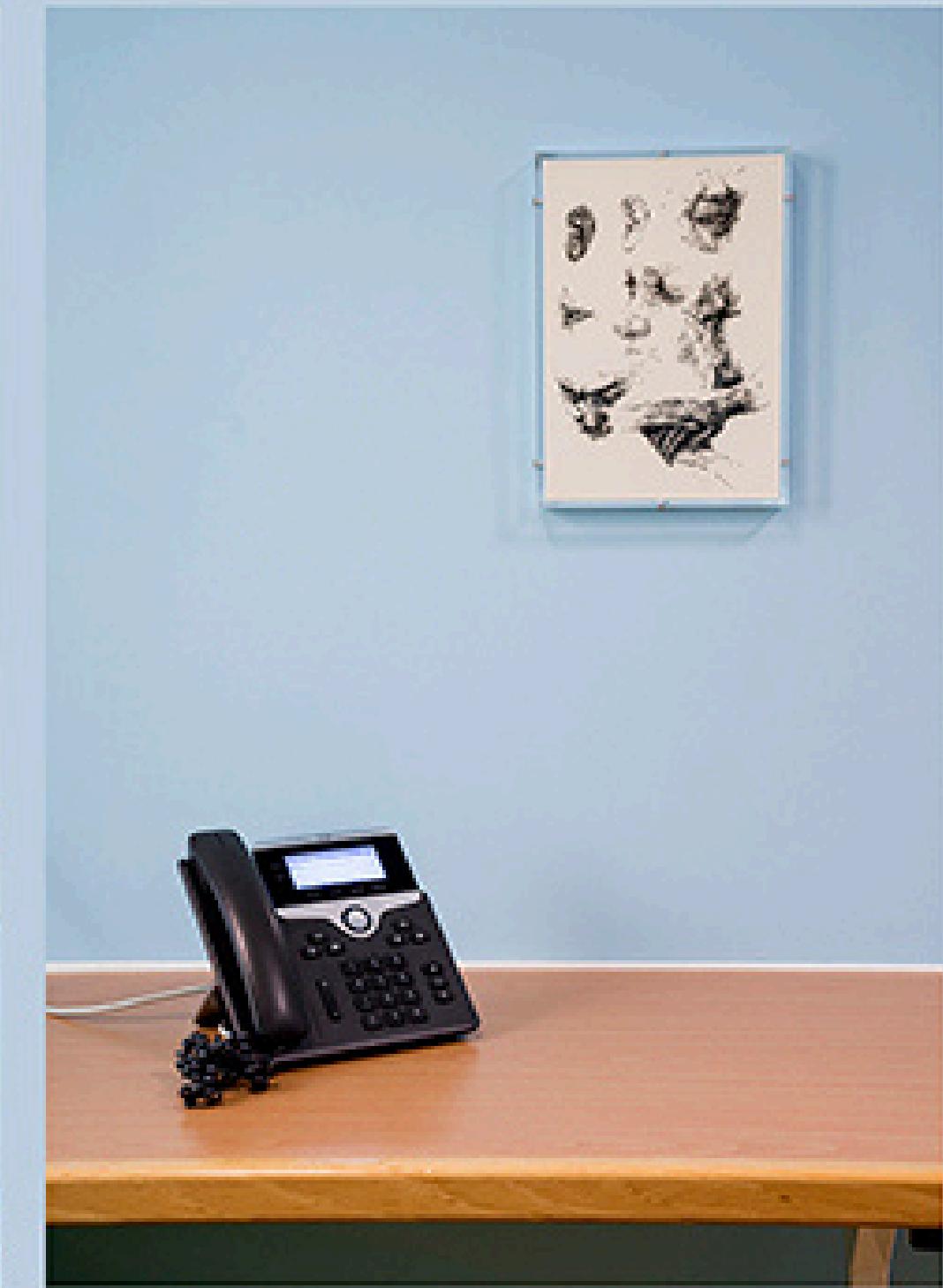


HUMAN-AI COLLABORATION IN GENERATING CALMING ART FOR HOSPITALS

Using both pretrained & scratch-trained models





Why hospital art?

(1)

Dr. Staricoff's research project: (91 patients of ages between 20-90)

-**80%** reported that art improves mood

-**47%** found art effective in distracting themselves from medical worries



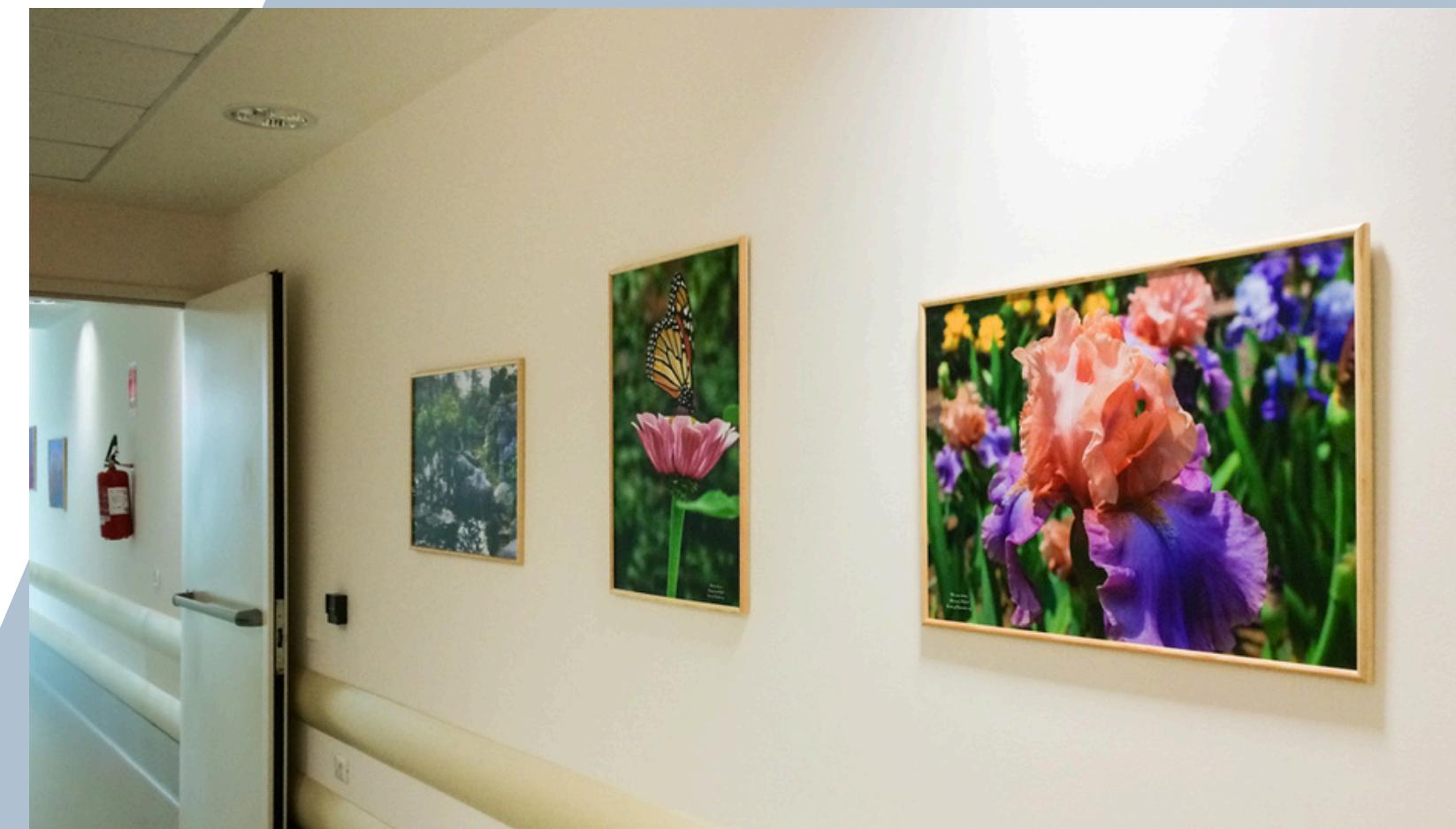
(2)

Arts in healthcare report:

-physical environment can **reduce patient stress**

-enhance their sense of **safety**

-improve the **caregiver's well-being.**



(3) **Problem**

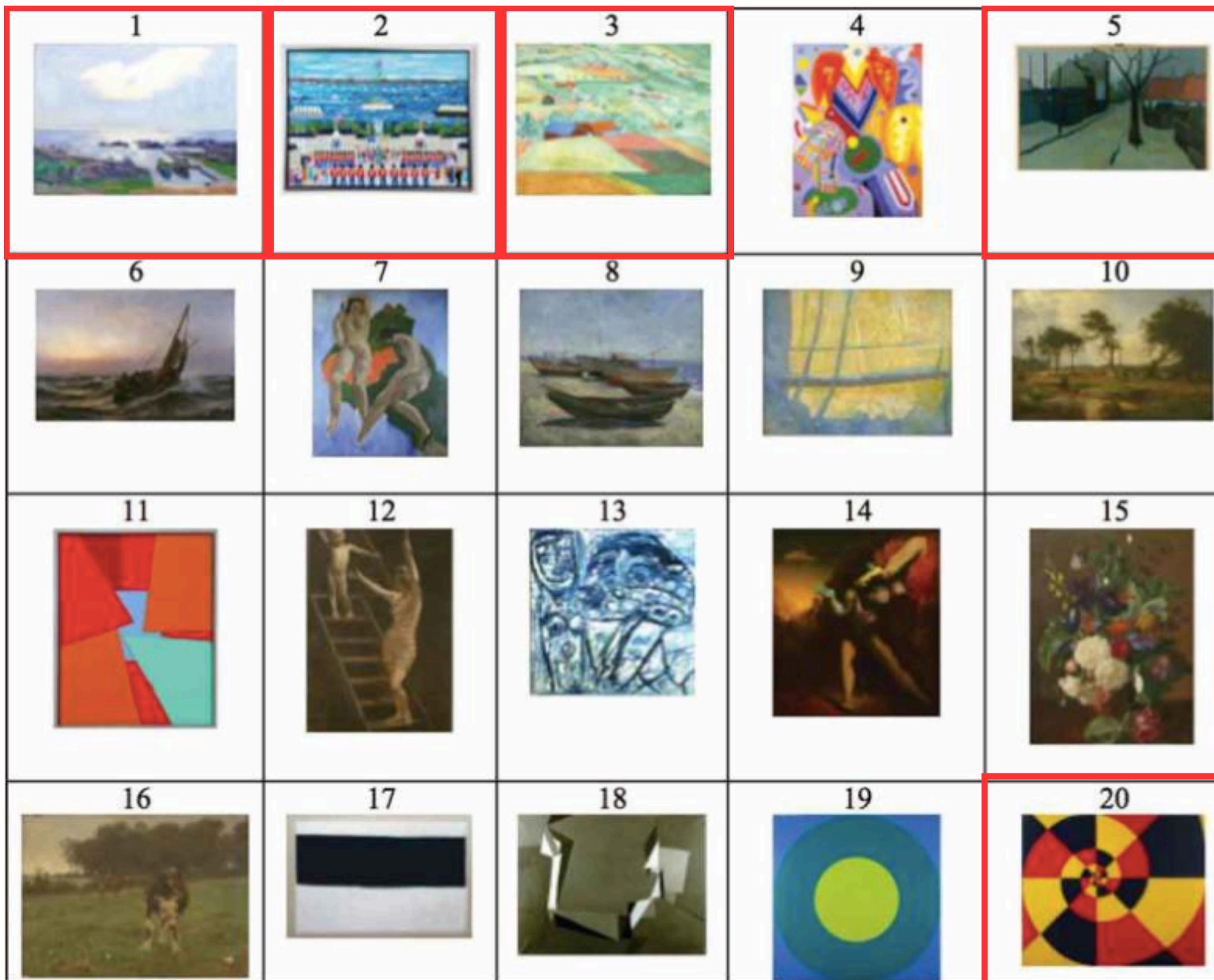
-The artist had voiced **doubts about the safety of the work**

(1) Staricoff, J., (2016). The Chelsea and Westminster Hospital arts programme: Evaluation report. London, UK

(2) Rollins, J., Sonke, J., Cohen, R., Boles, A., & Li, J. (2009). State of the field report: Arts in healthcare 2009. Washington DC: Society for the Arts in Healthcare.

(3) Aston, J., 2007 Public art online: The leading public art resource. Public Art Online Resources - Advice for the healthcare sector - When the Architects Leave: Maintaining artwork in the hospital environment.

What makes certain art calming for people?



⁽¹⁾ A study conducted by national library of medicine on **103 patients** shows:
out of 20 artpieces picked by professionals as calming art,
patients **selected 1,2,3,5 and 20 as the preferred pieces**

4/5 were landscape with one exception

⁽¹⁾ Nielsen, S. L., Fich, L. B., Roessler, K. K., & Mullins, M. F. (2017, December). How do patients actually experience and use art in hospitals?

What methods are used? Why?

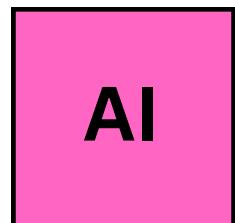
Method 1:
pretrained

image synthesizer

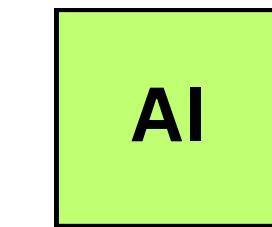
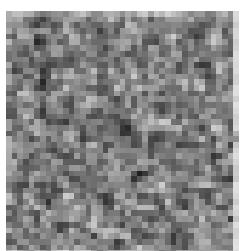
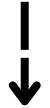
TEXT



TEXT →



Method 2:
scratch-trained
GAN



x N

Method 3:
scratch-trained
CycleGAN

A



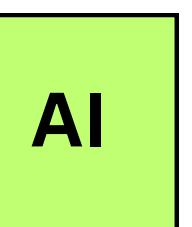
A



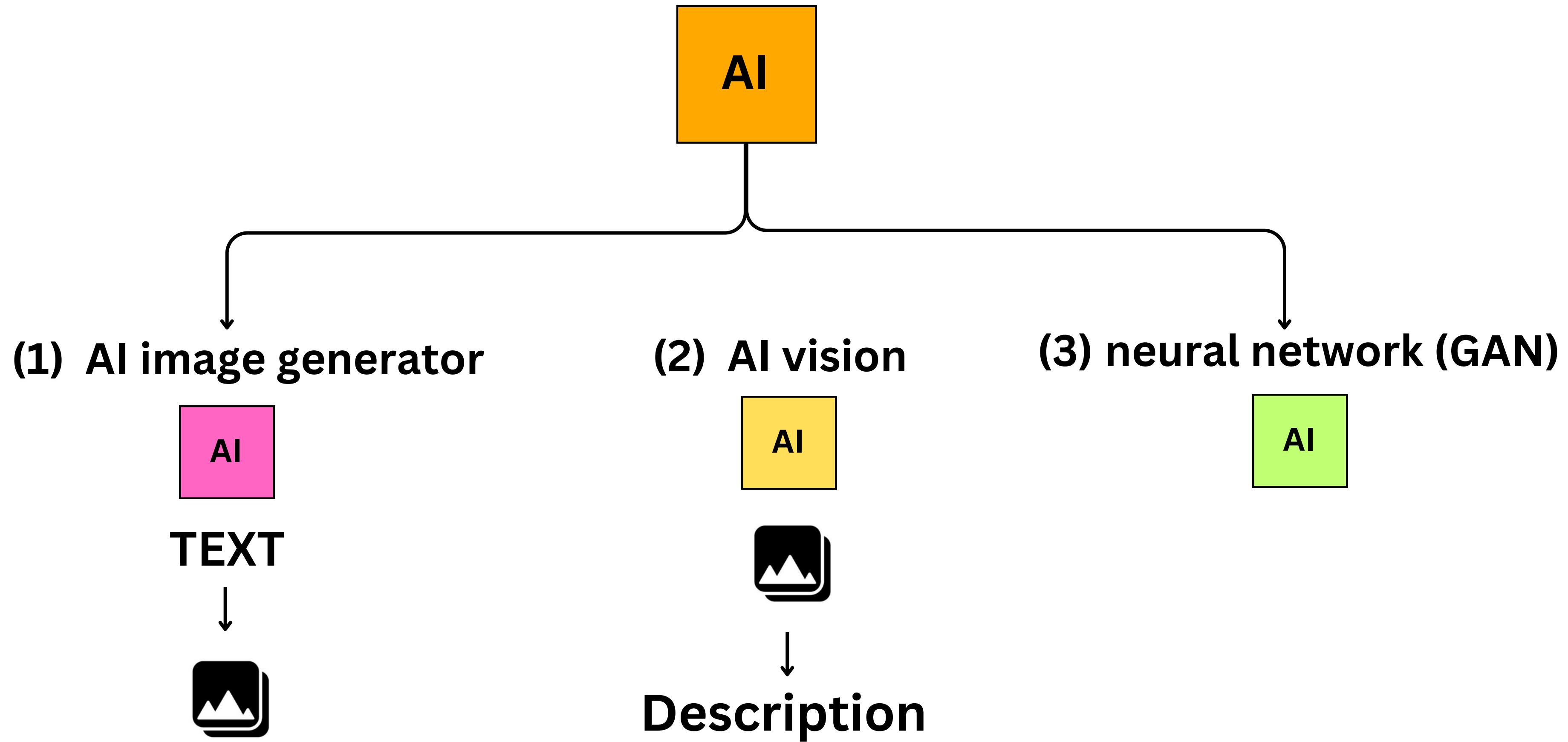
B



B



The types of AI that I am using

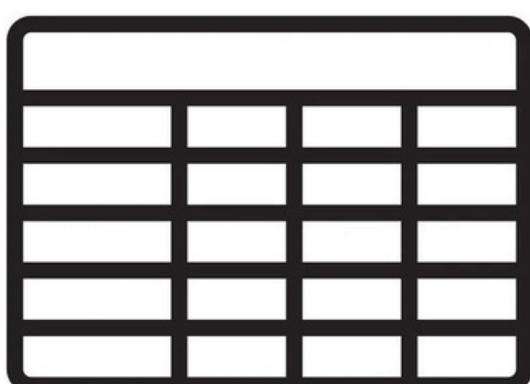


What is GAN?

