

# Mask-based Style-Controlled Image Synthesis Using a Mask Style Encoder

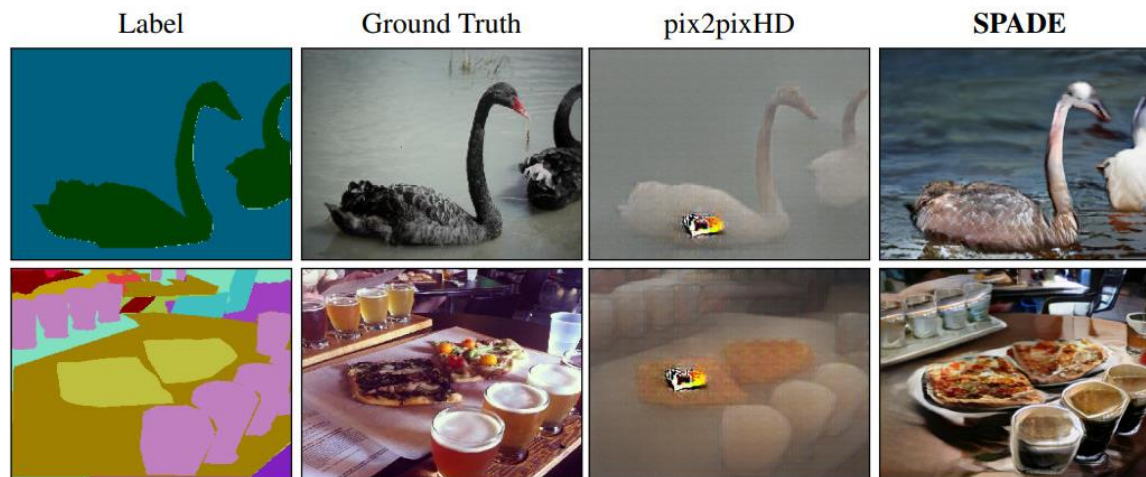
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# INTRODUCTION

- Mask-based image synthesis
  - Image-to-image translation
  - Method for generating images using a semantic segmentation mask
  - Pix2pixHD<sup>[1]</sup>, SPADE<sup>[2]</sup>, etc.



[1] Wang et al. High-resolution image synthesis and semantic manipulation with conditional gans, CVPR, 2018.

[2] Park et al. Semantic image synthesis with spatially-adaptive normalization, CVPR, 2019.



# INTRODUCTION

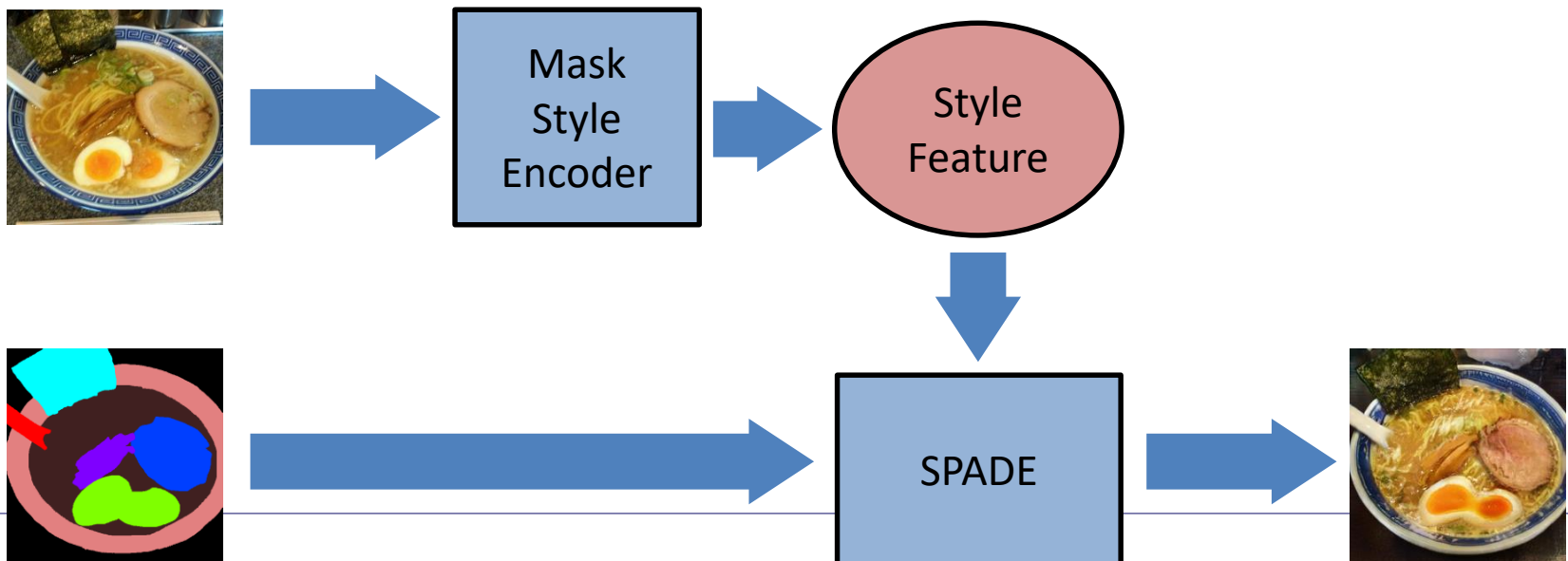
- The SPADE method has made it possible to synthesize high-quality, photo-realistic images from semantic masks.
- However, The SPADE method is difficult to synthesize an image that controls the style of each mask element.





