

# Painted Object Synthesis

## Stylized Image Generation with SAGANs

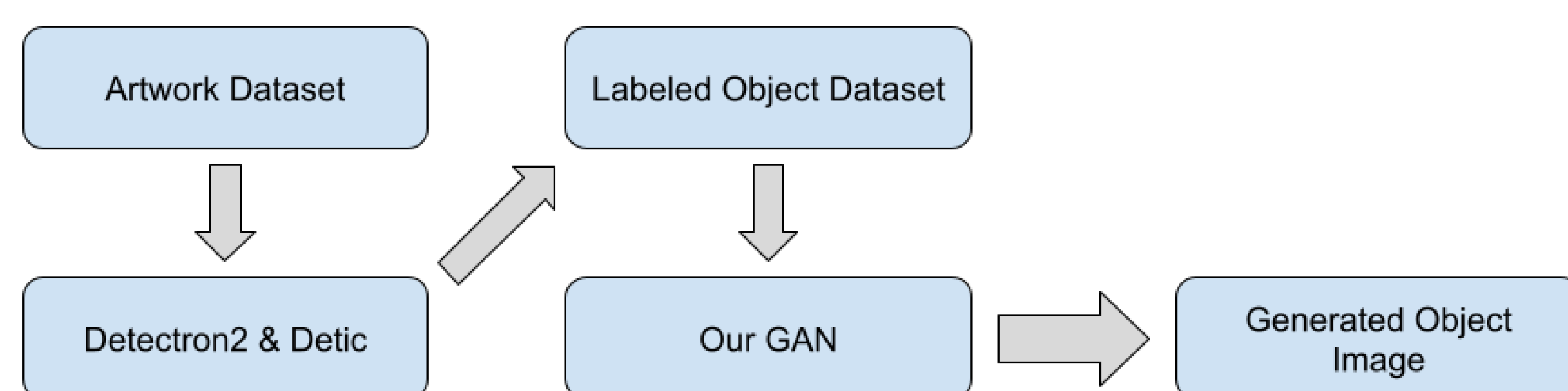
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### Abstract & Motivation:

- Segment object crops from paintings using Detectron2 & Detic
- Train one SAGAN per object class to generate stylized images
- Performance dependent on object consistency & crop quality