(1) research characteristics



calming elements

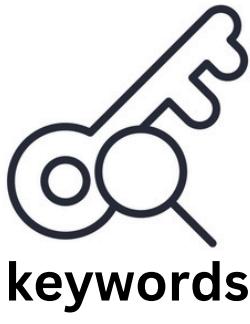


information arranged in table

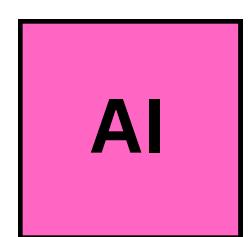


keywords

(2) prompt engineering + text-to-images;



keywords



AI



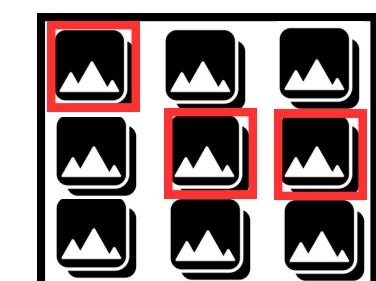
AI generated images

(3) selection



AI generated images

assessment

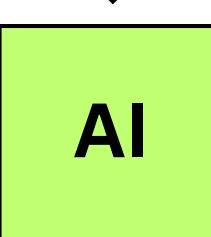


+500 image dataset

(4) GAN-based AI generation



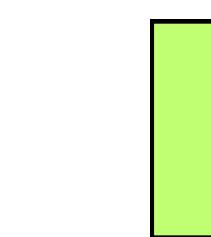
+500 image dataset



GAN



+500 image dataset

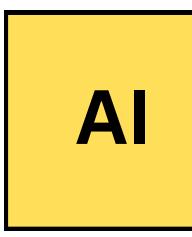


Cycle GAN

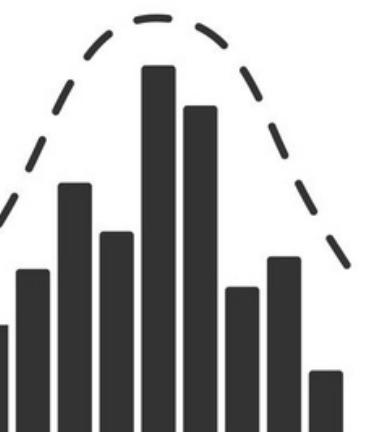
(*) assessment and insights



AI generated images



AI



AI rate the images

3 methods for image generation

Physiological and Psychological Benefits of Viewing an Autumn Foliage Mountain Landscape Image among Young Women

by Hyunju Jo  † , Harumi Ikei  †  and Yoshifumi Miyazaki *  

evidence that shows that certain elements are calming

Various nature-derived stimuli have been used to study the visual effects in indoor experiments [21]. The studies have reported the physiological relaxing effects on the brain and autonomic nervous system activity by viewing natural landscapes through display [22] and slide [23] and by viewing other actual natural stimuli, including flowers [24,25], foliage plants [26,27], and bonsai trees [28,29].

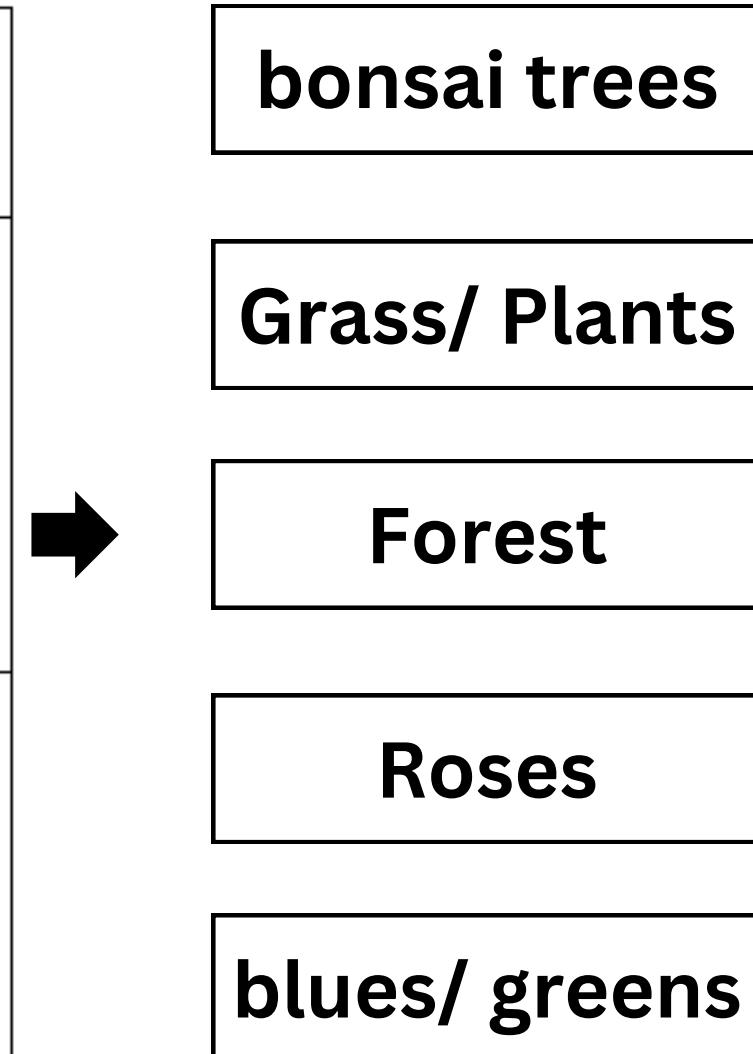
natural landscape for Japanese people. Although no previous studies have reported on the effects of viewing autumn foliage landscapes, some studies have reported that viewing colored flowers, such as red [24] and pink roses [13], induced visual physiological relaxation. In addition, some field experiments focused on natural seasonality; Song et al. found that walking in an urban park in spring [12], fall [34], and winter [11] induced physiological relaxation.

Interventions: Fresh rose flowers as an olfactory stimulant, with air as a control.

Outcome measures: Heart rate variability and subjective evaluations. The power levels of the high-frequency (HF) (0.15–0.40 Hz) and low-frequency (LF) (0.04–0.15 Hz) components of heart rate variability were calculated by the maximum-entropy method. The HF power was considered to reflect parasympathetic nervous activity. The LF/HF power ratio was determined to reflect the sympathetic nervous activity. A modified semantic differential method was used to perform subjective evaluations.

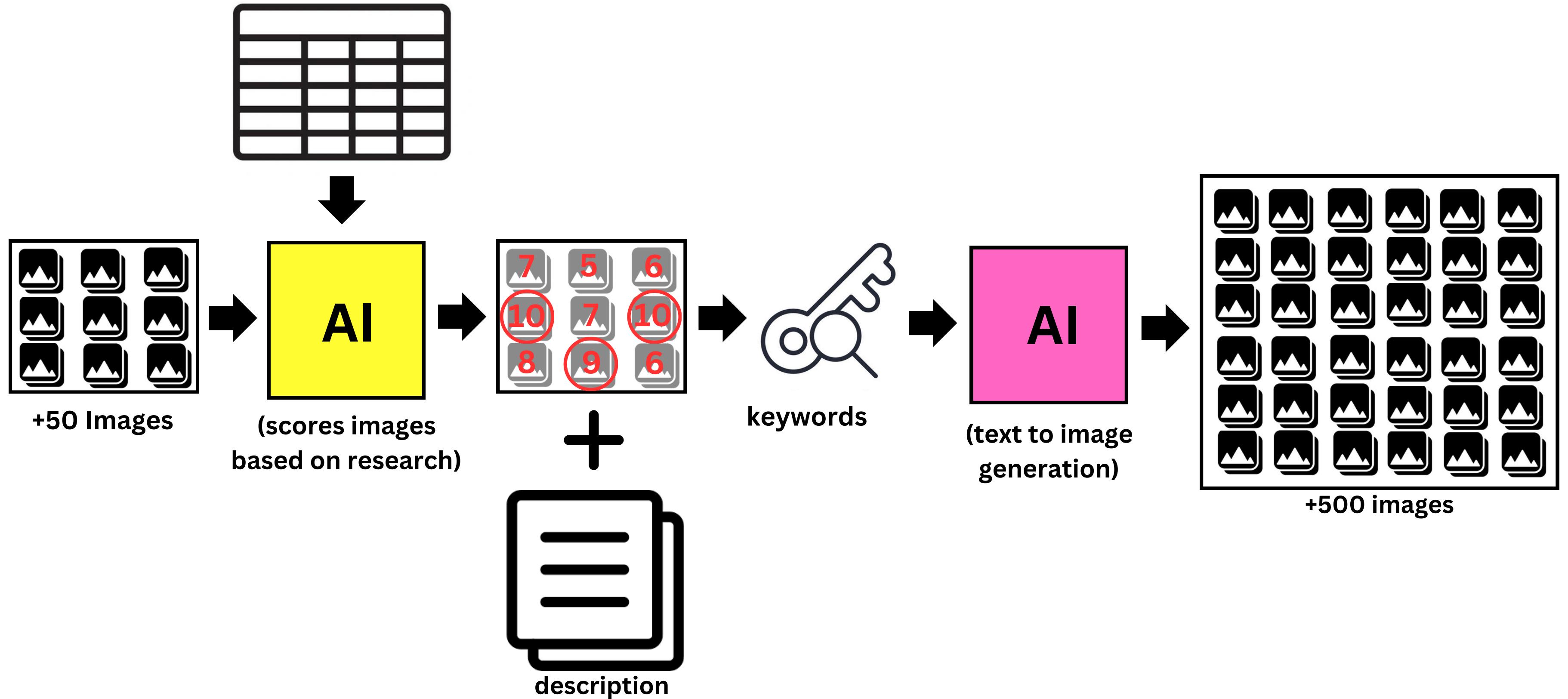
(1) research characteristics

Keywords	Who it is conducted on	Information from source	Research of the academic journal
Bonsai tree, flowers in general	Study conducted with 27 university students:	autonomic nervous system activity by viewing natural landscapes	Jo, H., Ikei, H., & Miyazaki, Y. (2022)
roses	19 female university and graduate students (mean age, 21.6 ± 1.5 years; age range, 19.0-26.0 years):	decrease in oxy-Hb concentrations in the right prefrontal cortex	Jo, H., Ikei, H., & Miyazaki, Y. (2022)

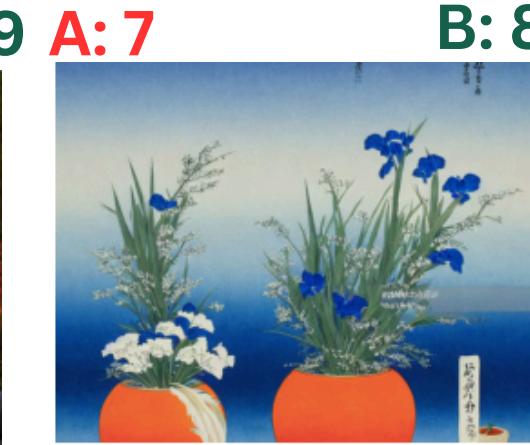
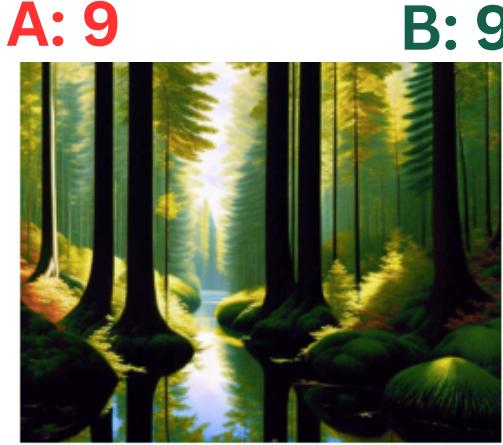
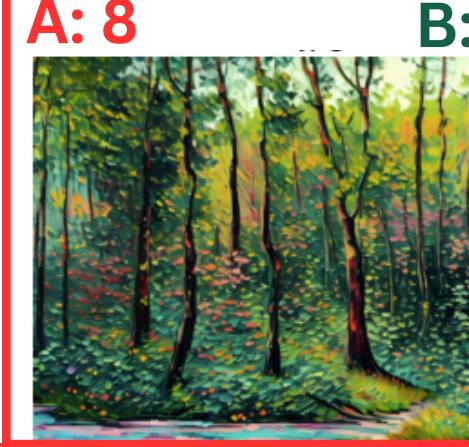
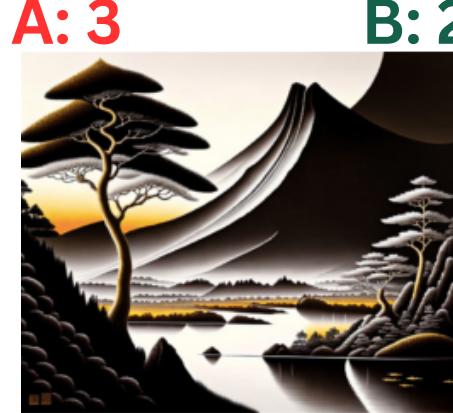
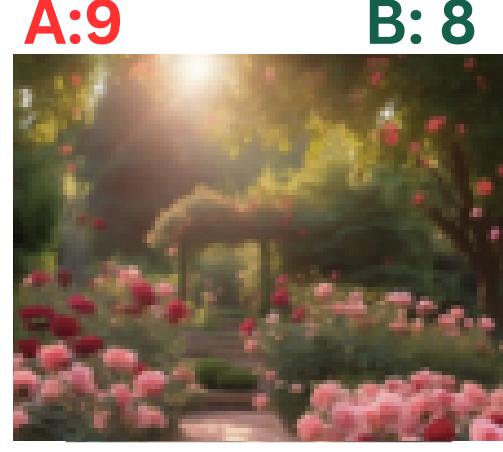
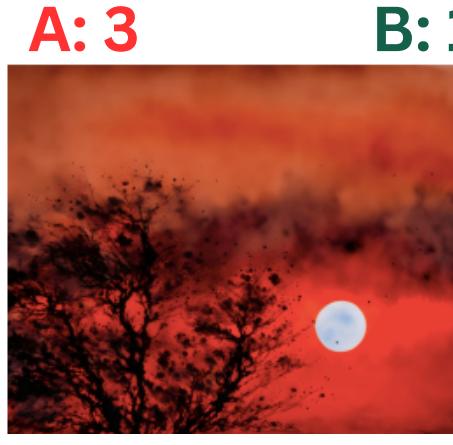
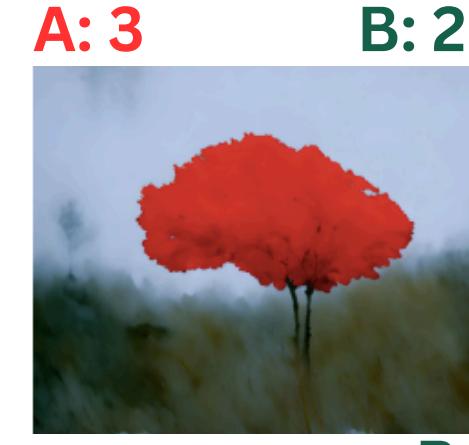
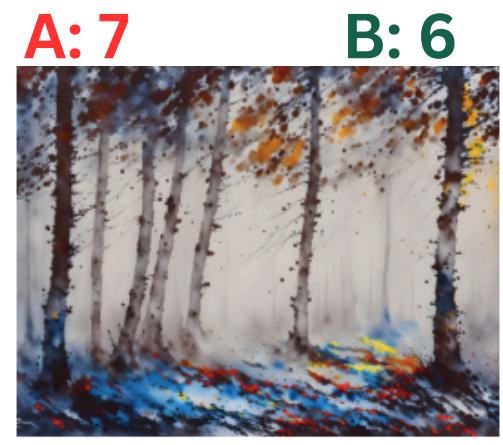