# INTRODUCTION

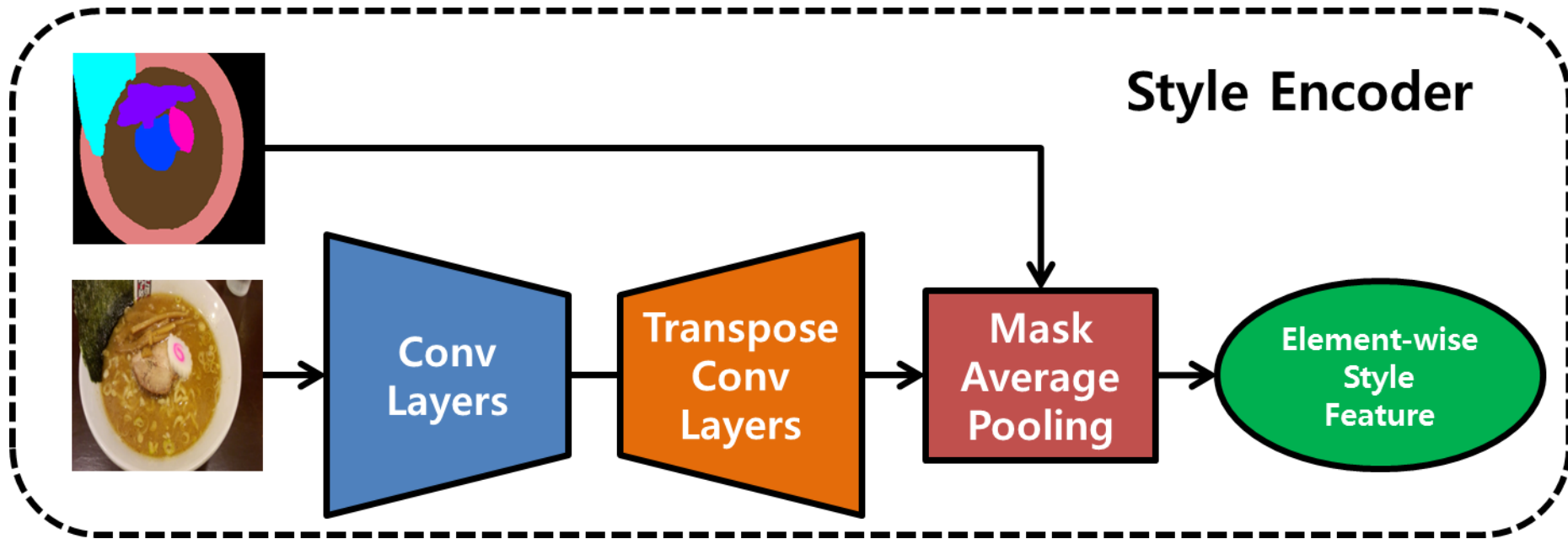
- We propose a style-controlled image synthesis method for each mask element.
  - SPADE-based architecture
  - Using a mask style encoder





