Unsupervised Scene Sketch to Photo Synthesis

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

SkethyScene, ECCV 18

Gallery of object sketch

SkethyCOCO, CVPR 20

object sketch to photo

combine
Existing Work: Break to Objects, Synthesize, then Combine

Artifacts come from combination…
Can we directly learn from images?

SkethyScene, 2018

SkethyCOCO, 2020
Learning Directly from Photos

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

Training

standardization

Inference

photo

sketch
Training Pipeline

Step 1: auto-encoding

Step 2: 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?

| (%) | 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