+50
images
generated
by AI

(*) assessment and insights



The scores of the images (assessment)

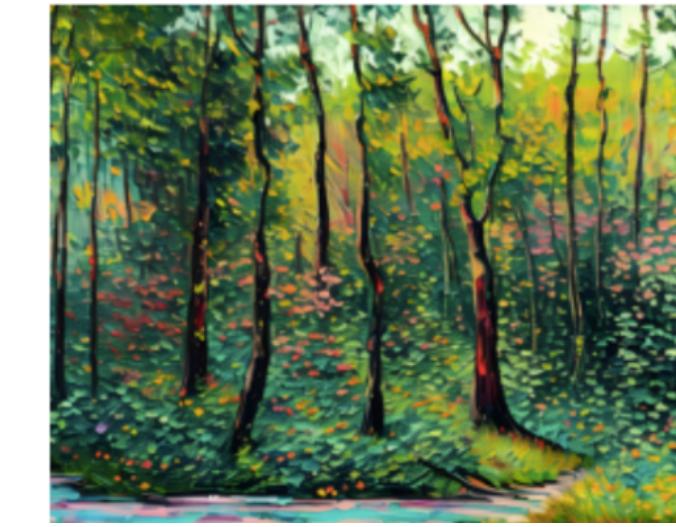


A: rate this image based on how much it matches [the description of my research] on 1-10

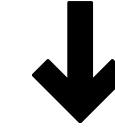
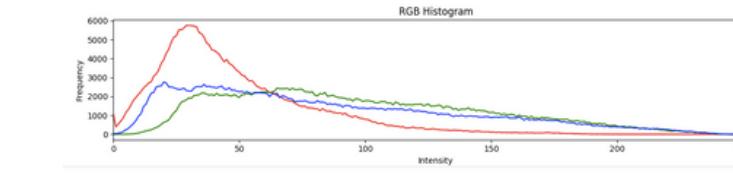
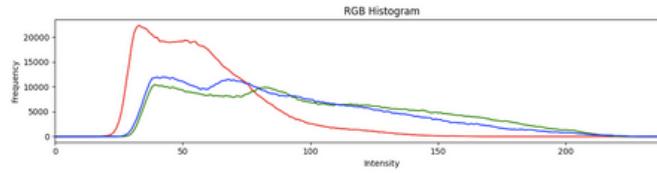
(description of research here)

B: rate this image for it's calmness and ability to improve mood on 1-10

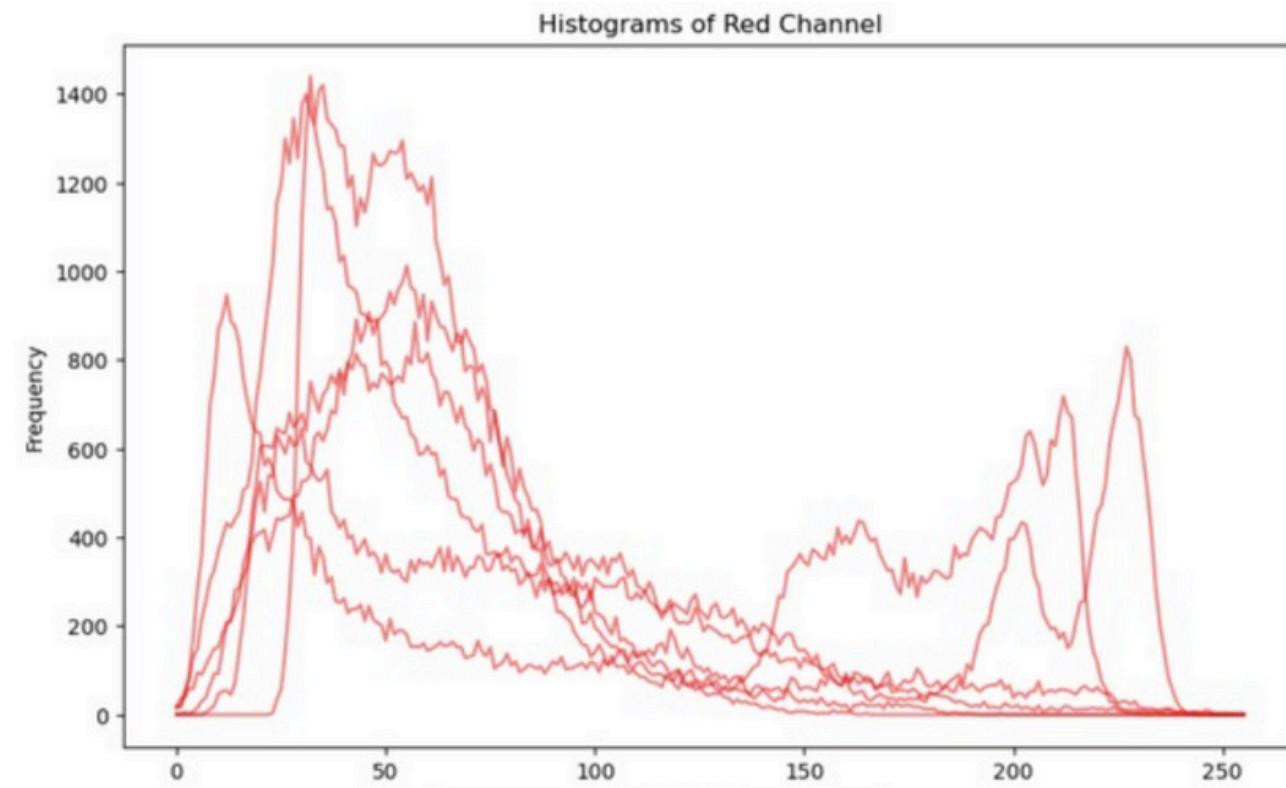
Histogram (assessment)



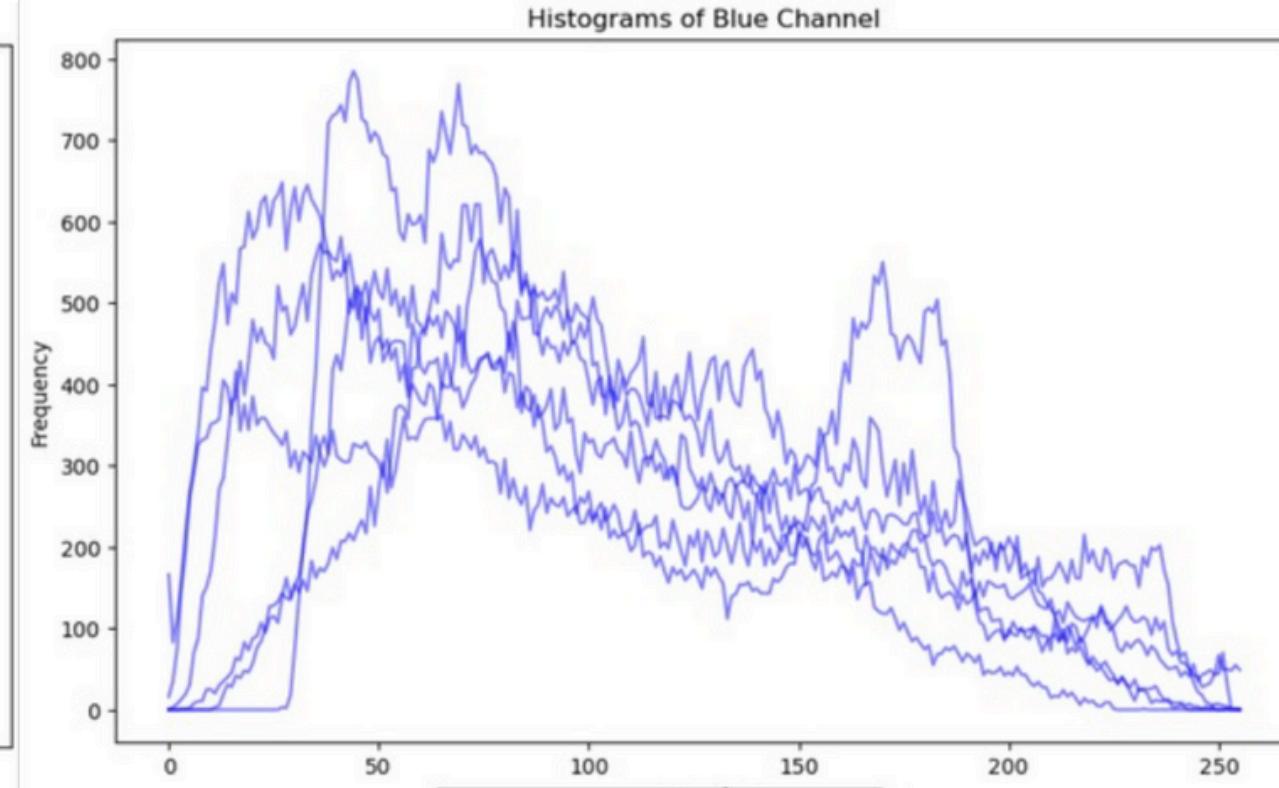
x= color intensity
y= number color pixels



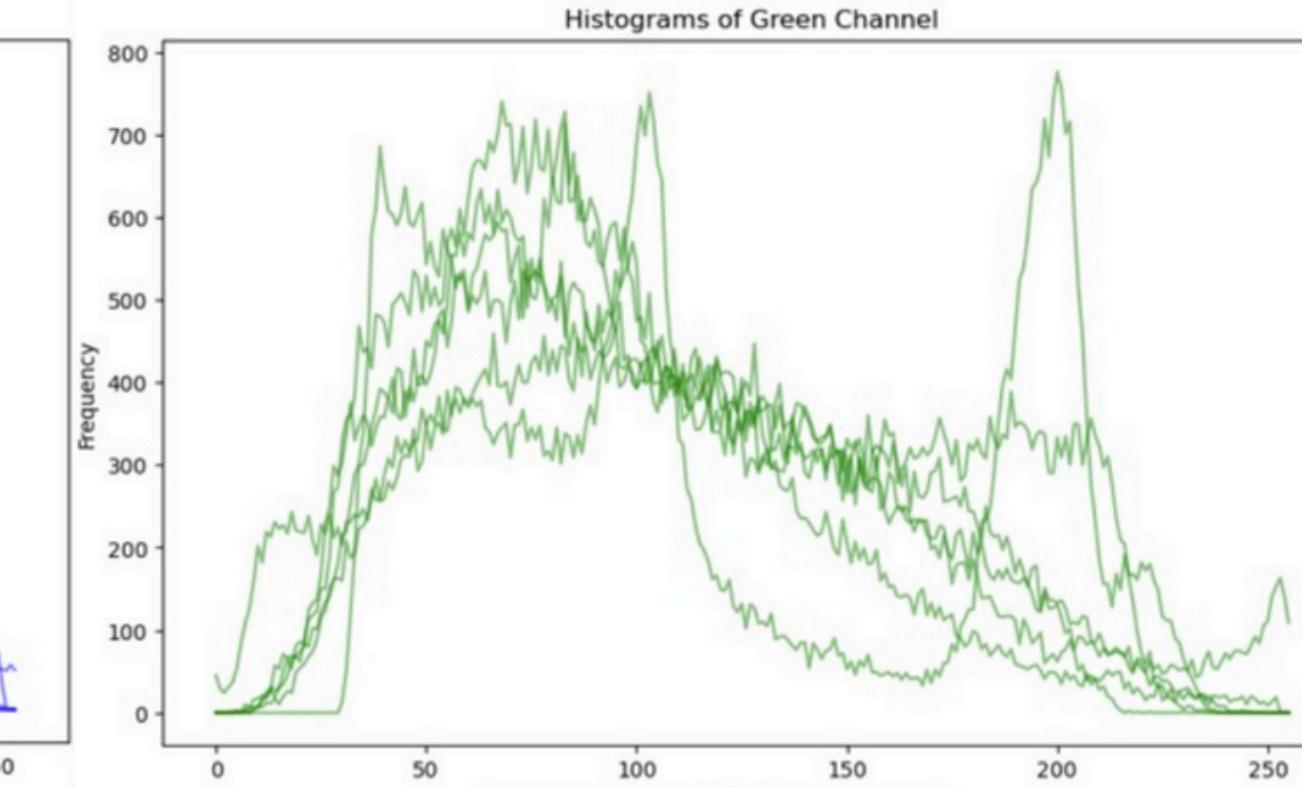
Histograms of Red Channel



Histograms of Blue Channel



Histograms of Green Channel



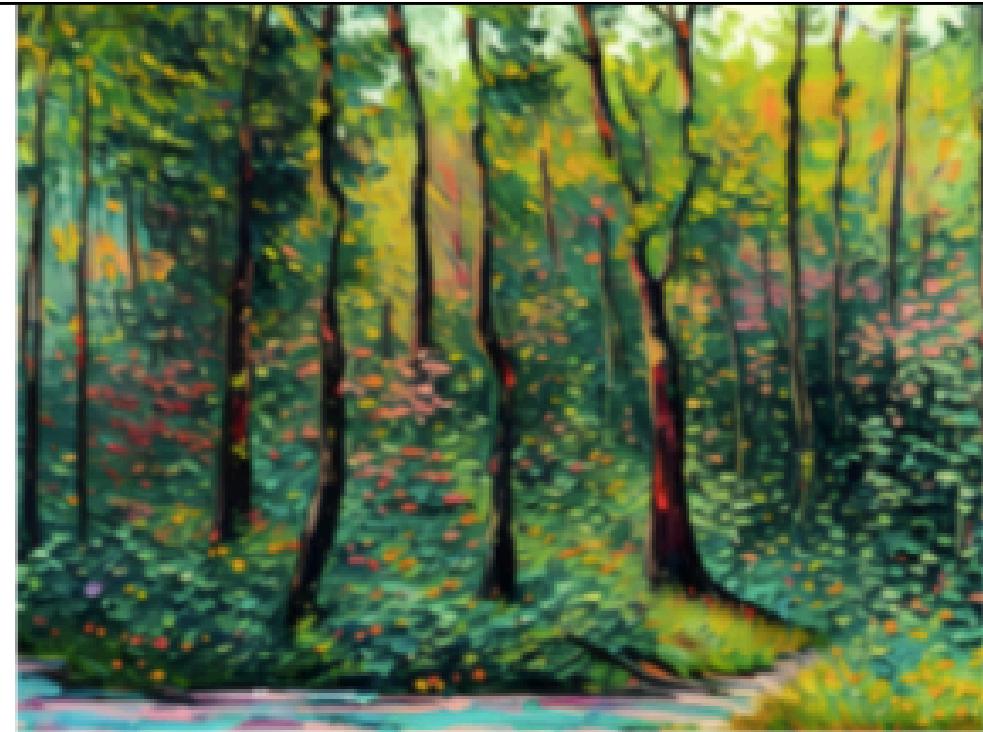
A histogram of color pixels of multiple images with high score of both A & B

Keywords generation

PROMPT

(A)
rate from 1-10 on
how much this
matches the
description of:
containing
predominantly blues
and greens, limited
existence of bright
red, containing
either forest, roses,
bonsai trees, foliage
plants, flowers,
mountains as
subject matter.

ANSWER FROM AI



I would rate this image as an 8 out of 10 in terms of matching the provided description. Here's why:

1. The image depicts a **lush green forest** with tall **trees** and **dense foliage**.
 - o Various shades of **green dominate** the scene, creating an atmosphere that could be described as calming or relaxing.
 - o There are **touches of yellow and orange hues** scattered throughout the foliage, adding depth and warmth to the scene.
 - o A few trees have trunks with reddish tones but are not prominent or aggressive.
 - o The ground is covered with **grass and small plants**, painted in strokes of greens mixed with spots of yellows and reds.
 - o The painting style **appears impressionistic** with **visible brush strokes** that add texture to the overall image.