# PROPOSED METHOD

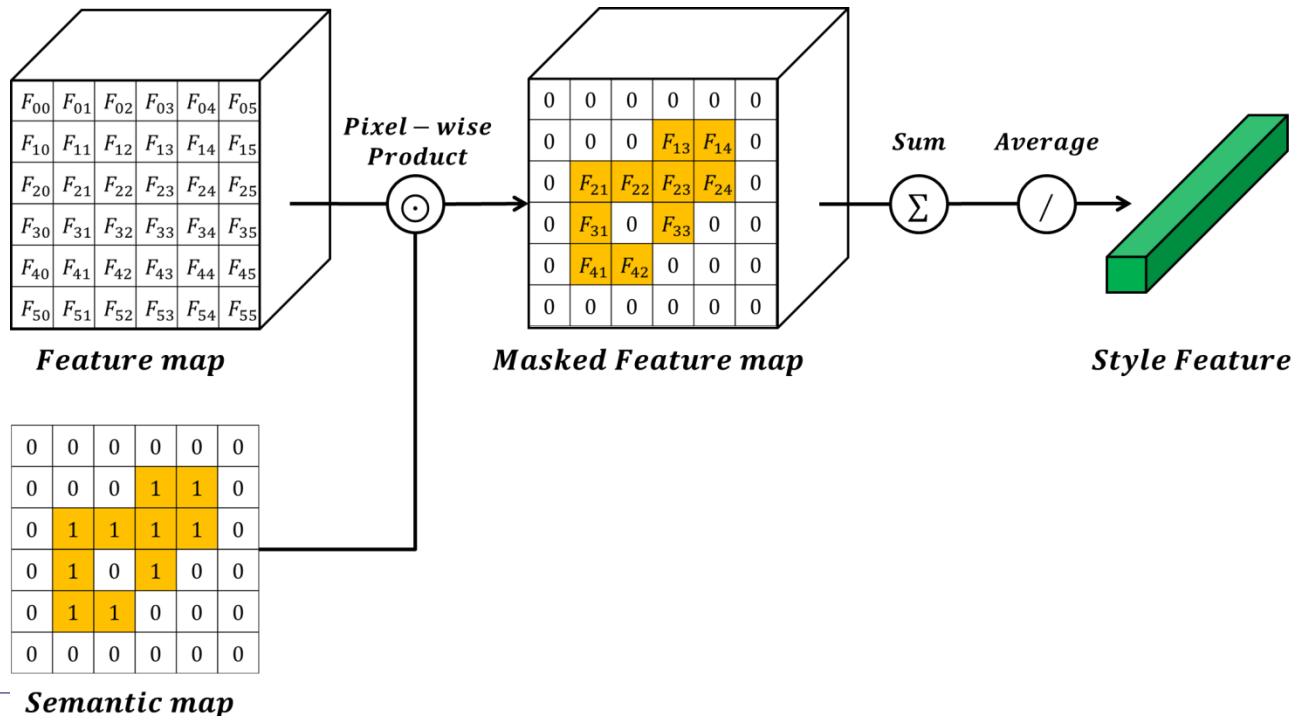
- Style Encoder
  - Extract style features from each of the mask elements of the style image.





