Unsupervised Scene Sketch to Photo Synthesis

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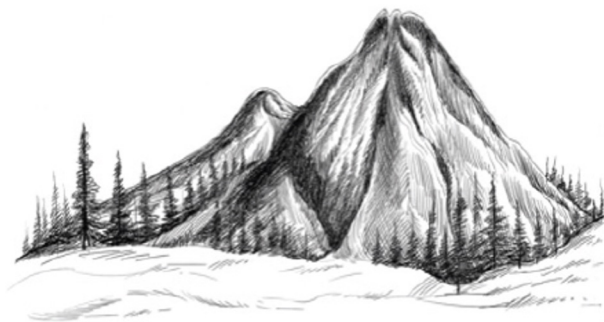
Xi Zhang, Himanshu Arora, Yu Lou

Amazon

http://pwang.pw/scenesketch.html
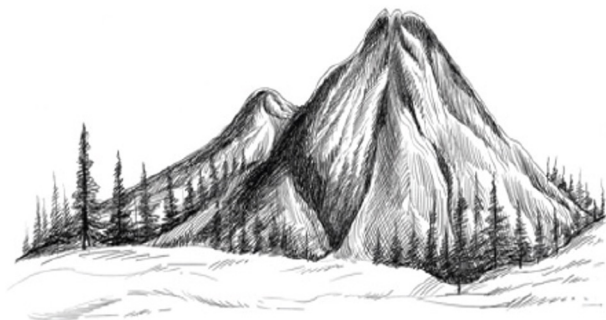
Sketch-Based Scene Generation

sketch

Sketch-Based Scene Generation

synthesized photo

Sketch-Based Scene Generation

sketch

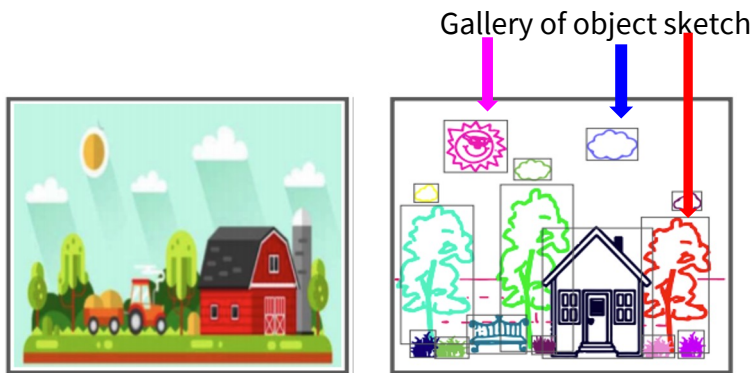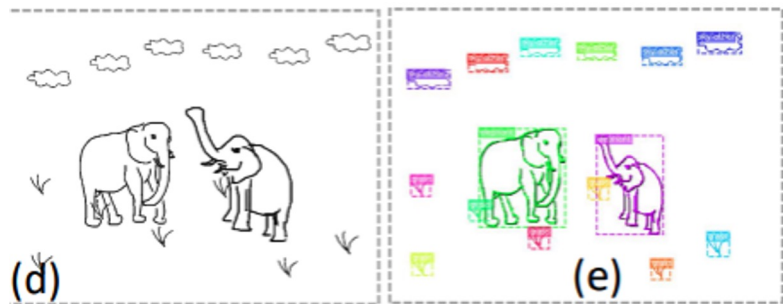# Sketch-Based Scene Edit

photo　　　　　synthesized sketch　　　　　modified sketch

new style　　　　　edited photo

Existing Work: Break to Objects, Synthesize, then Combine

Gallery of object sketch

SkethyScene, ECCV 18

(d)