DESCRIPTION> KEYWORDS

keywords	id
trees, path, forest, greenery, nature, artwork...	1
mountains, forest, river, mist, sunrise, trees...	10
sunset, hills, lake, reflection, trees, flower...	11
forest, river, trees, nature, landscape, sunli...	12
mountains, trees, reflection, water, sunset, c...	13
birch trees, snow, autumn leaves, river, rocks...	14
trees, clouds, blue sky, field, flowers, natur...	15
mountains, boat, lake, trees, flowers, sky, cl...	16
trees, mountains, snow, moon, forest, nature, ...	17
forest, river, trees, mist, rocks, waterflow, ...	18
flowers, yellow, blue, painting, nature, lands...	19
forest, trees, greenery, pathway, ferns, natur...	2
landscape, cliff, ocean, sky, clouds, vegetati...	20

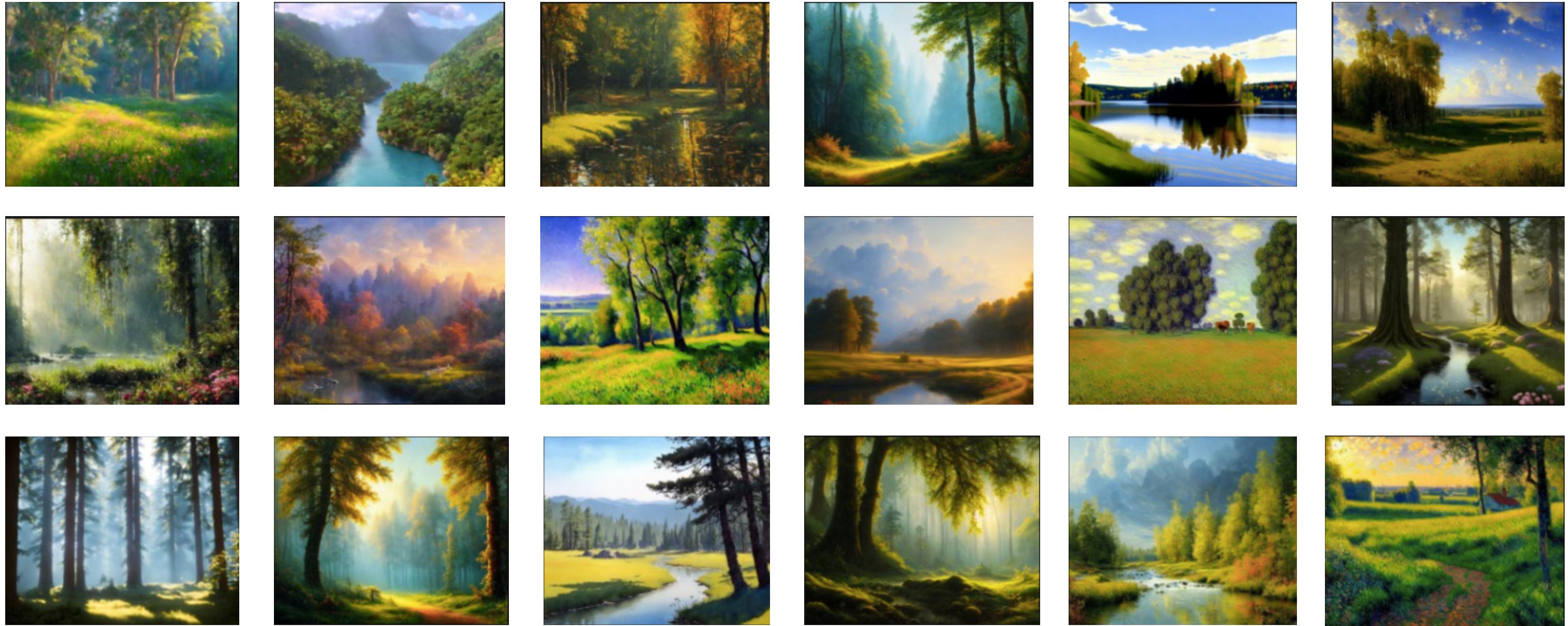
river

greenery

vegetation

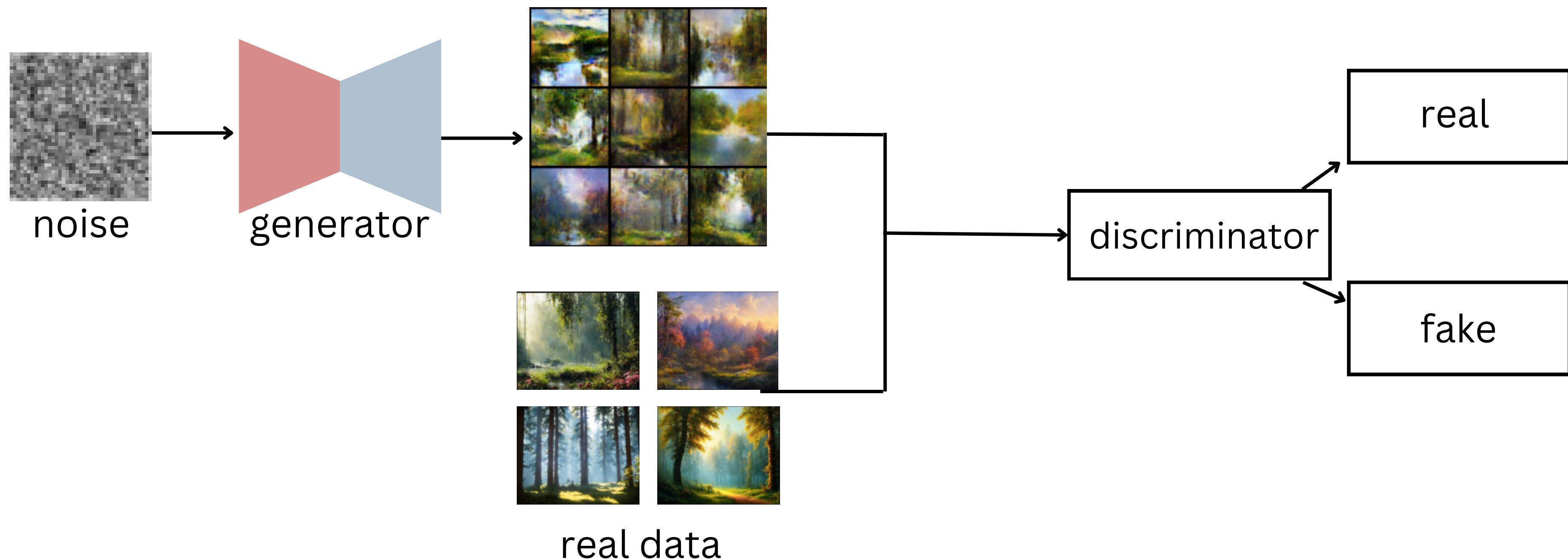
Lake

More image generation (+500)