# PROPOSED METHOD

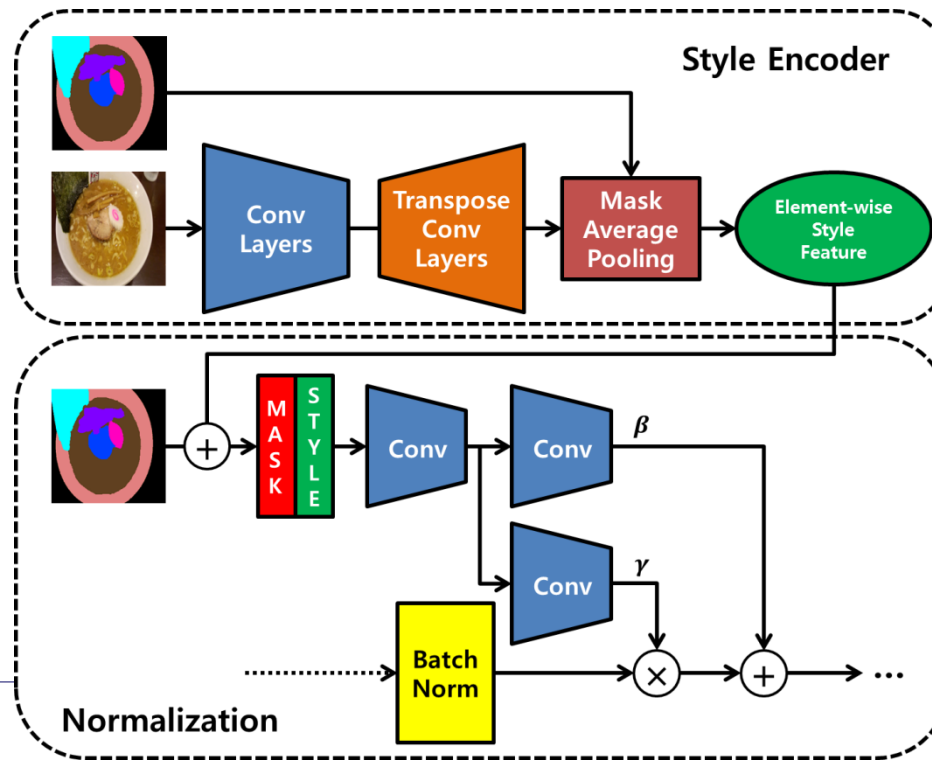
- Mask Average Pooling Layer
  - Extract averaged feature vectors of the input feature map over the specific region label.





# PROPOSED METHOD

- Mask style features are concatenated with the semantic mask label map, and provided to SPADE layers.