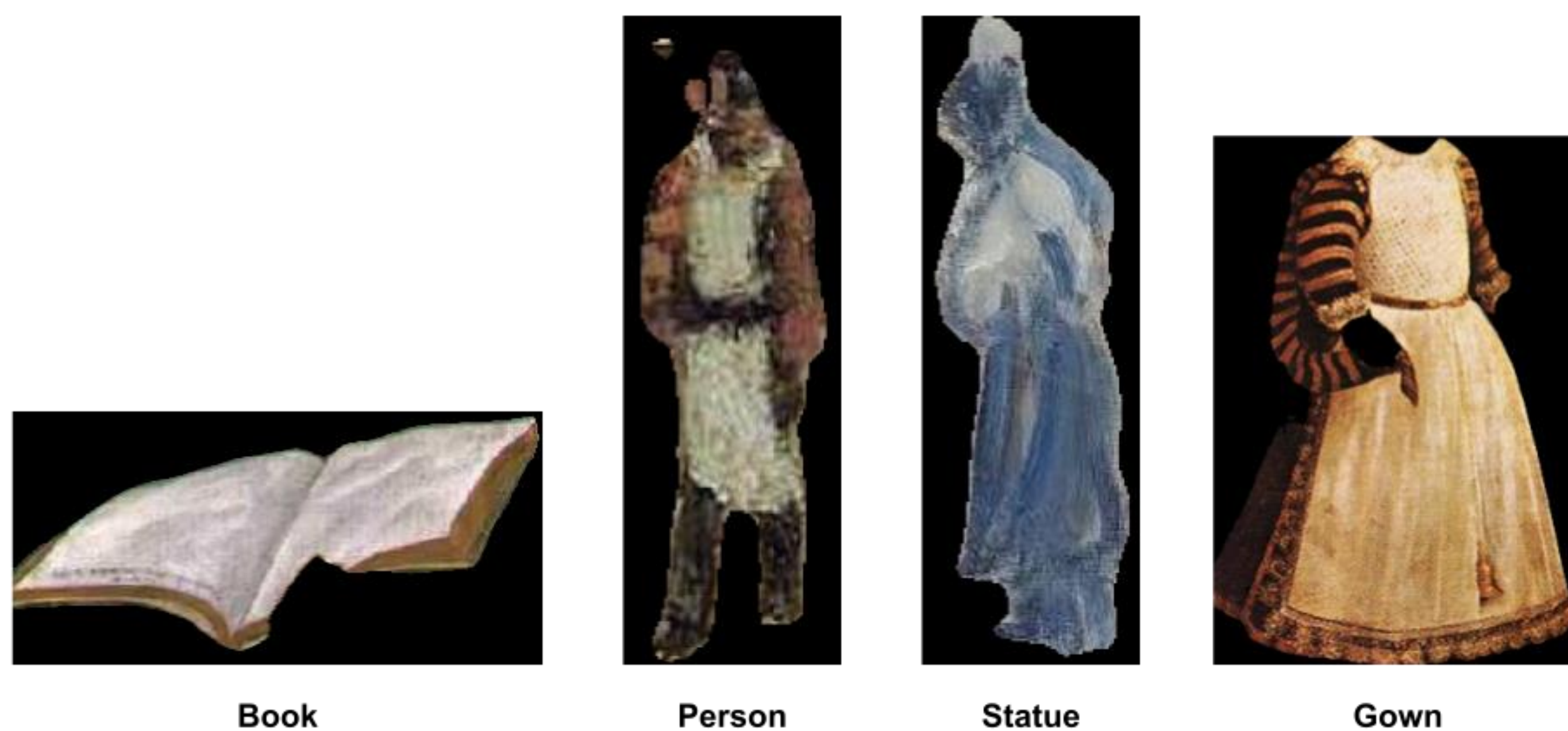


### Project Pipeline:



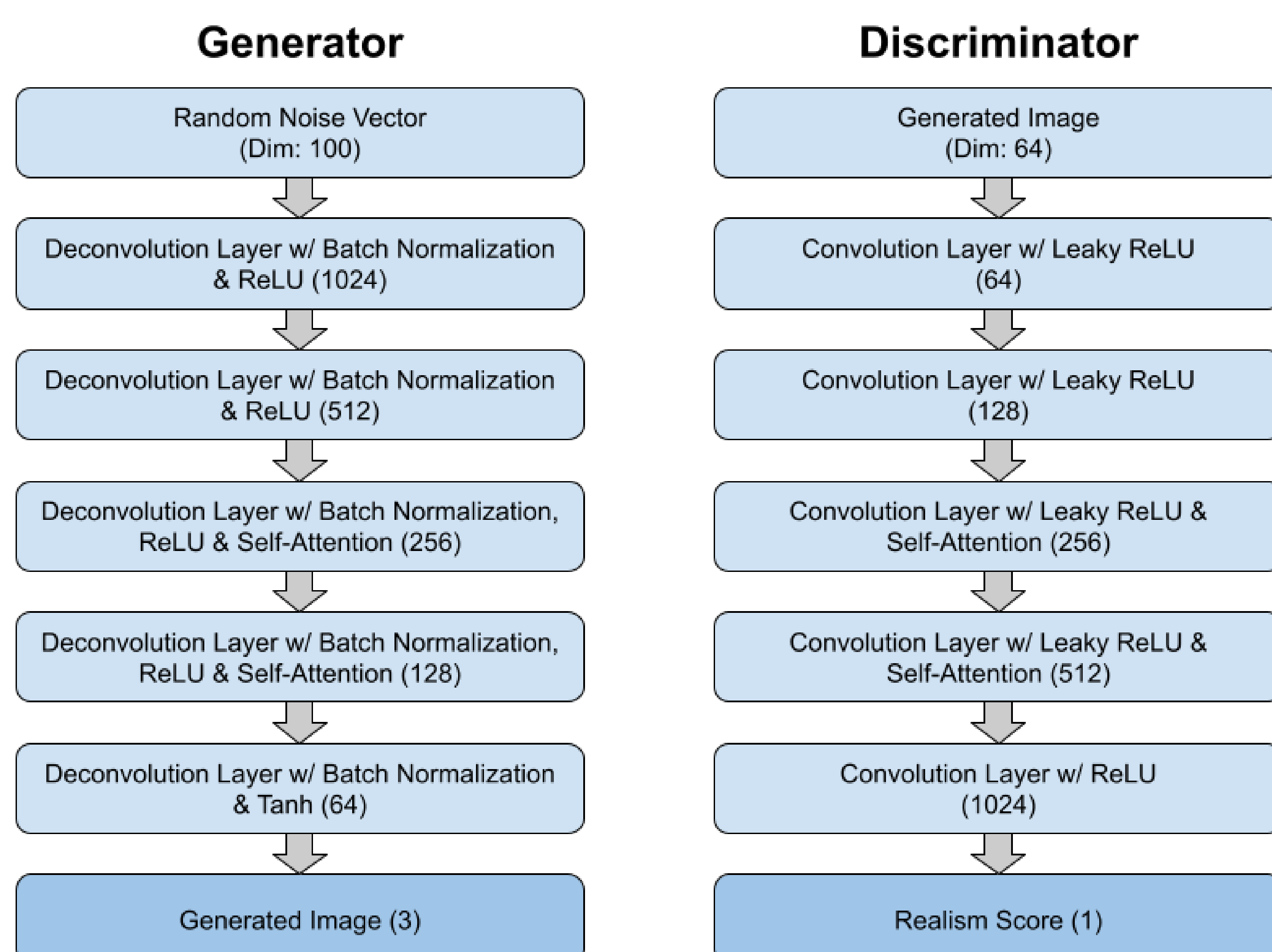
### Dataset & Preprocessing:

- 2026 WikiArt images segmented into 18,271 object crops
- 325 Classes from WordNet
- Trimmed to 1,000 images per class for underrepresentation



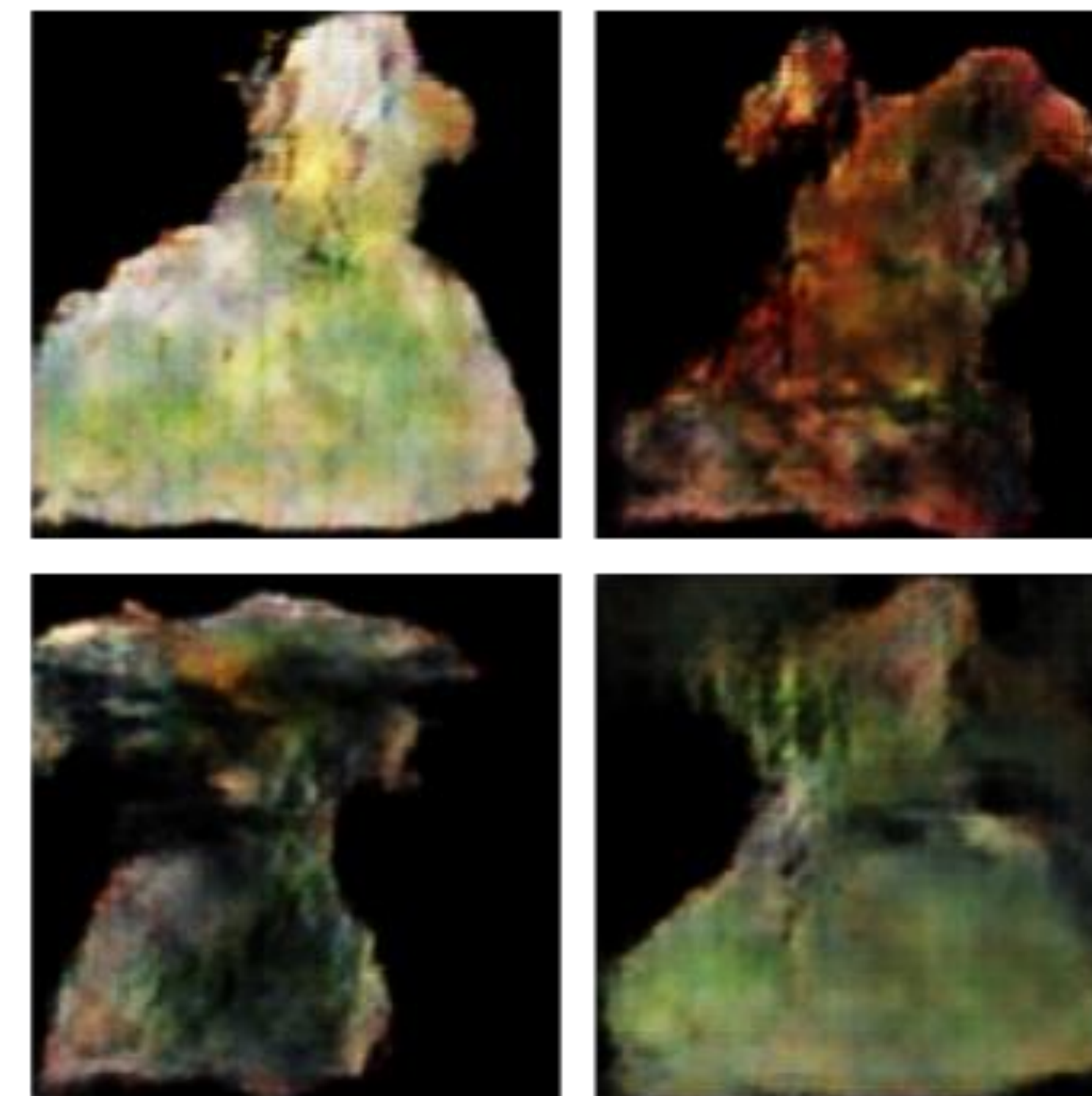
### Model Architecture:

