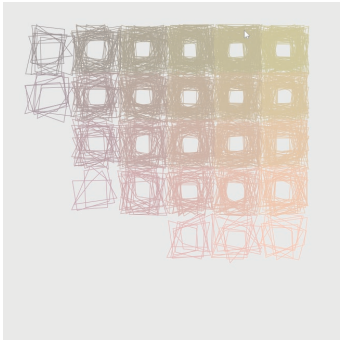


Original Artwork :
Véra Molnar, *Structure de quadrilatère*, 1985



Static recoding

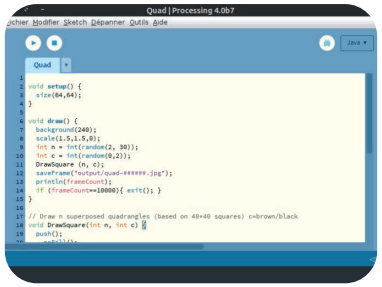


Dynamic recoding

1. Generating the dataset

Pseudo-algorithm

```
void setup()
  create a 64*64 canvas


void draw()

  int n <- random int between 2 and 30
  int c <- random int between 0 and 1

  DrawSquare (n, c)

  save 10 000 times, as «output/quad-######.jpg»


void DrawSquare(int n, int c)
  exactly the same as in recoding project, it draws n randomly
scribbled quads over the same position

but in addition, checks c
  if c=0, draw in brown
  if c=1, draw in black
```



Generated 10 000 with Processing

Possibilities and examples

$$N = 2\left(\prod_{i=2}^{30} 27^{(2*4)}\right) \simeq 10^{320} \text{ possibilities}$$

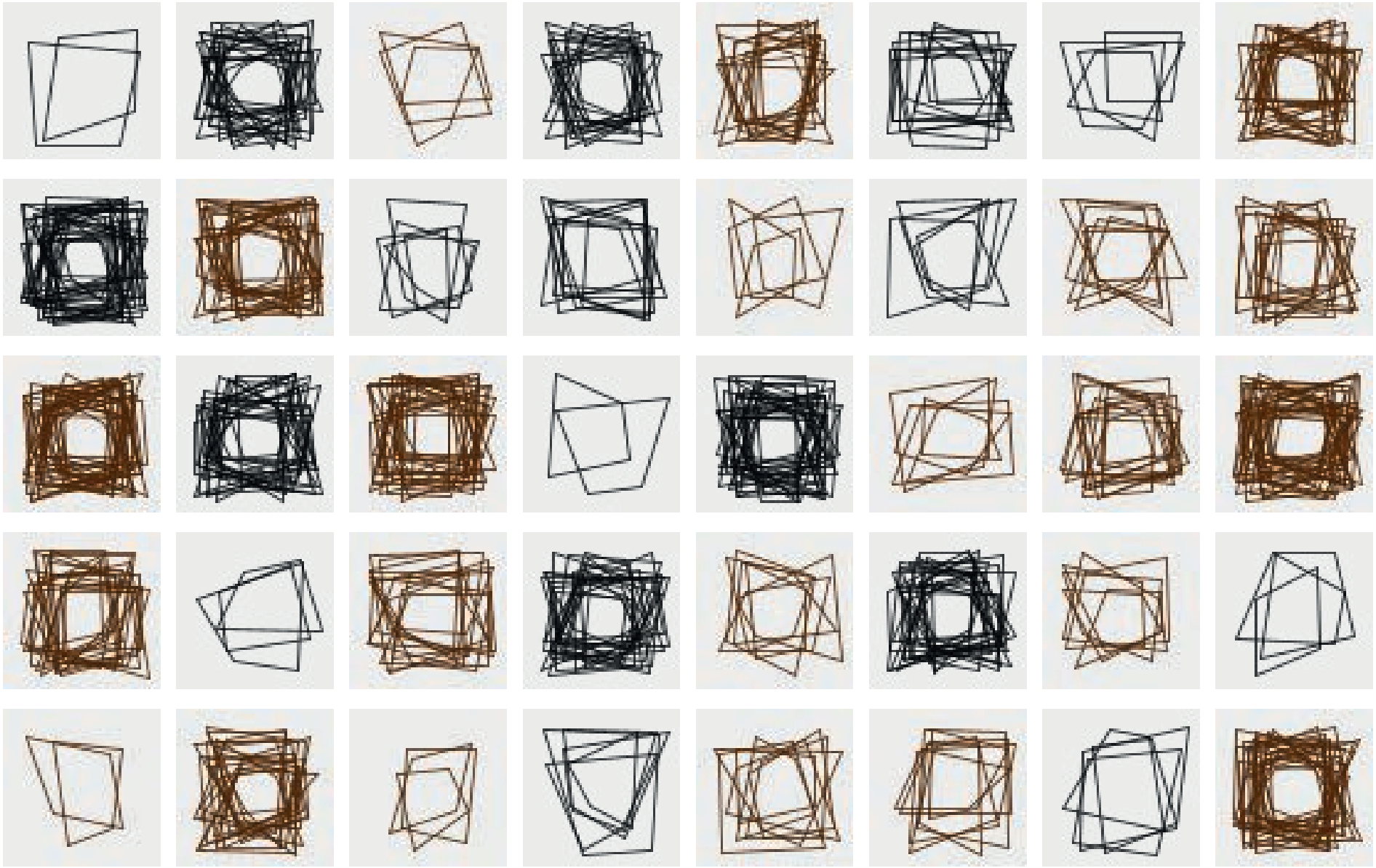
Black or brown * we superpose from 2 to 30 quads * 27 possible values for each x and y of 4 vertices of each quad (they vary by (-12,-12) to (+15,+15) from the original positions of regular square)