# EXPERIMENTS

Label

GT

SPADE

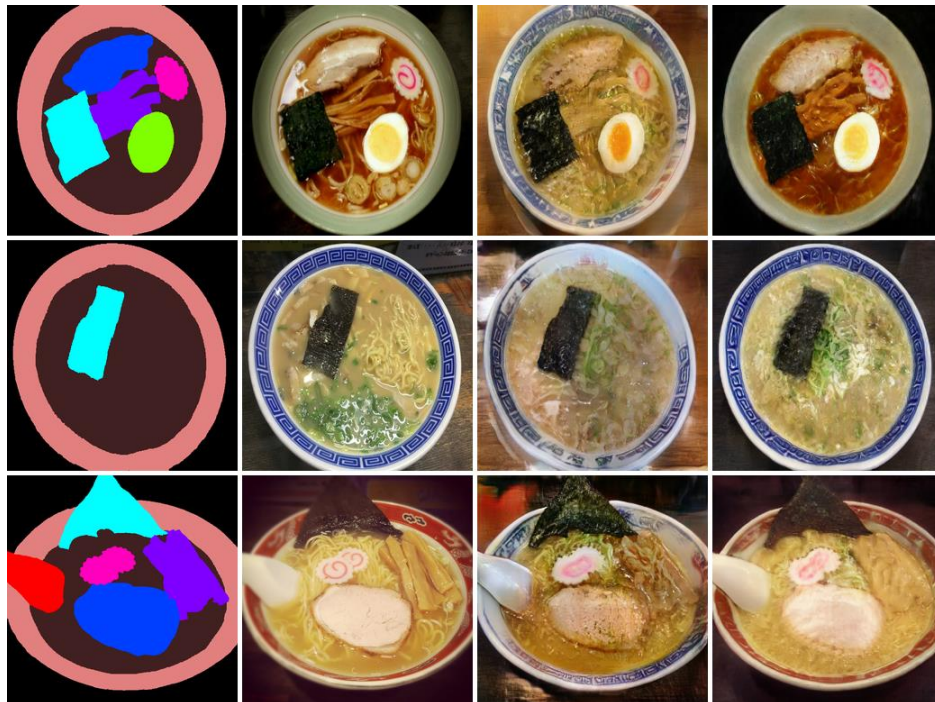
Ours

Label

GT

SPADE

Ours



UEC-Ramen555



CelebA





# EXPERIMENTS

Label	Style					

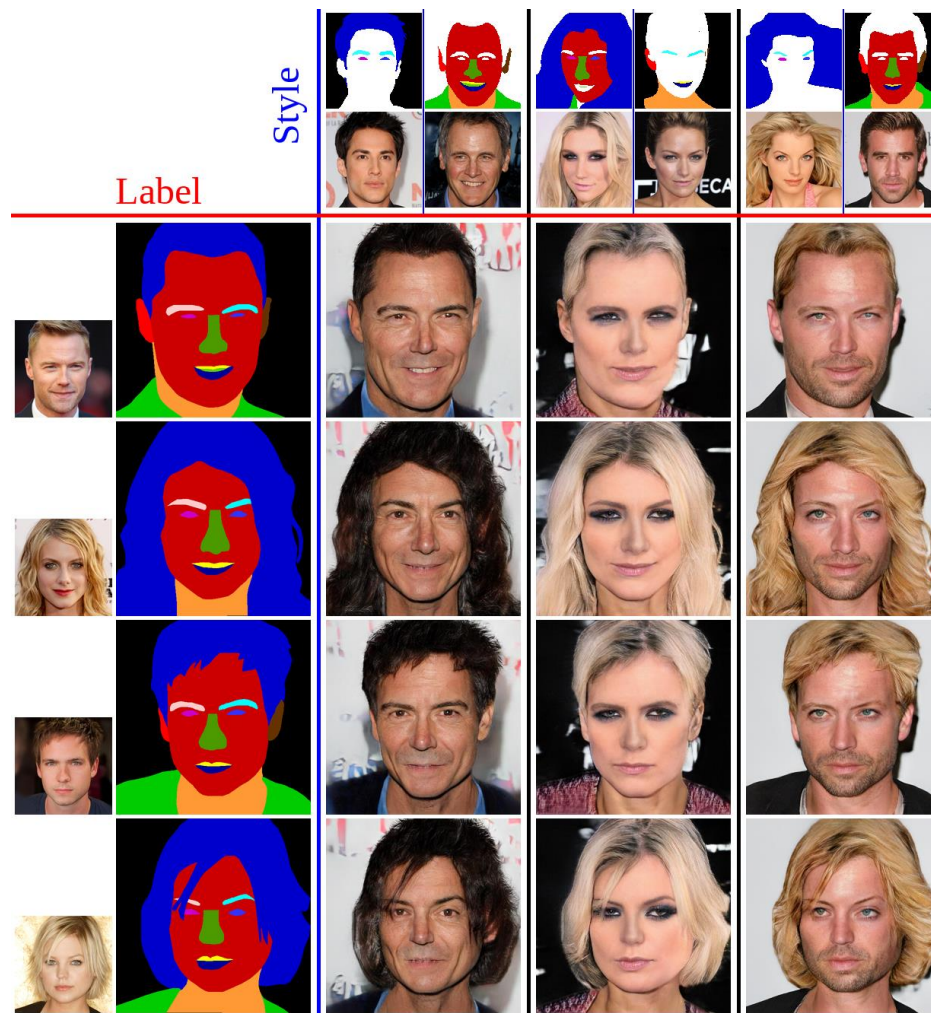
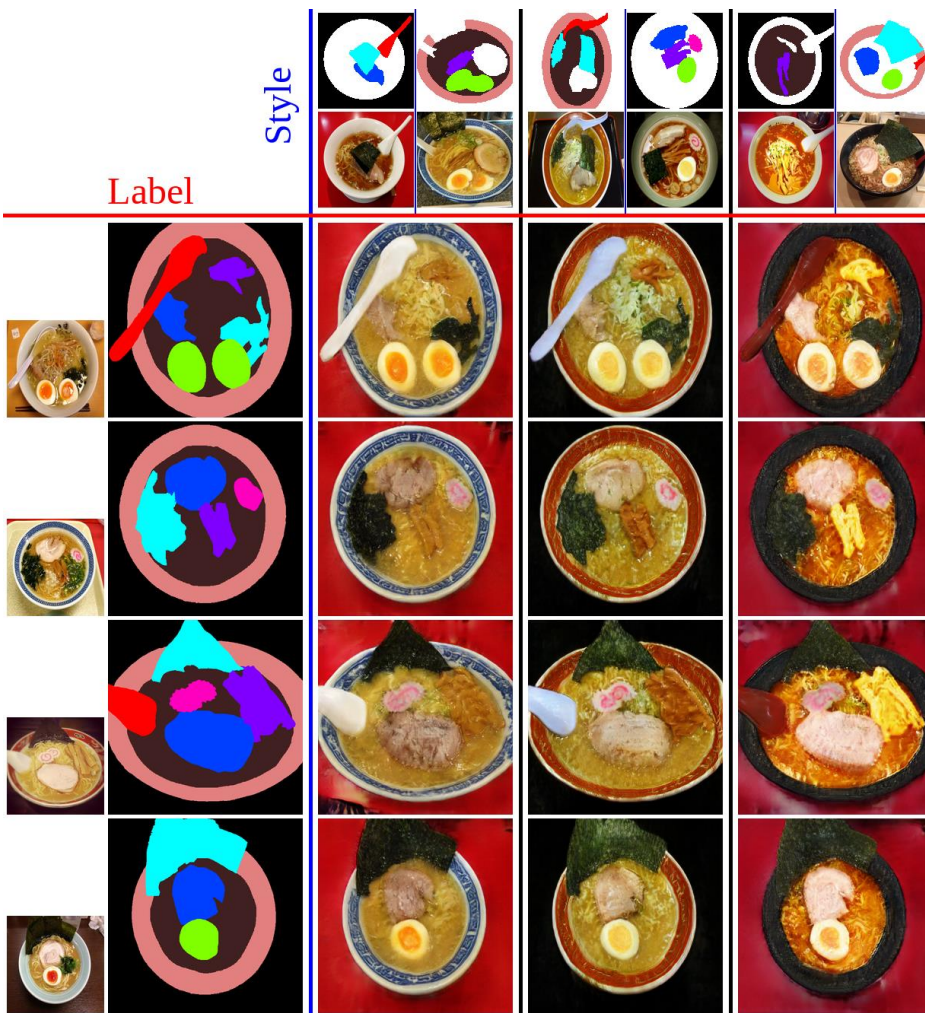


# EXPERIMENTS





# EXPERIMENTS





# CONCLUSIONS

- We have proposed a novel style-controlled image synthesis method using a mask style encoder.
- Our method realized style-controlled image synthesis by concatenating mask style features with the modified SPADE-based network.
- The experiments have shown that our method has enough ability on style-controlled image synthesis.



# RamenStyleAsYouLike DEMO

Please search YouTube with “RamenStyleAsYouLike”.

**Ramen Generation**

Generation presets: 1 2 3 4 5 6 7 8 9

Control: Generate Reload Download Reset

← →

Success

Move menu: Segmentation area, Style area, Generation area

Palette: Drawing tool: Pencil

Background	Bowl	Soup	Spoon	Chopsticks	Cut Egg	Egg
Seaweed	Meat	Menma	Naruto			

[https://www.youtube.com/watch?v=Ph-Zx\\_cRE5U](https://www.youtube.com/watch?v=Ph-Zx_cRE5U)