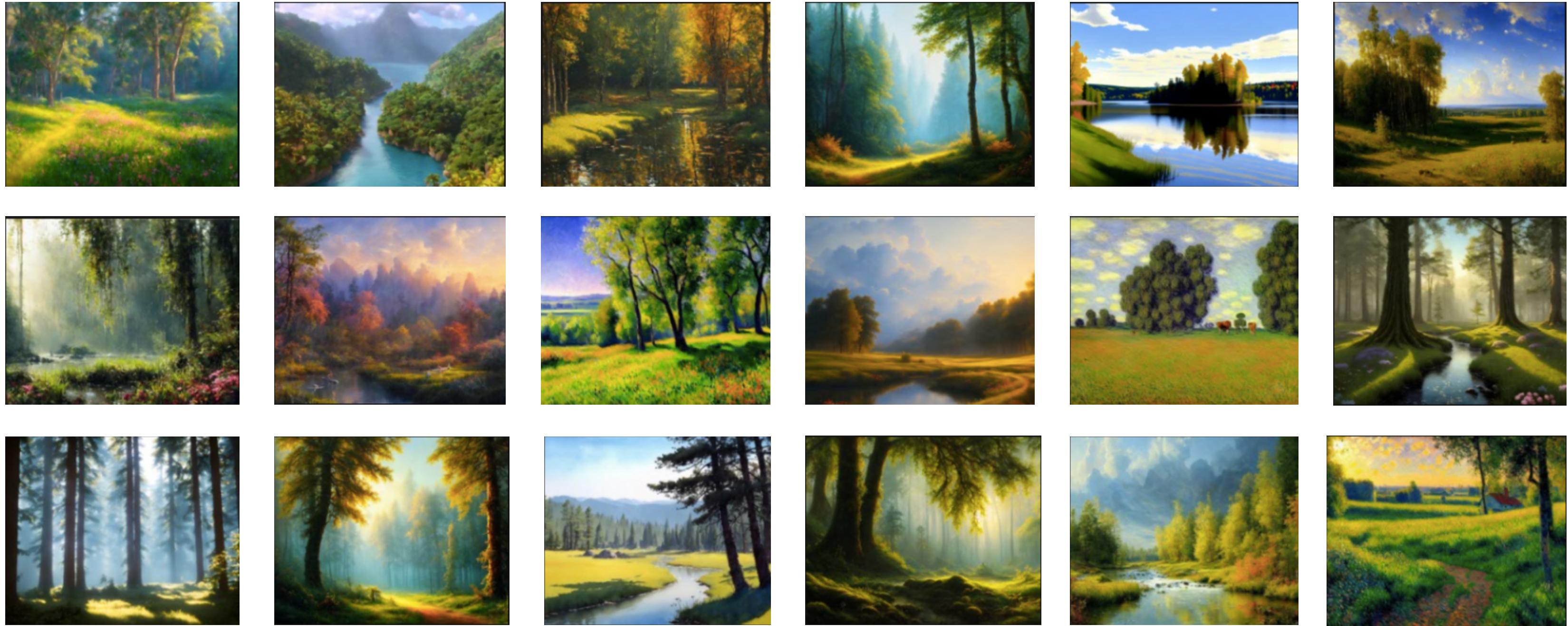


Having more AI images are generated for the GAN based on the keys words

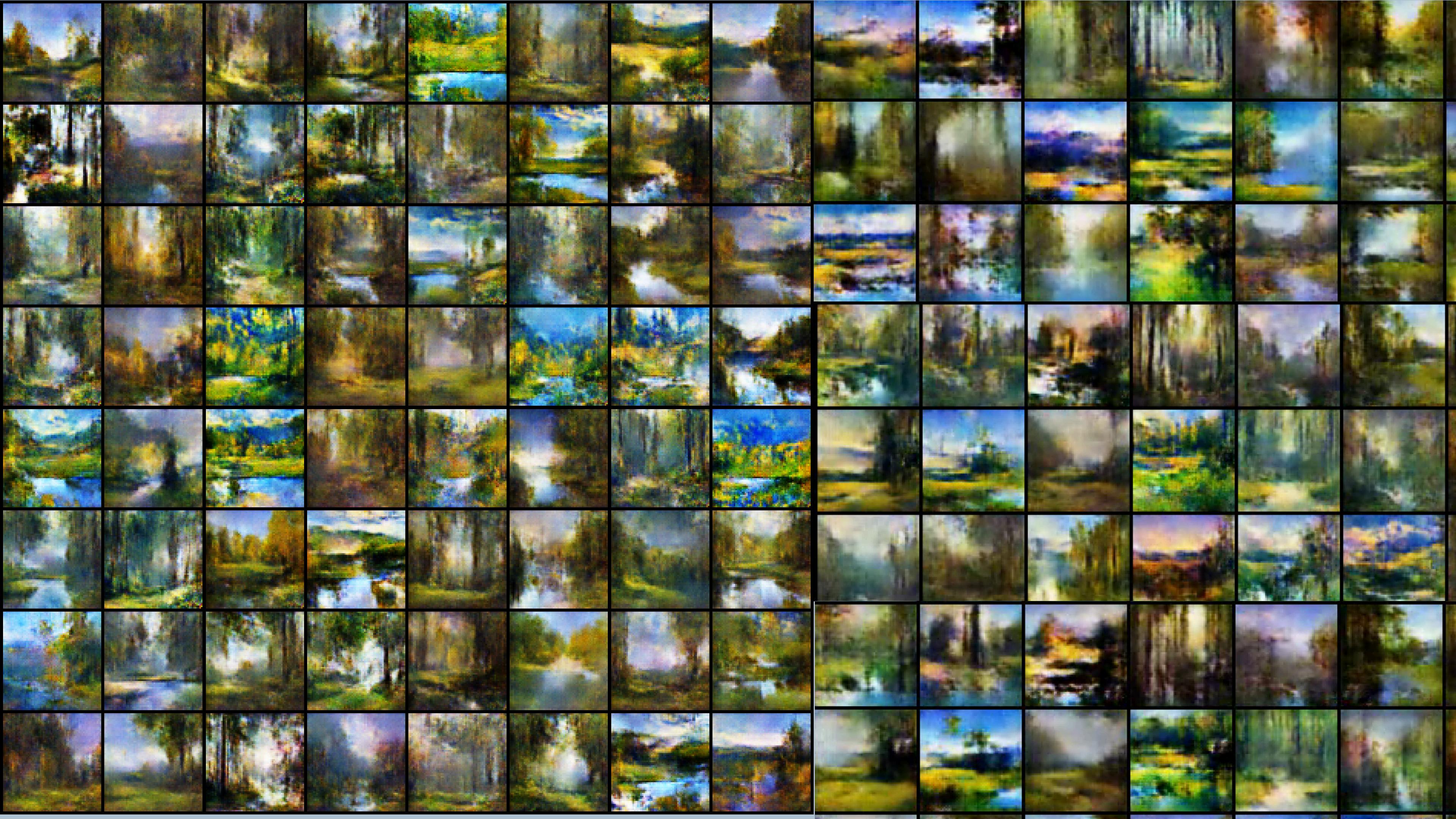
GAN

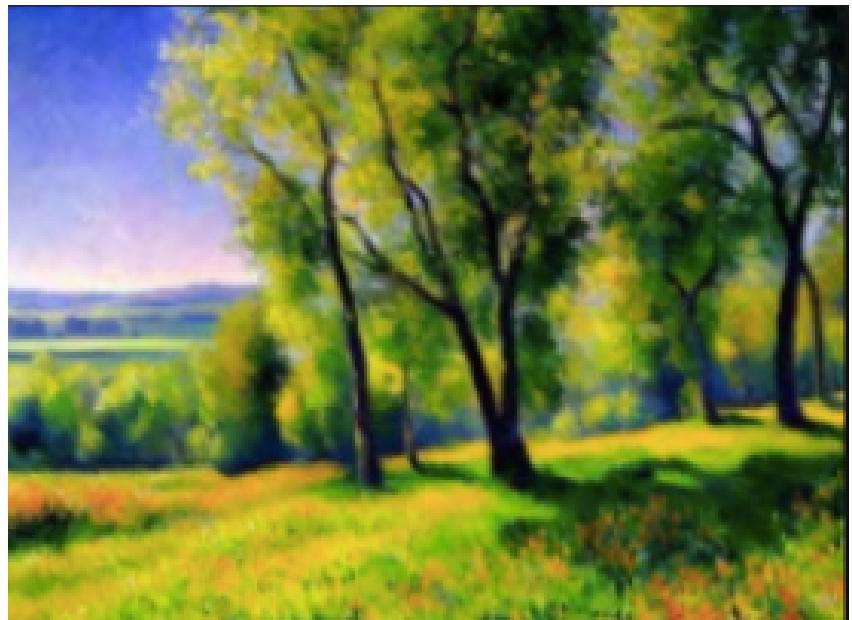
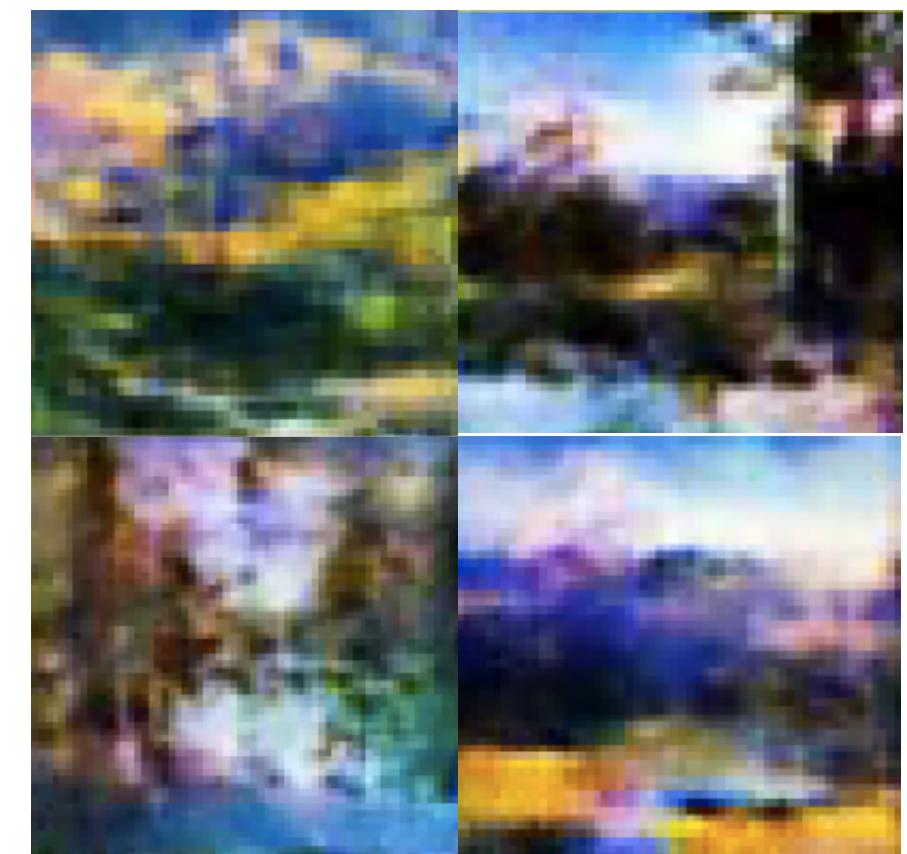
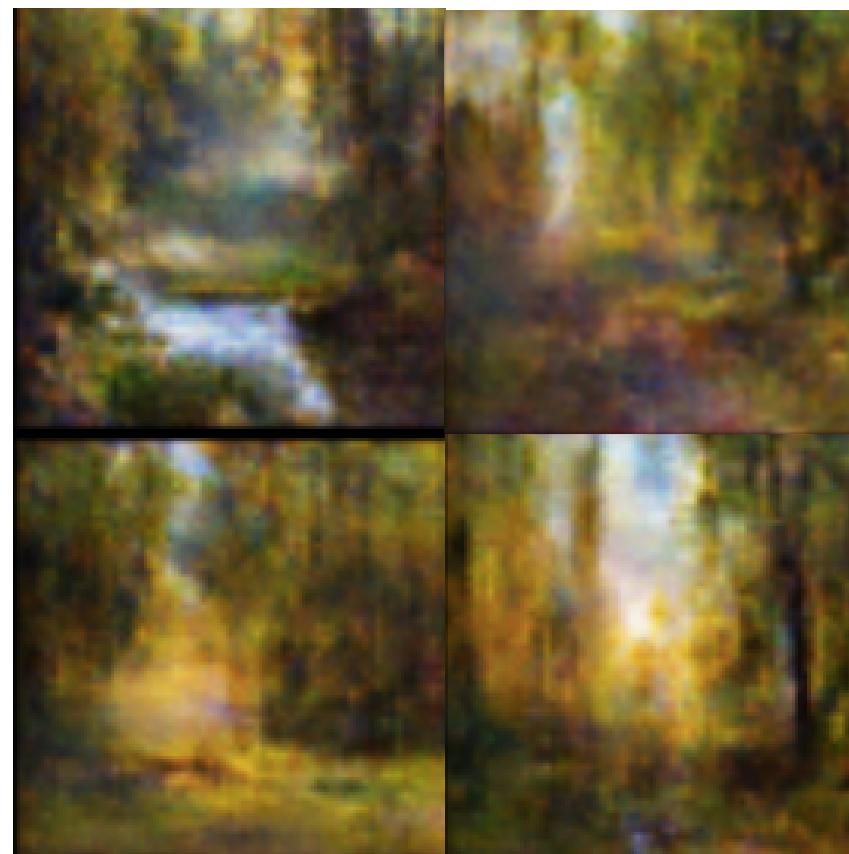
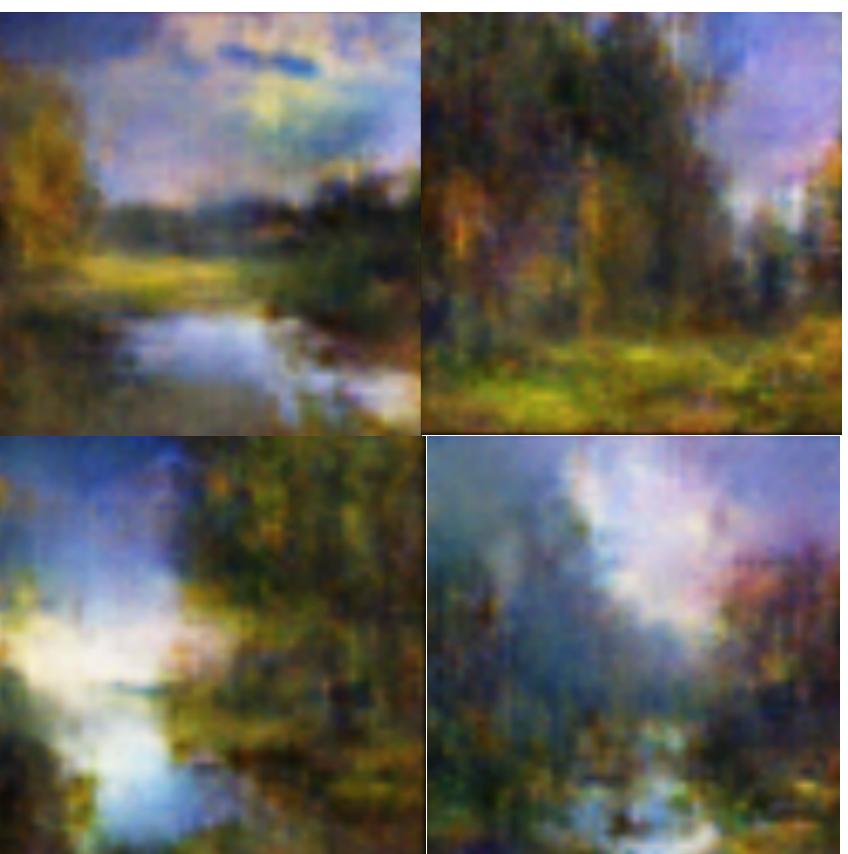
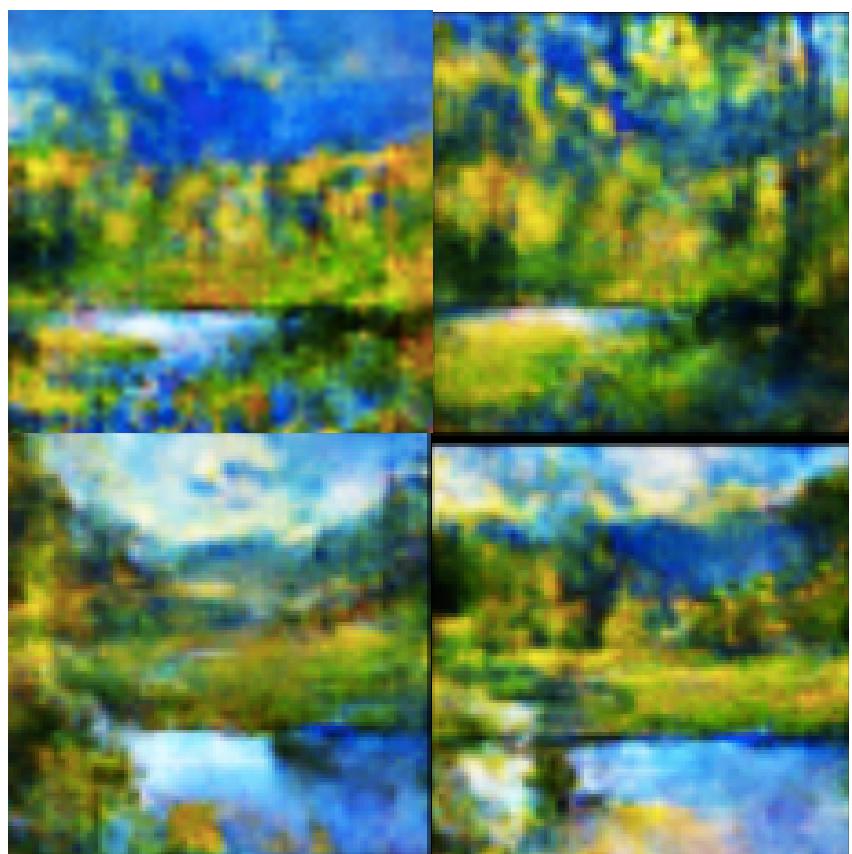
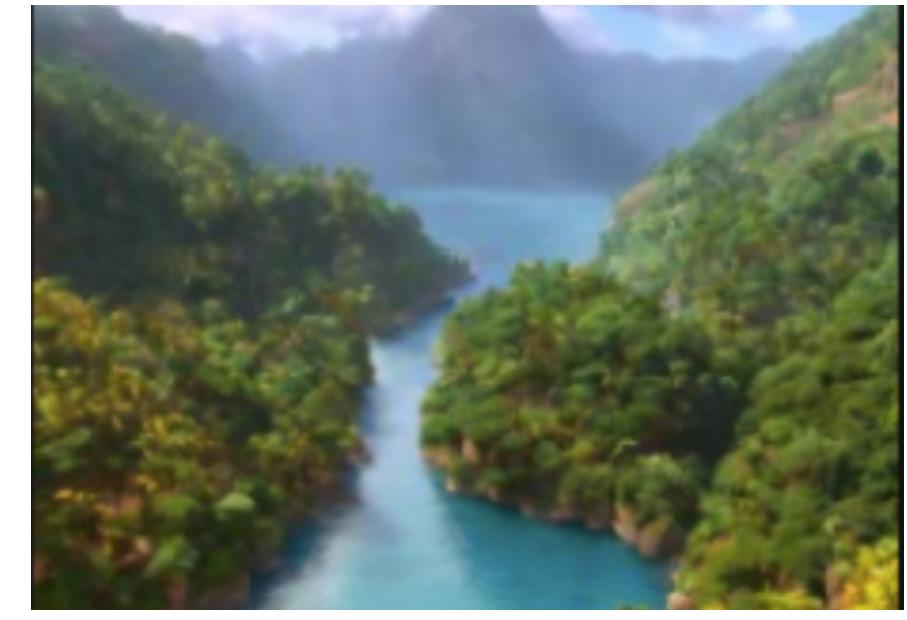


More image generation (+500)