(e)

object sketch to photo

combine

(c)
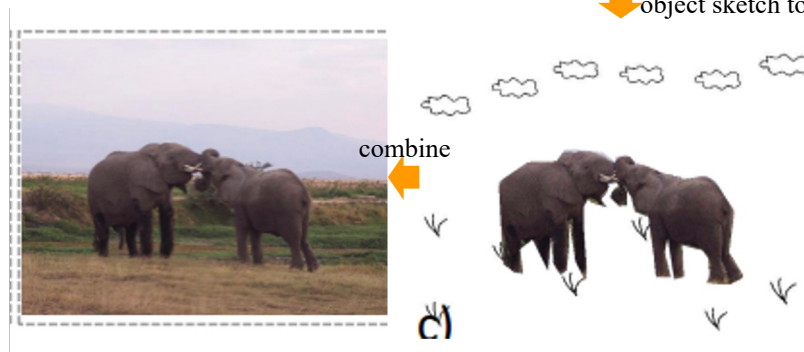
SkethyCOCO, CVPR 20

Existing Work: Break to Objects, Synthesize, then Combine

Gallery of object sketch
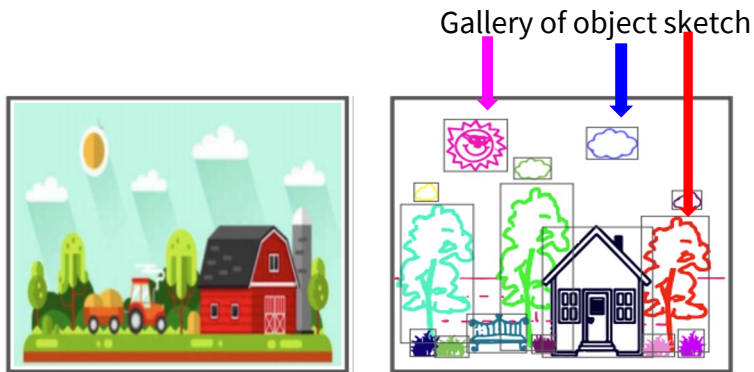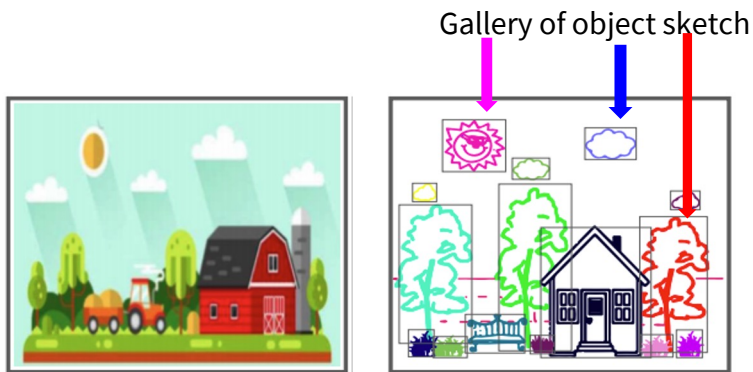
SkethyScene, 2018

Artifacts come from combination…
Can we directly learn from images?
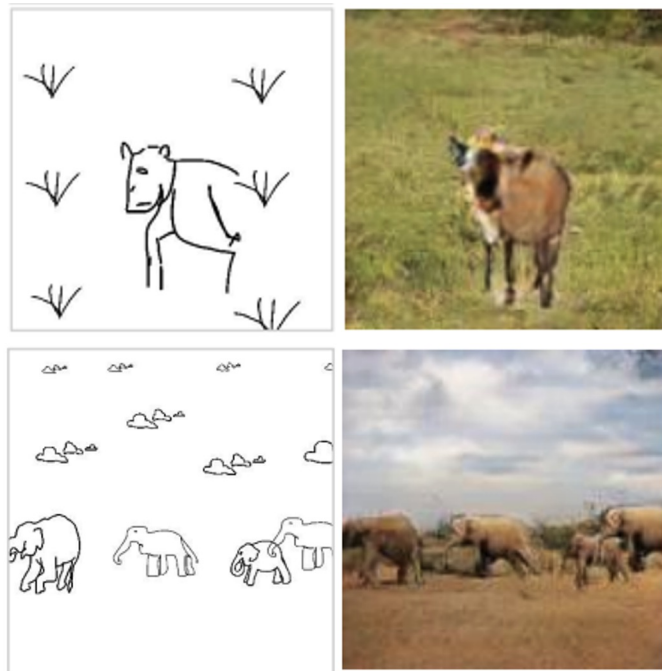
SkethyCOCO, 2020