c = 1
n -> 30

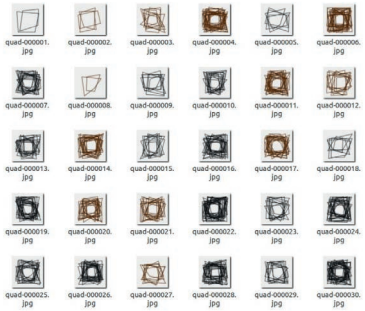
c = 1
n -> 2

c = 0
n -> 30

c = 0
n -> 2



2. Training the GAN



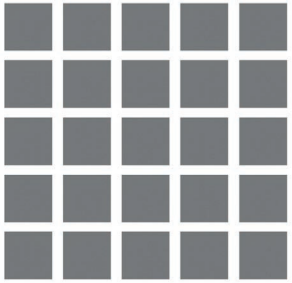
Dataset

output.zip

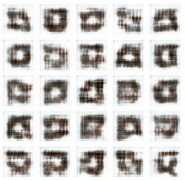
'https://github.com/leogenot/Generativ-eDeepDrawing/' + tensorflow

```
EPOCHS = 6500
PRINT_EVERY_N_BATCHES = 100
N_CRITIC = 5
BATCH_SIZE = 64
```

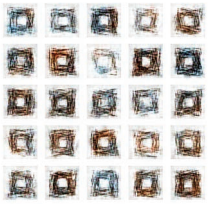
gan.train



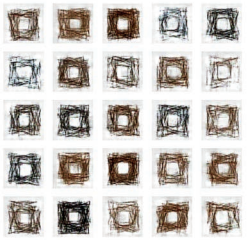
0



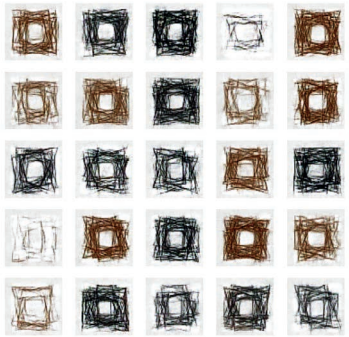
100



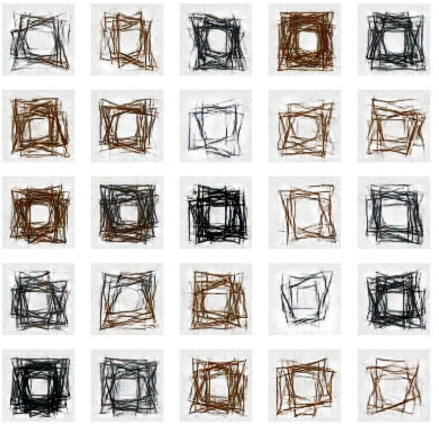
300



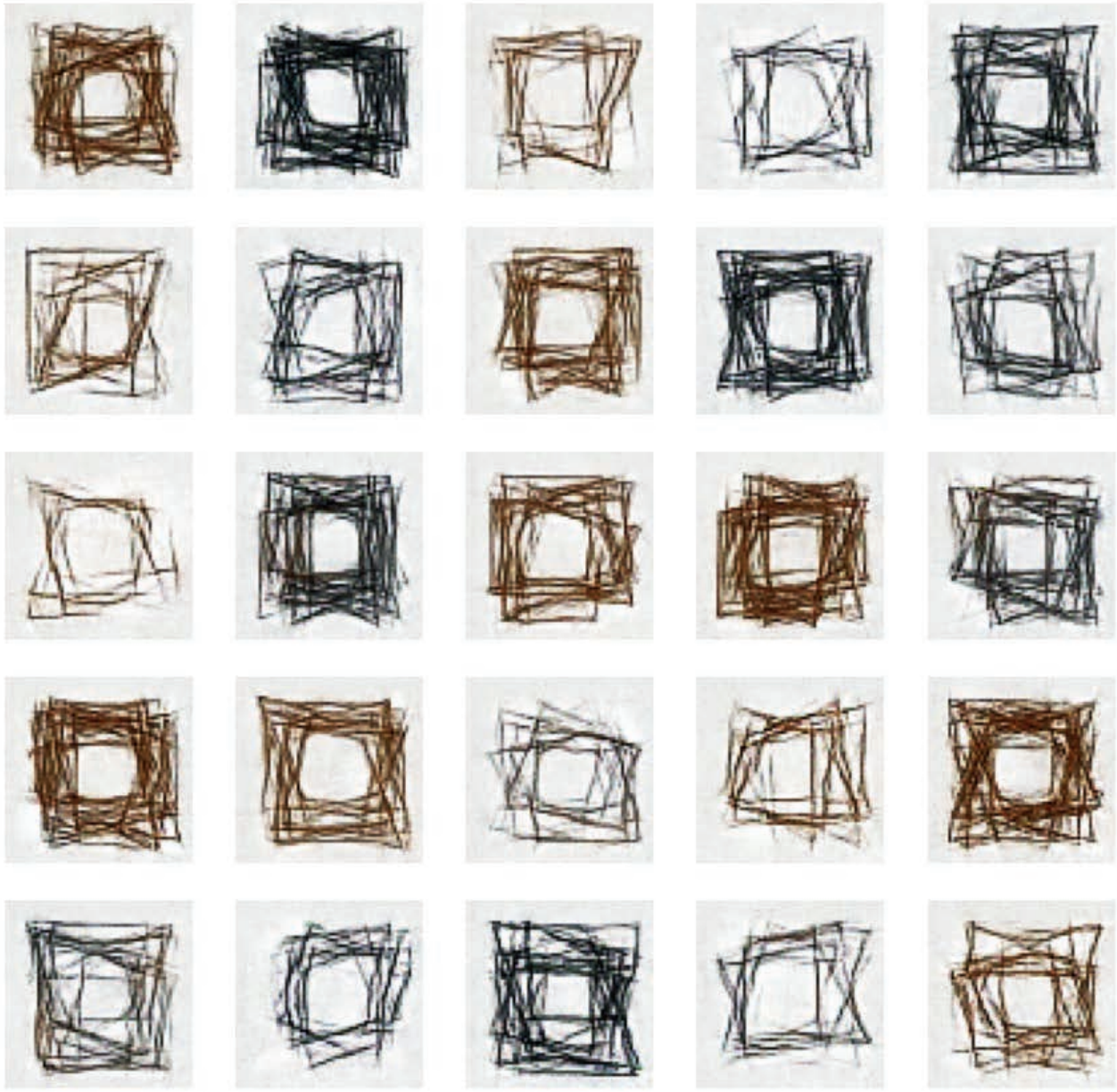
1000



2500



5000



6500 + generator.h5

3. Exploring the latent space

generator.h5

```
# create a plot of generated images
size = 64

# load model
model = load_model('generator (4200).h5')

# generate points (vectors) in latent space
pts = generate_latent_points(100, 2)
print(pts.shape)

# interpolate points in latent space
interpolated = interpolate_points(pts[0], pts[1], 20)

# generate images (INFERENCE)
# ------------------------------
X = model.predict(interpolated)
# ------------------------------

# scale from [-1,1] to [0,1]
X = (X + 1) / 2.0

# plot the result
plot_generated(X, len(interpolated))
```