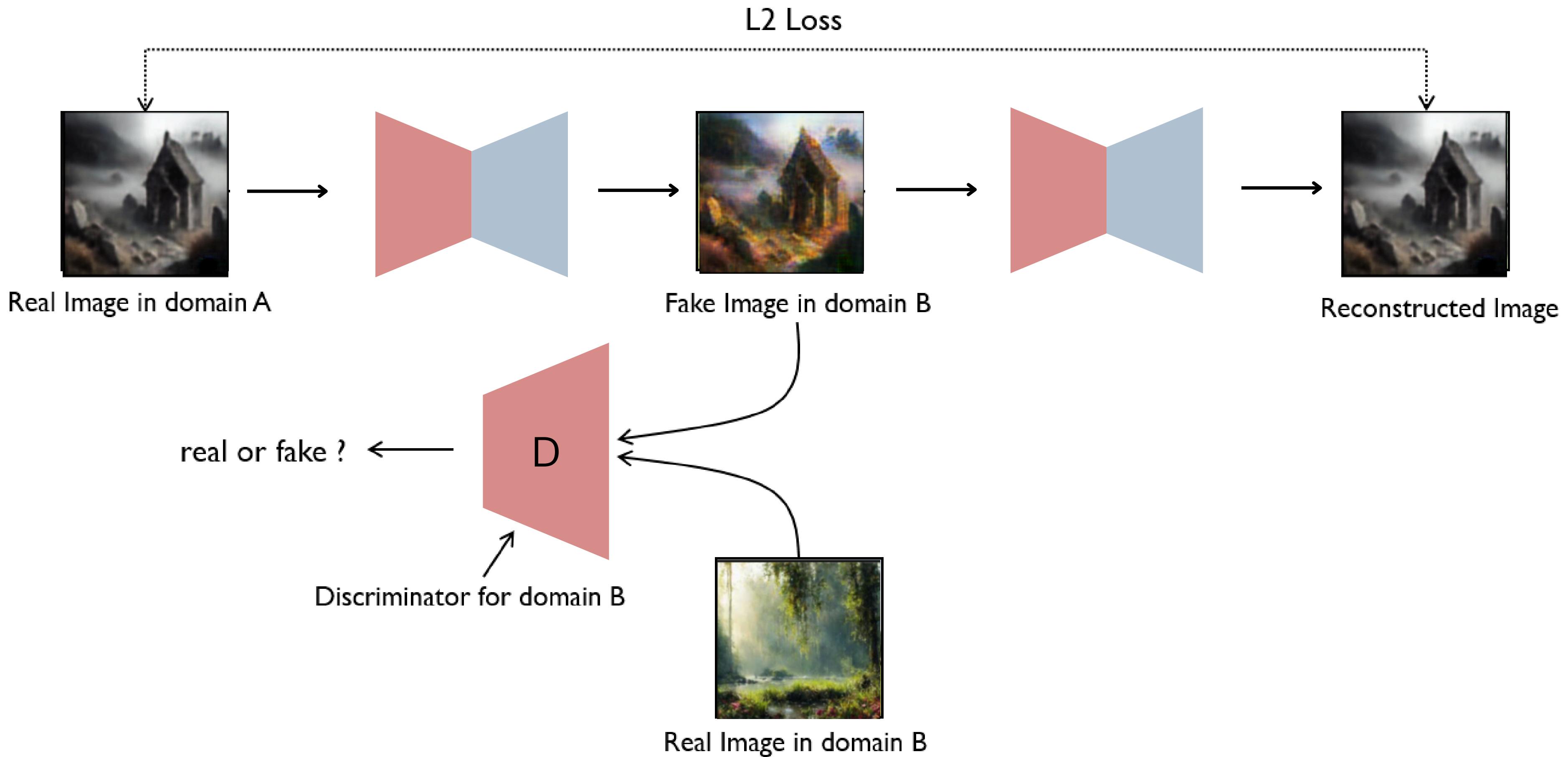


Having more AI images are generated for the GAN based on the keys words



A**B****C****D**

Cycle GAN

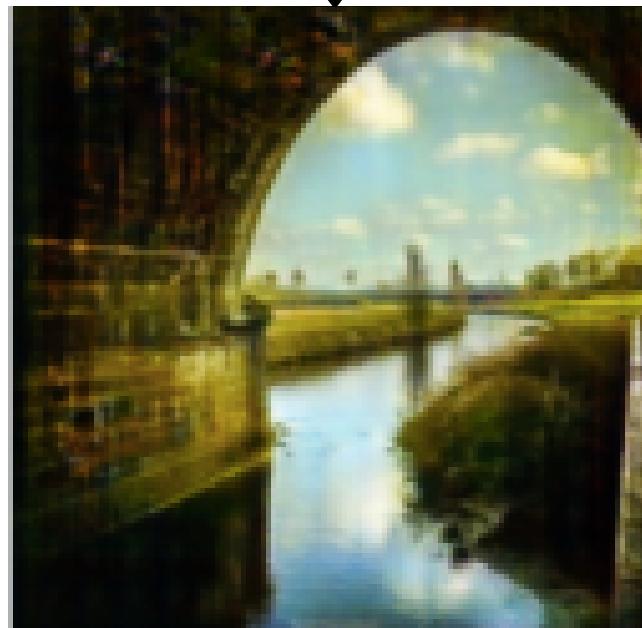


input images

A

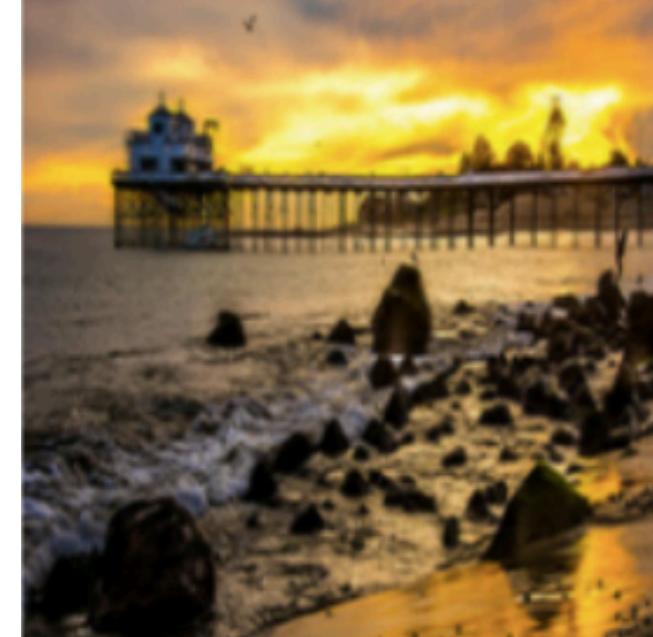


B

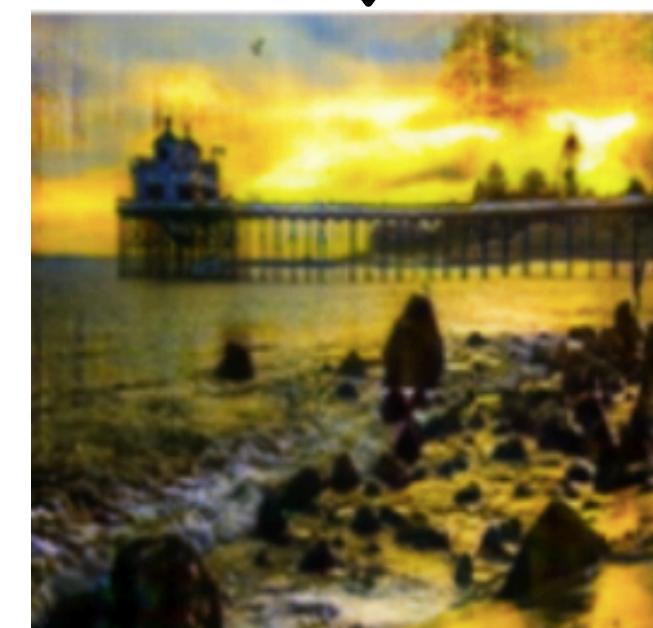


B

A

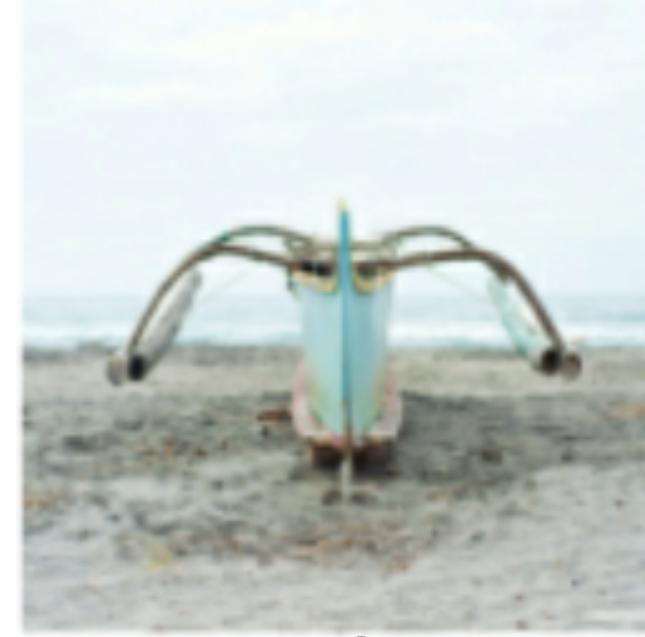


B



B

A

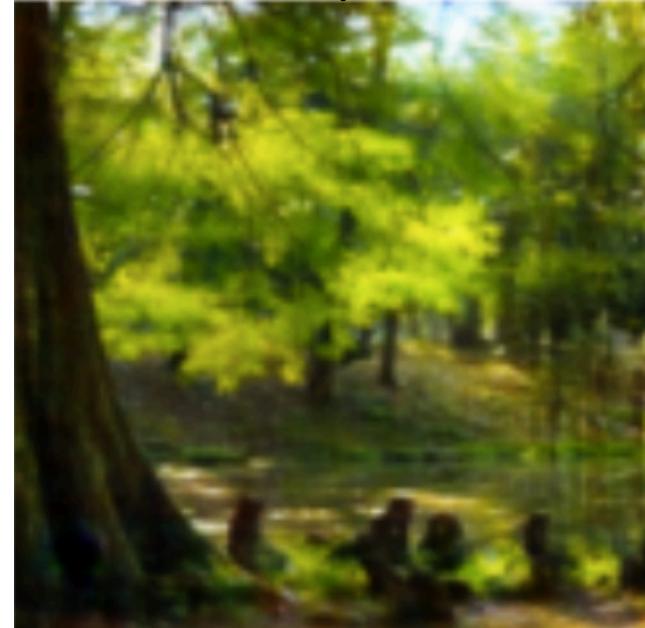


B

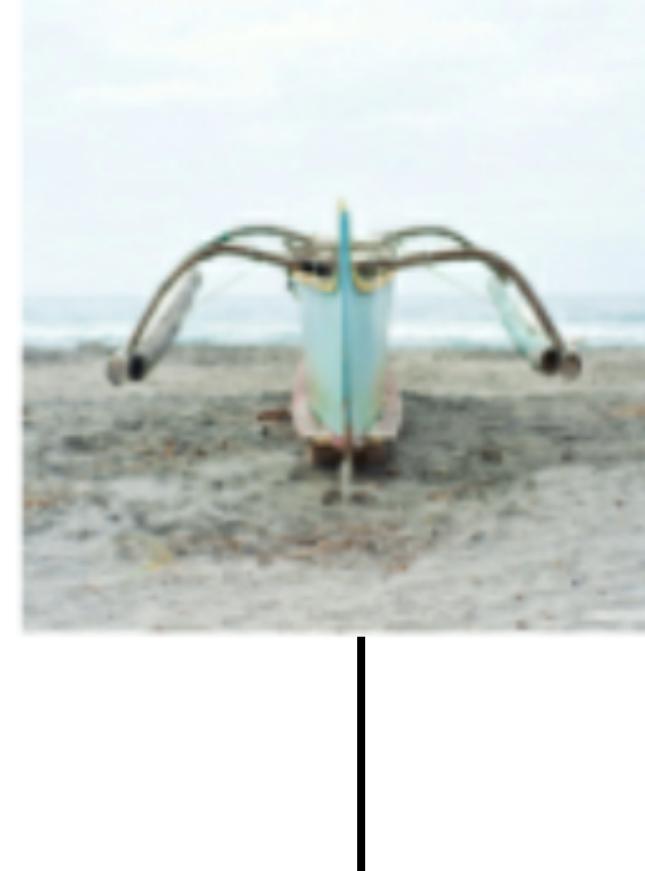


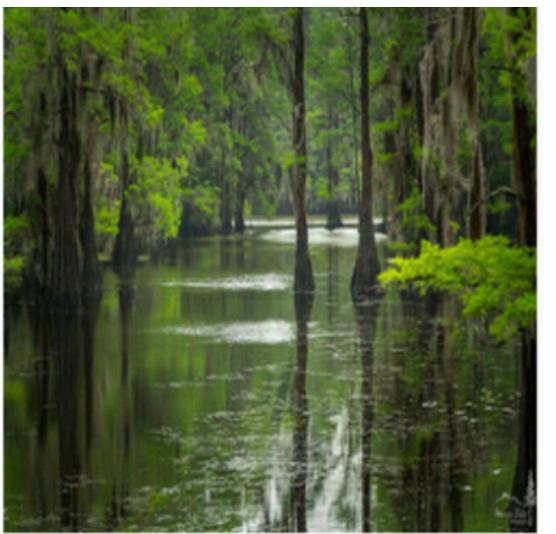
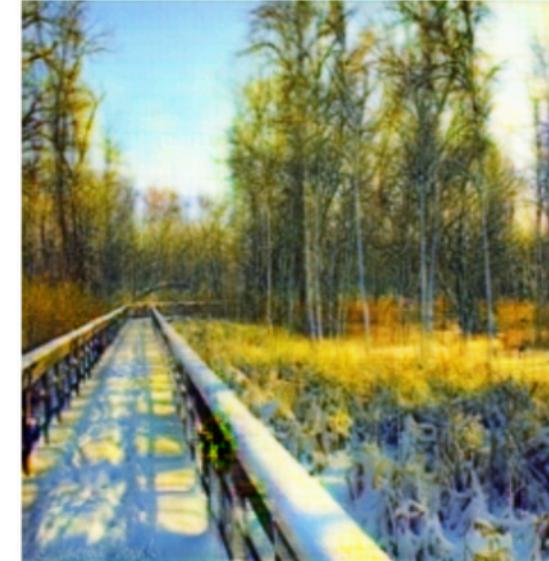
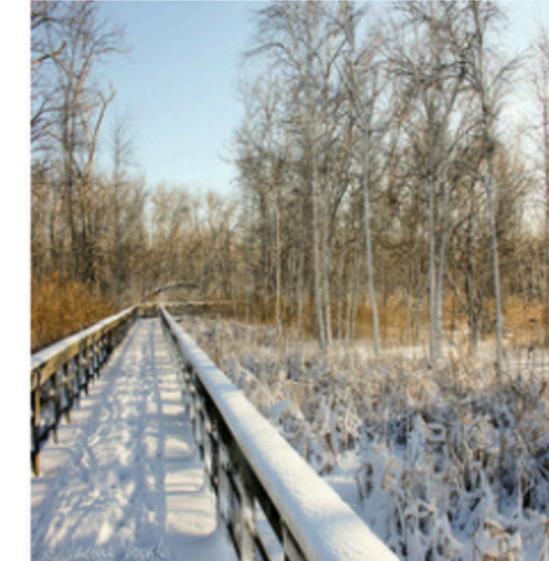
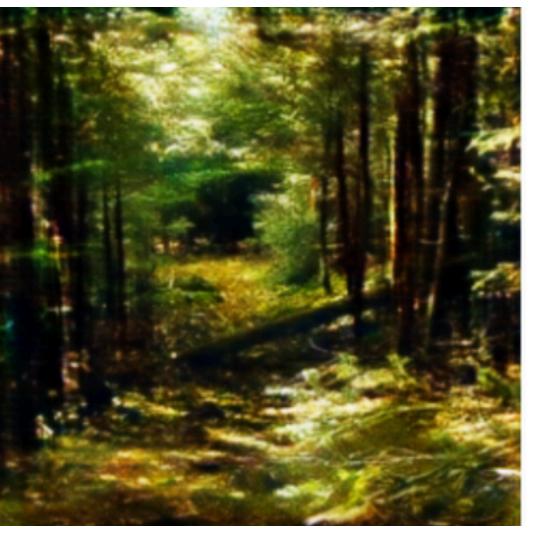
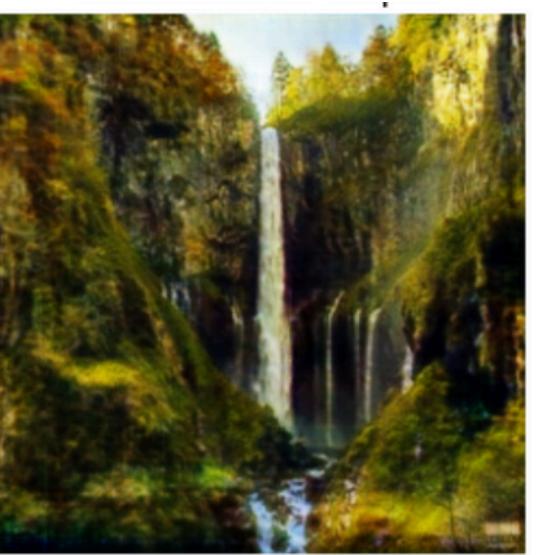
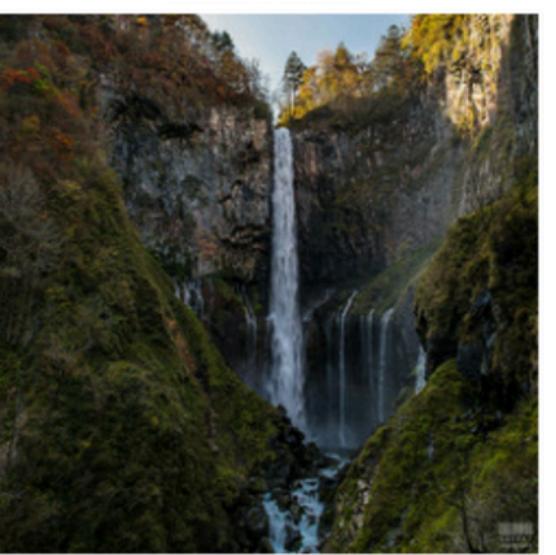
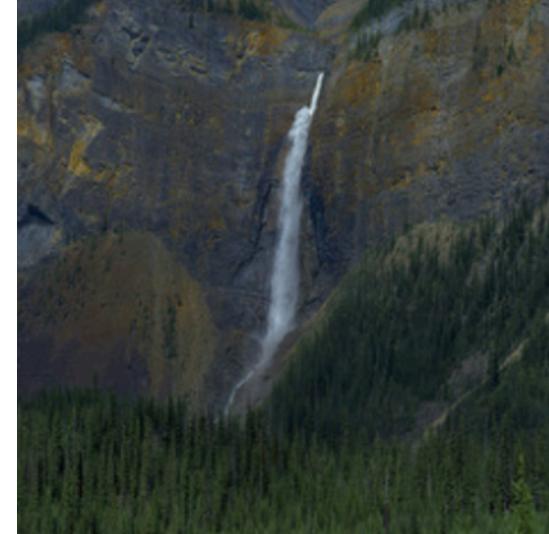
B