Learning Directly from Photos

Gallery of object sketch

SkethyScene, 2018

ours

Takeaway: the holistic scene structures need to be preserved rather than being broken into pieces

Learning Directly from Photos
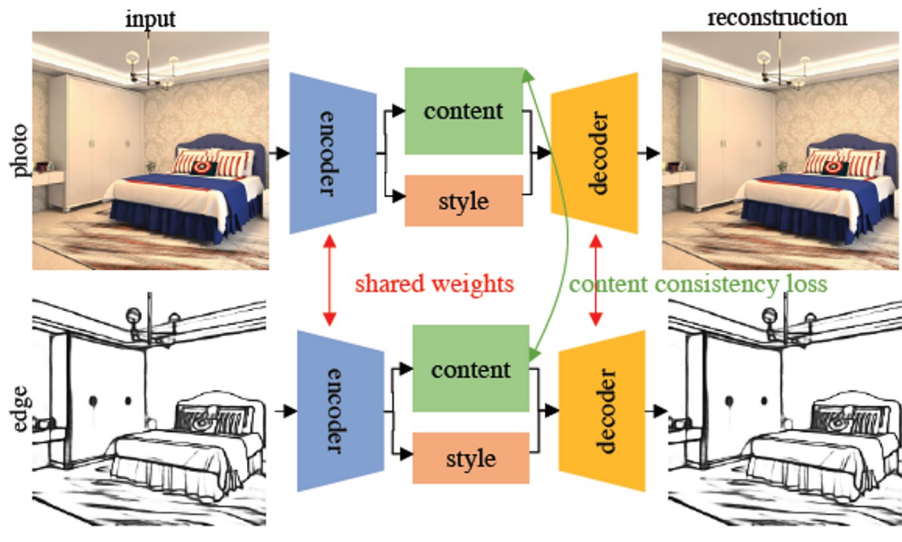

standardization
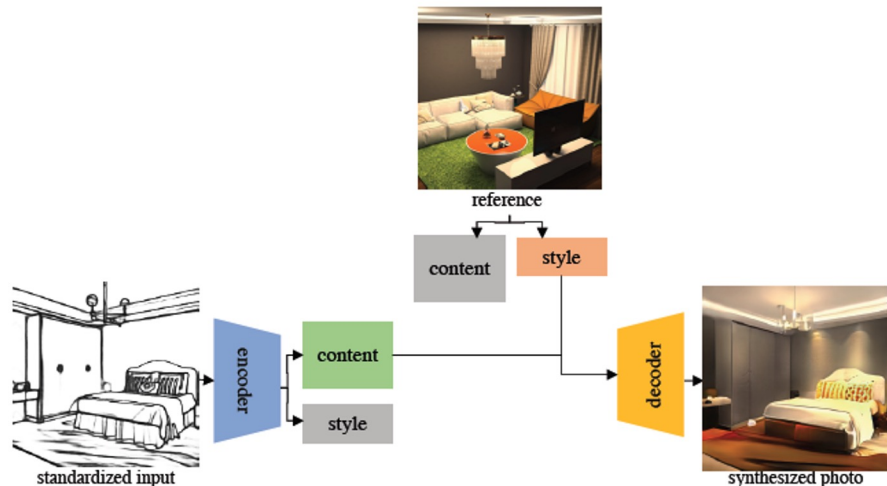
Training

photo

Inference

sketch

Training Pipeline

Step1: auto-encoding

Step2: fine-tuning with unpaired data

* refer to StyleGAN/StyleGAN2 for how decomposed representation can be learned.
** unsupervised due to no paired data