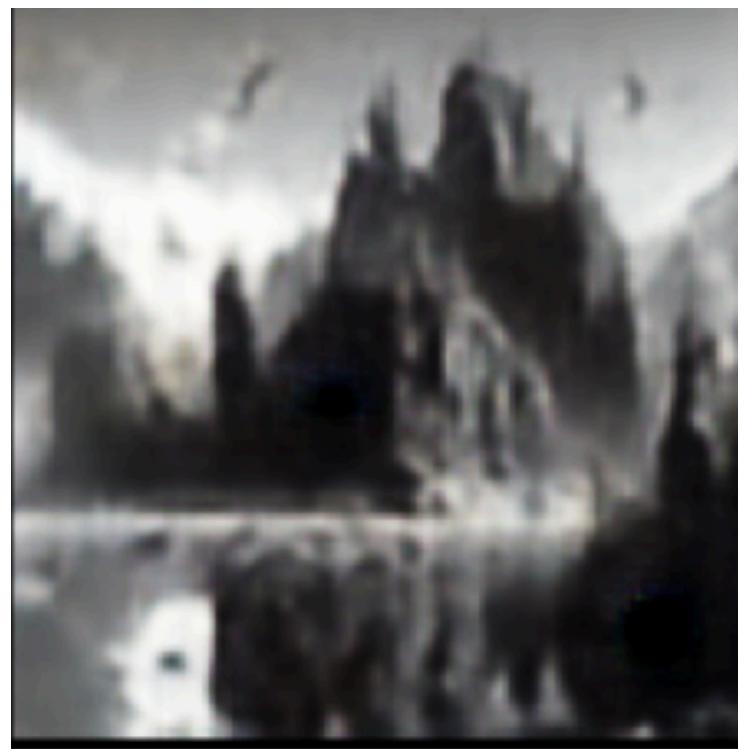
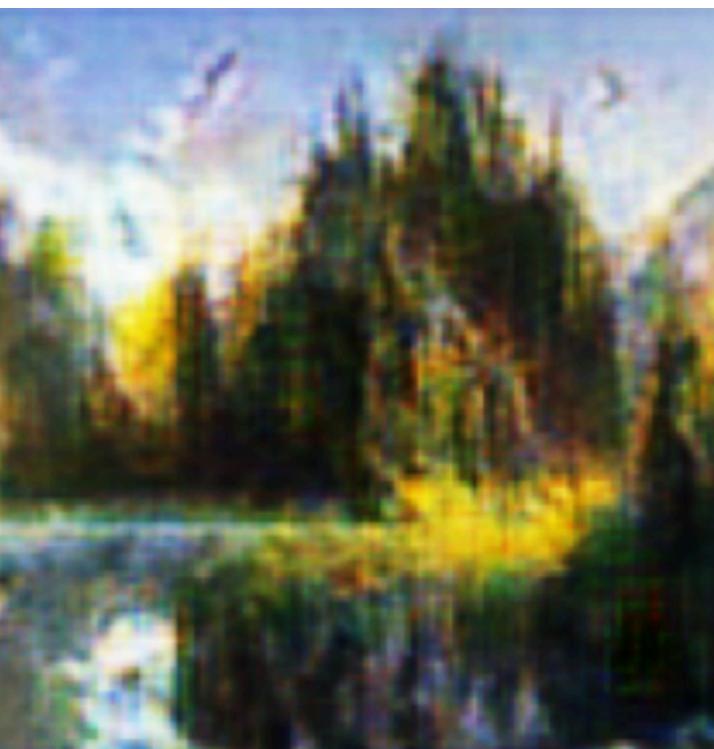
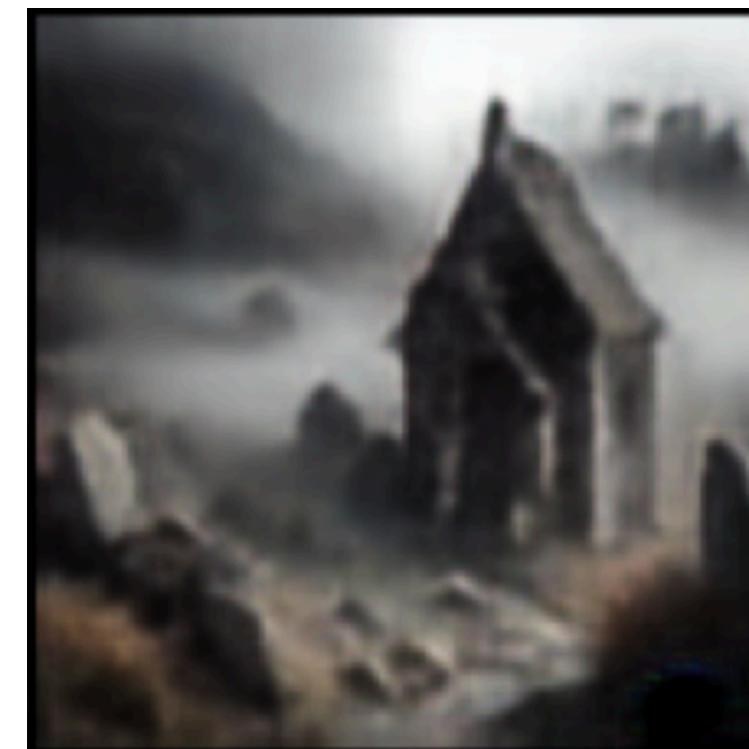
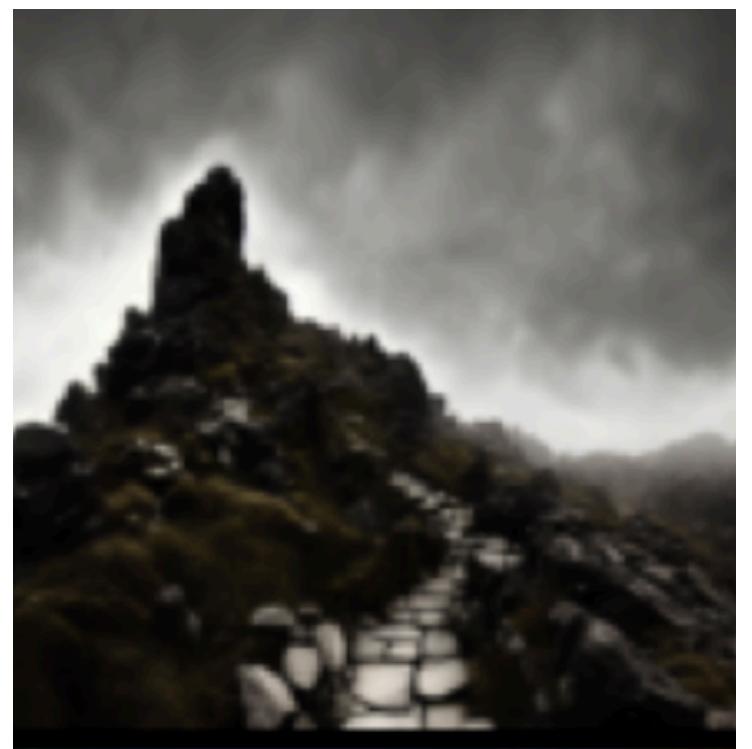
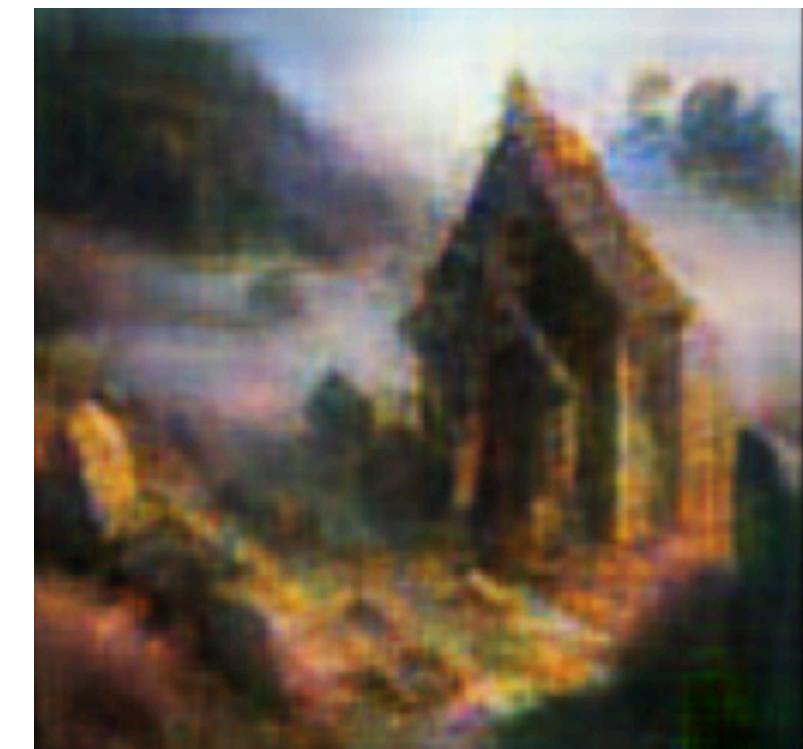
A

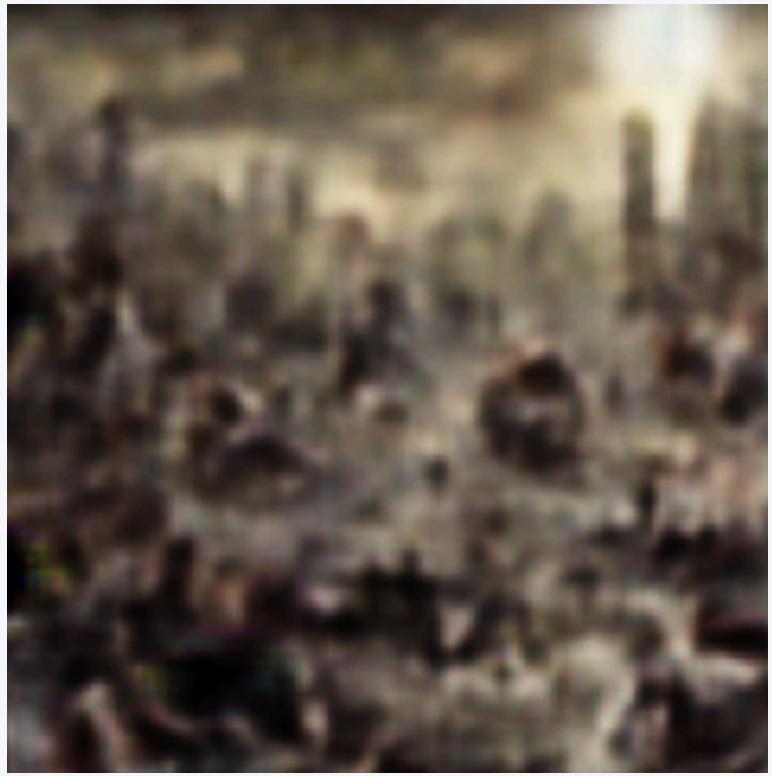
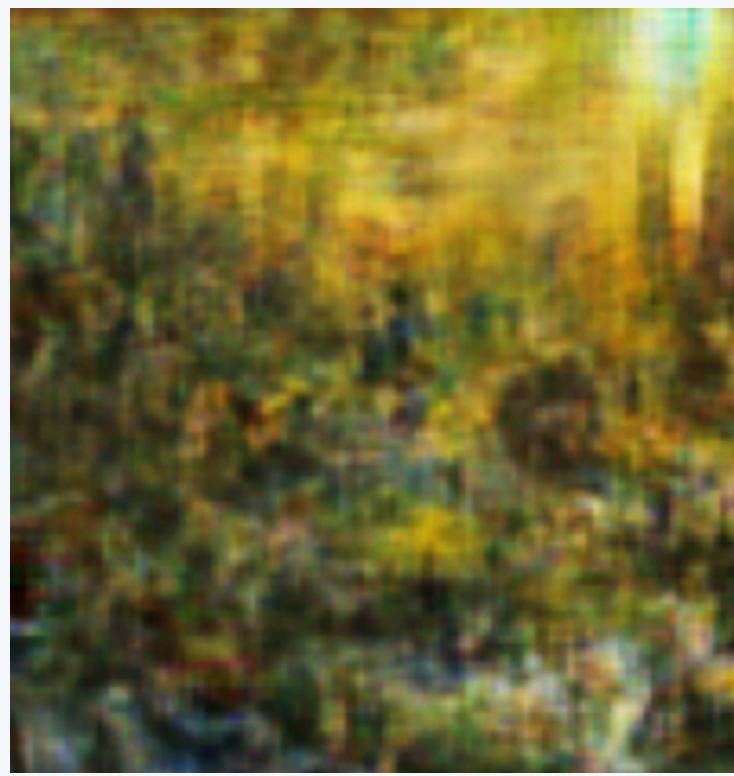
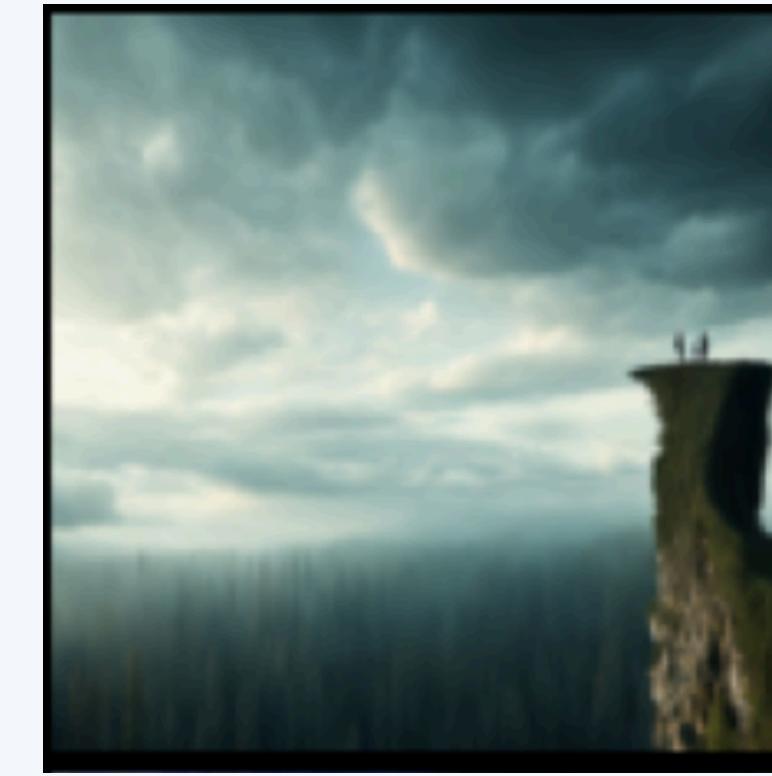
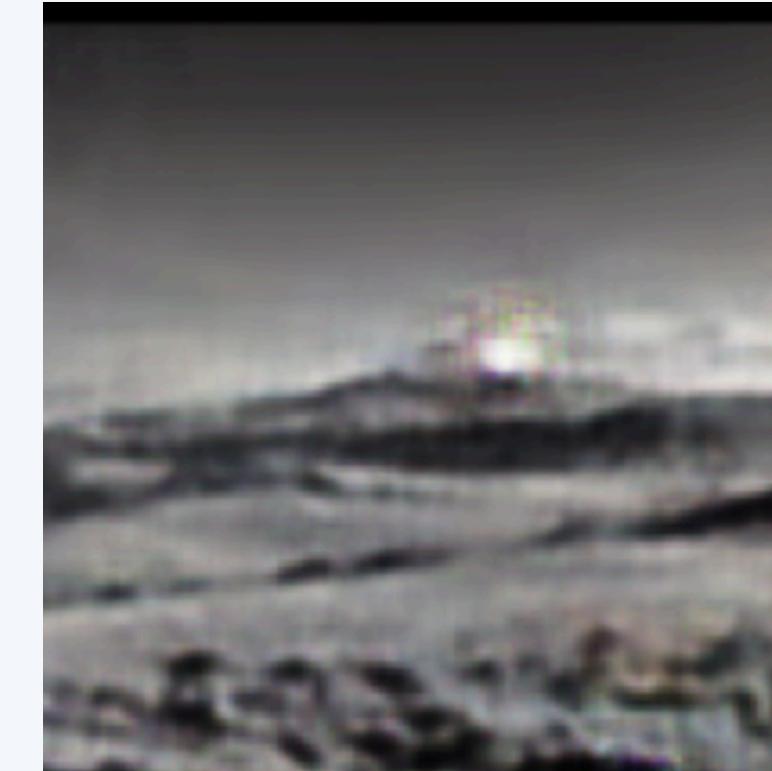
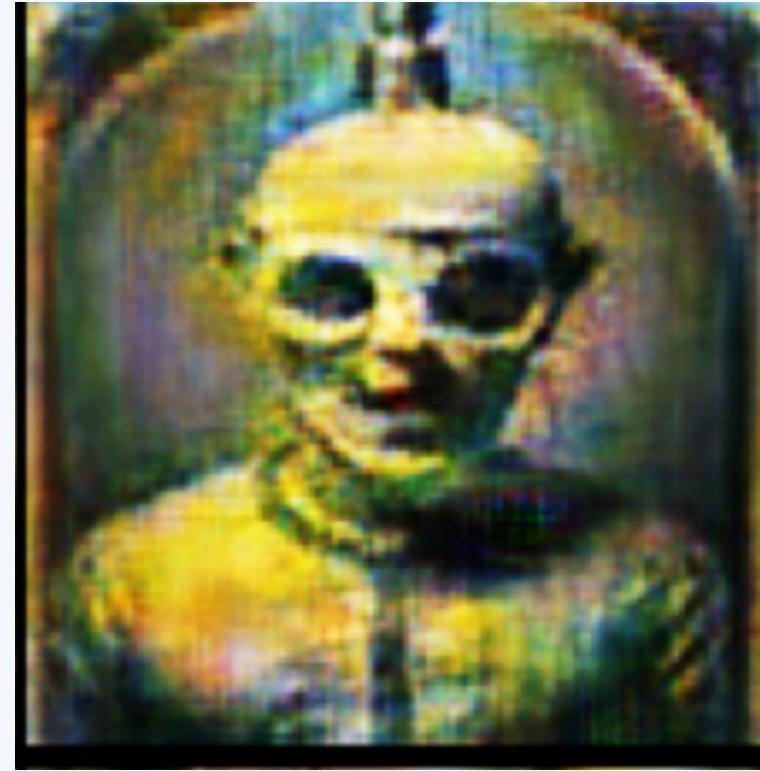
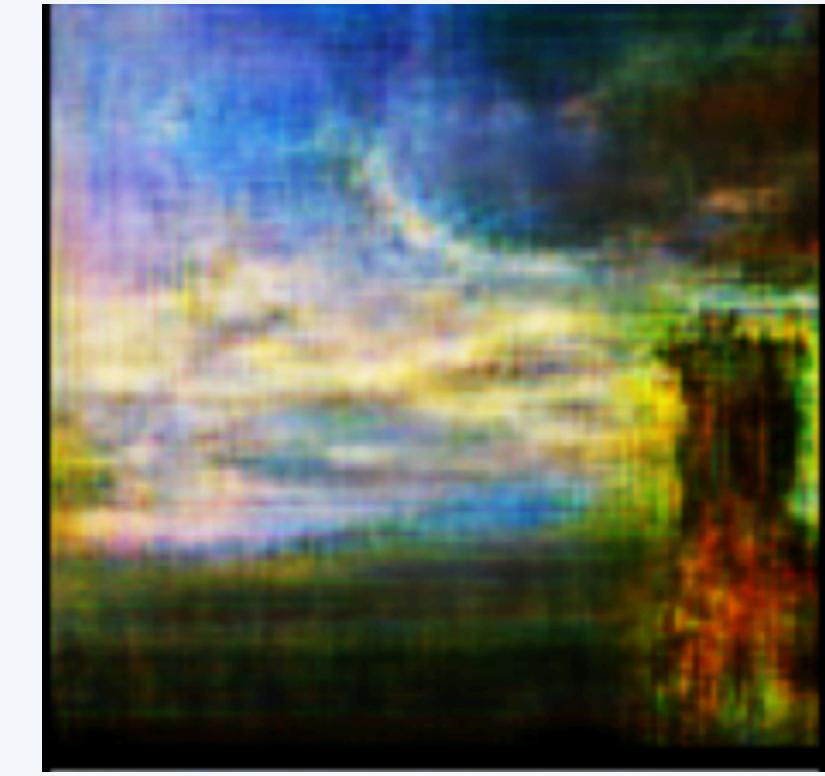


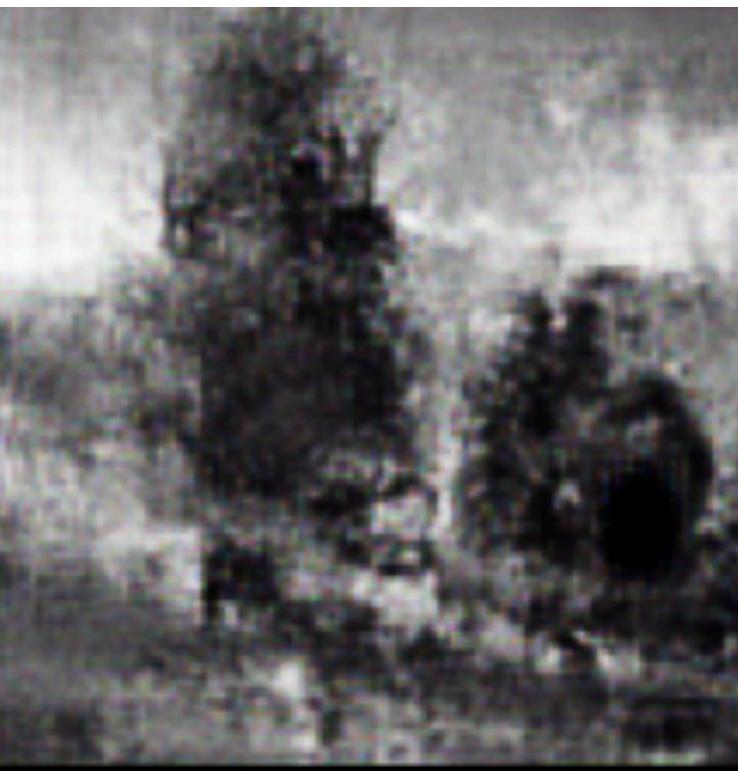
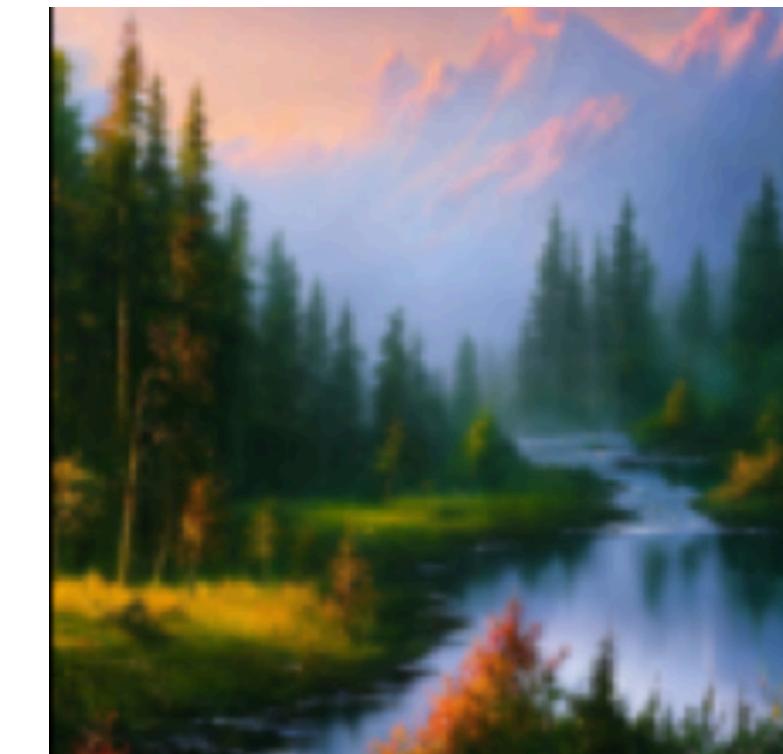
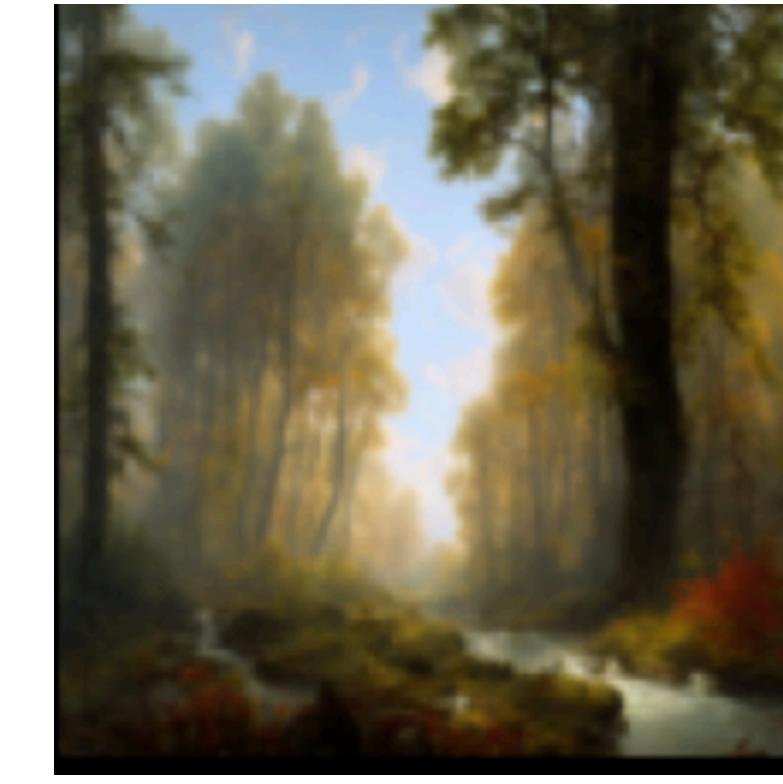
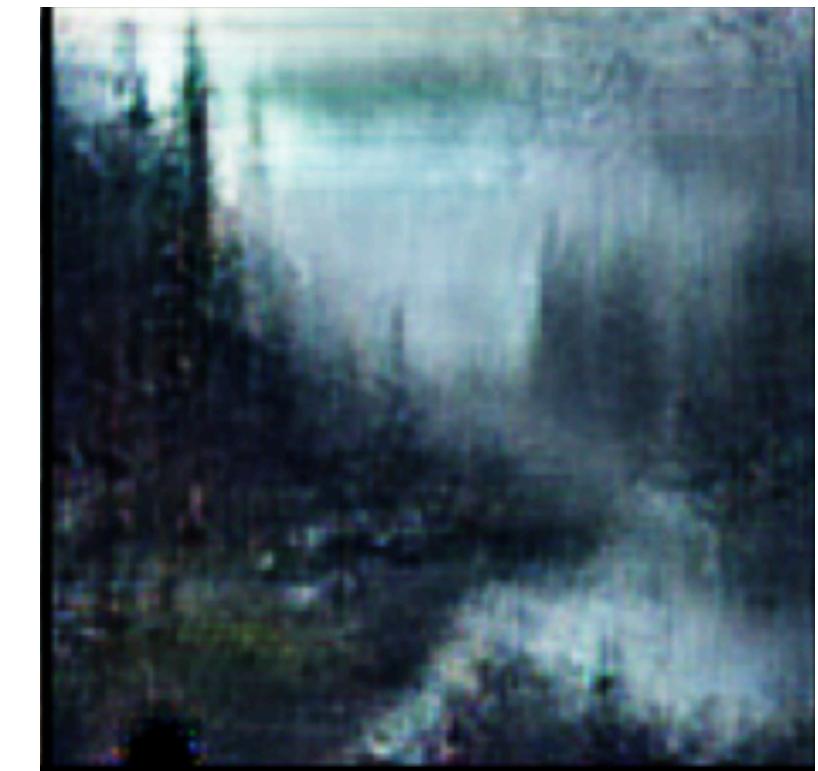
B



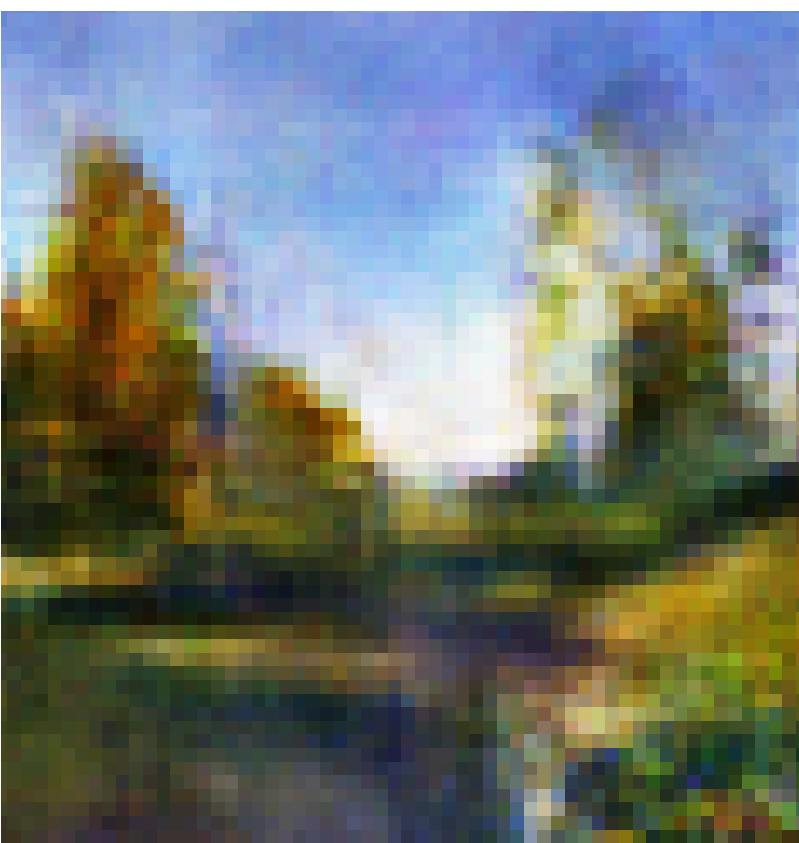
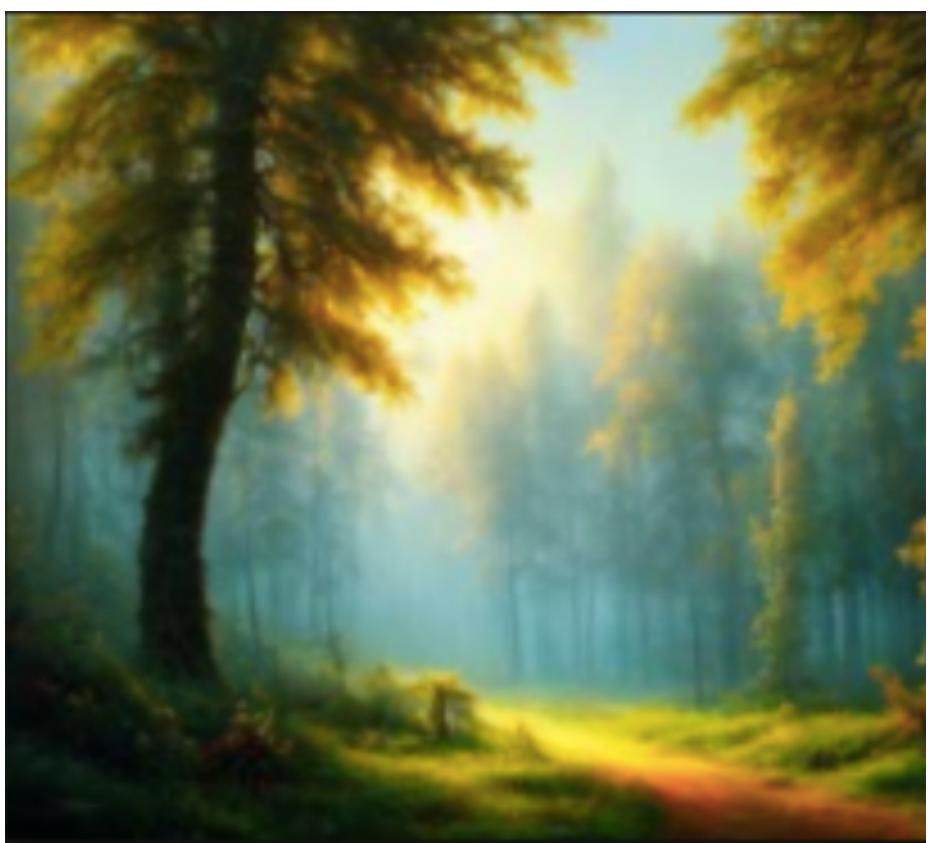
A**B****A****B****A**

A**B****A****B**

A**B****A****B**

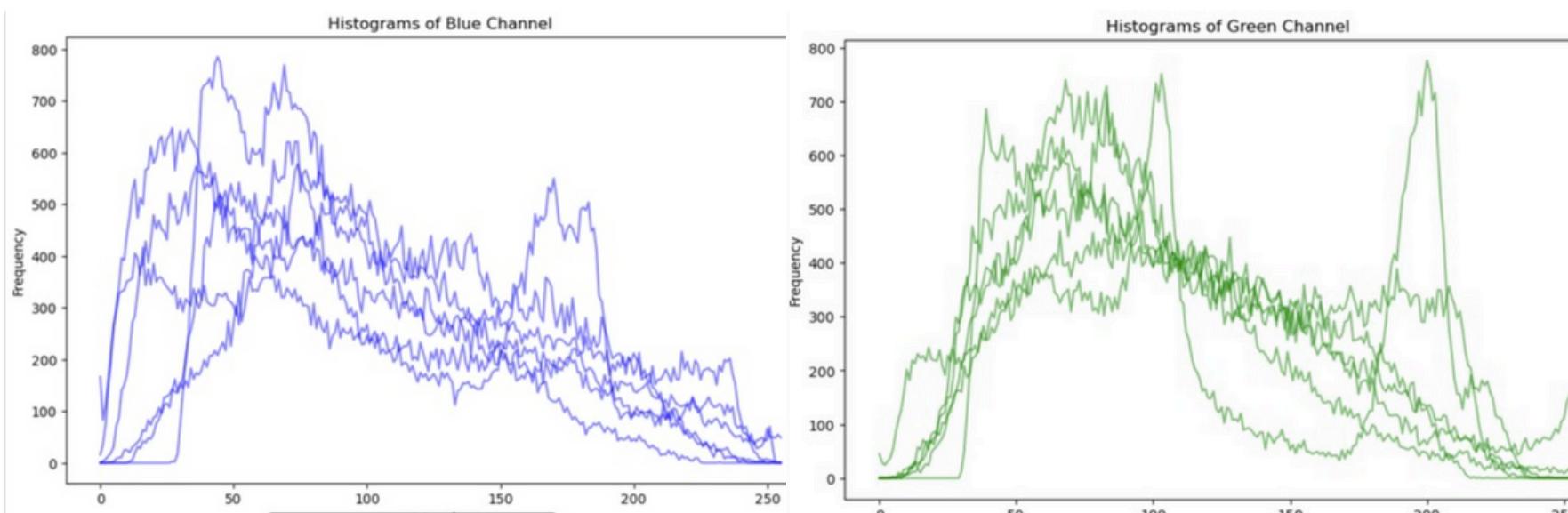
A**B****A****B**

Limitations



- There are **more sophisticated** methods, such as stable diffusion where **quality** of the image could be **better**.
- I have **limited skills** and **timeframe** in the project more methods can be explored
- Although being backed up with research, **what makes an image calming is subject**

Outlook in general



- Use insights of the histogram to help the model to **train better**

Summary



Thank you.