Results - Room Sketches

Results - Church Sketches

Results - Style Interpolation
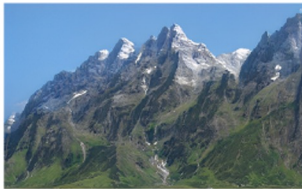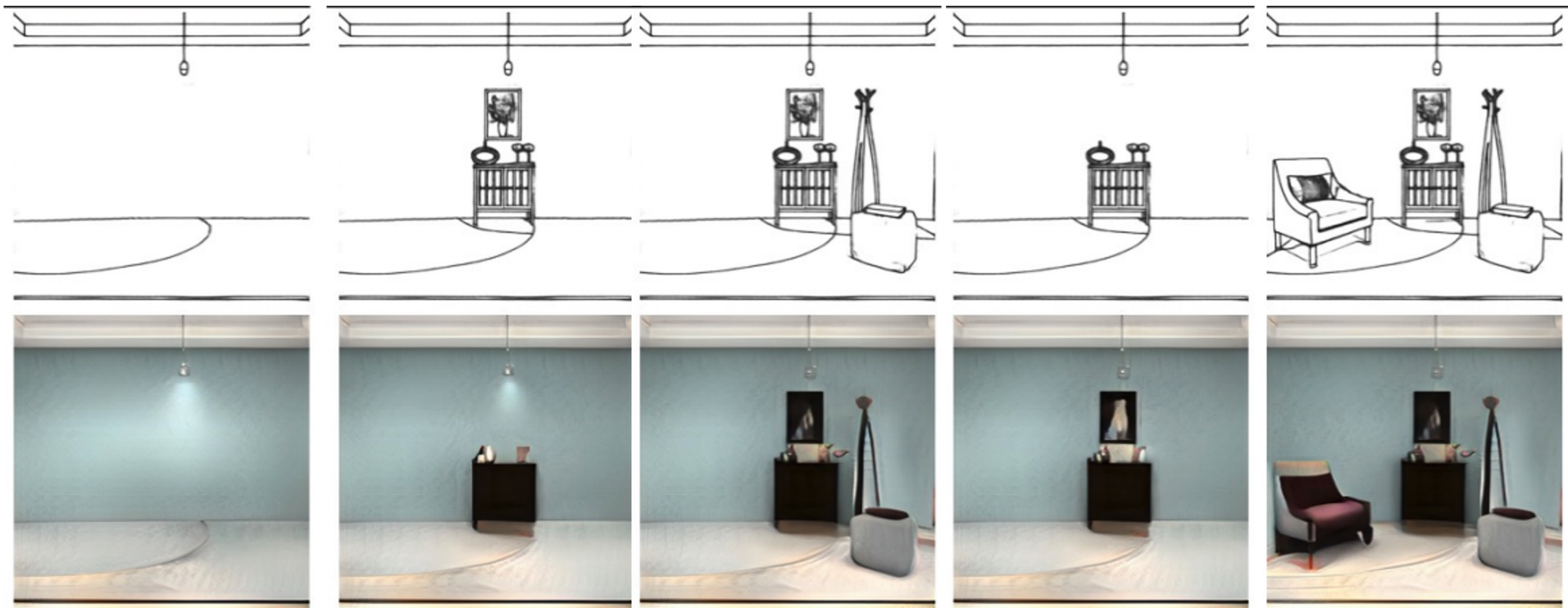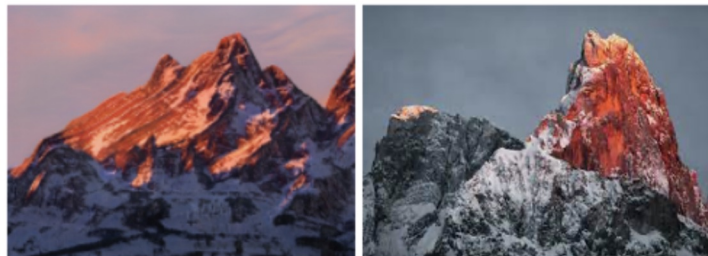
Results - Scene Editing

Perceptual Study: Can Generated Photo Fool People?

Which one is a real photo?

A   B

(%)	indoor scene	church	mountain	mean
ours	**25.00**	**44.3**	**48.9**	**39.4**
SAE [28]	10.0	6.6	20.0	12.2

51 subjects, 2k judgements
Additional questions on style and content matching