- Generator
  - 100-dim noise vector as input
  - 5 deconvolution layers, self-attention in layers 3 & 4
- Discriminator
  - 5 convolution layers, self-attention in layers 3 & 4
- Trained on AWS GPU with batch size 64 for 200 epochs

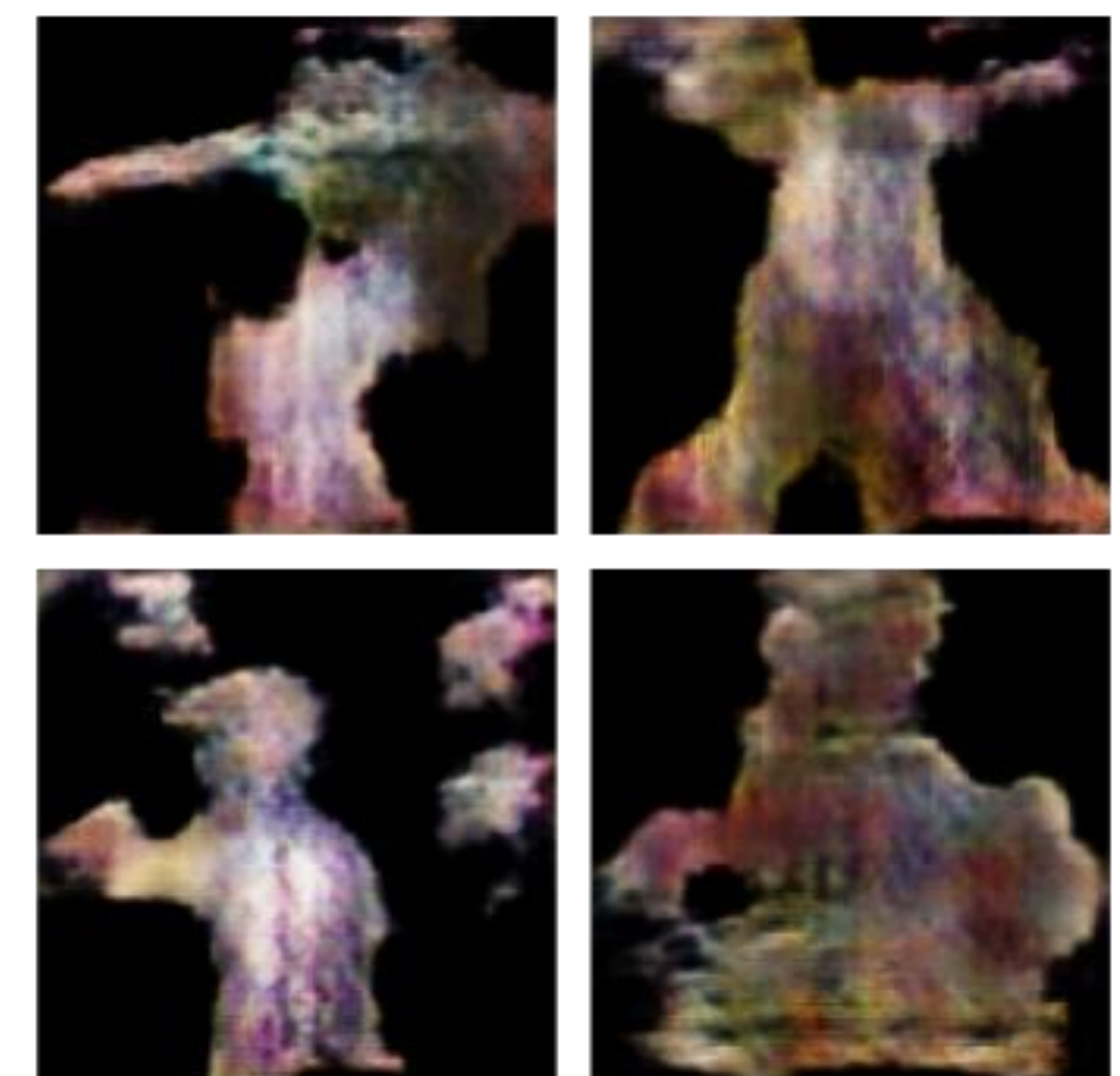


### Generated Images:

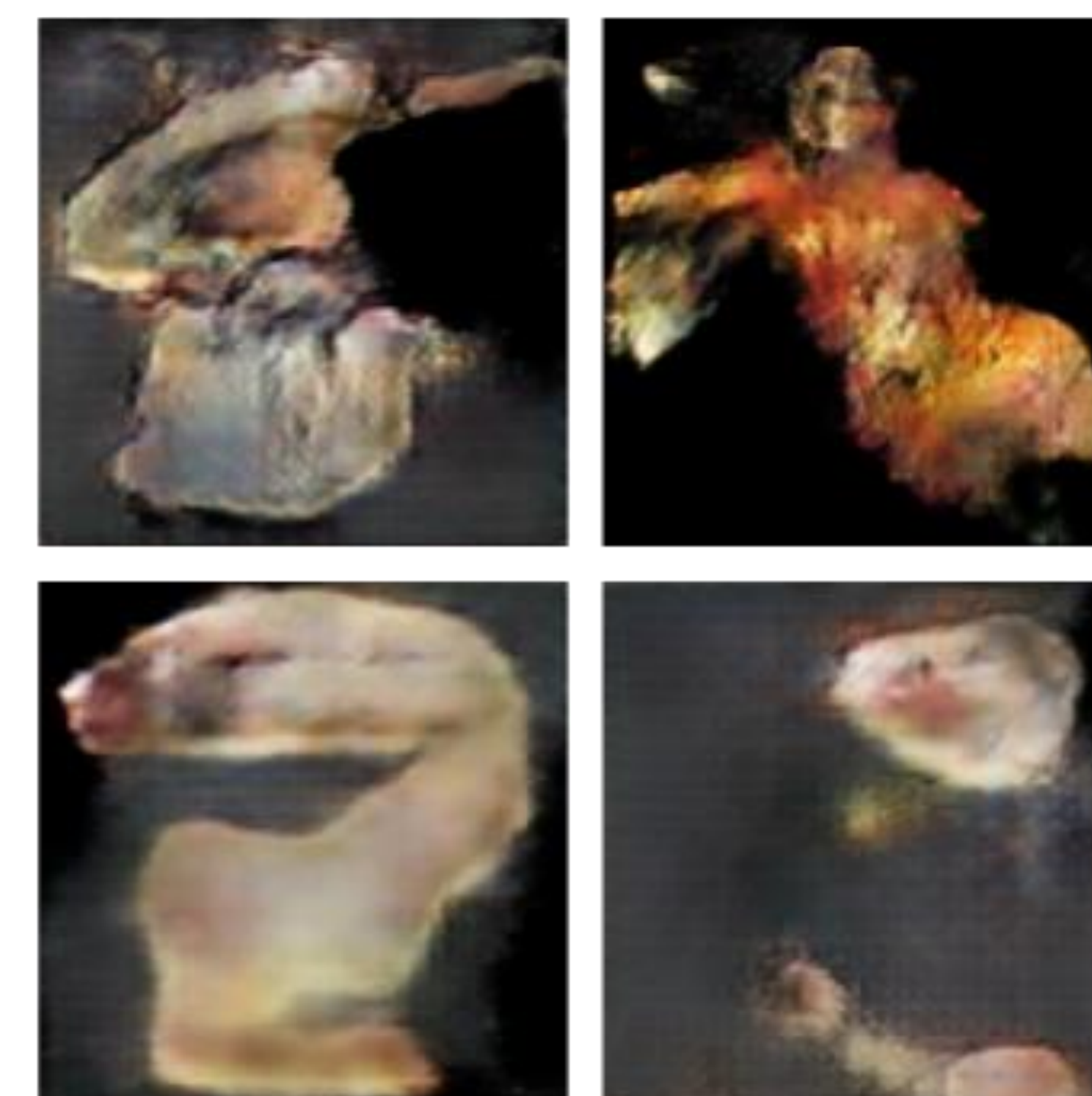
Gown (best):



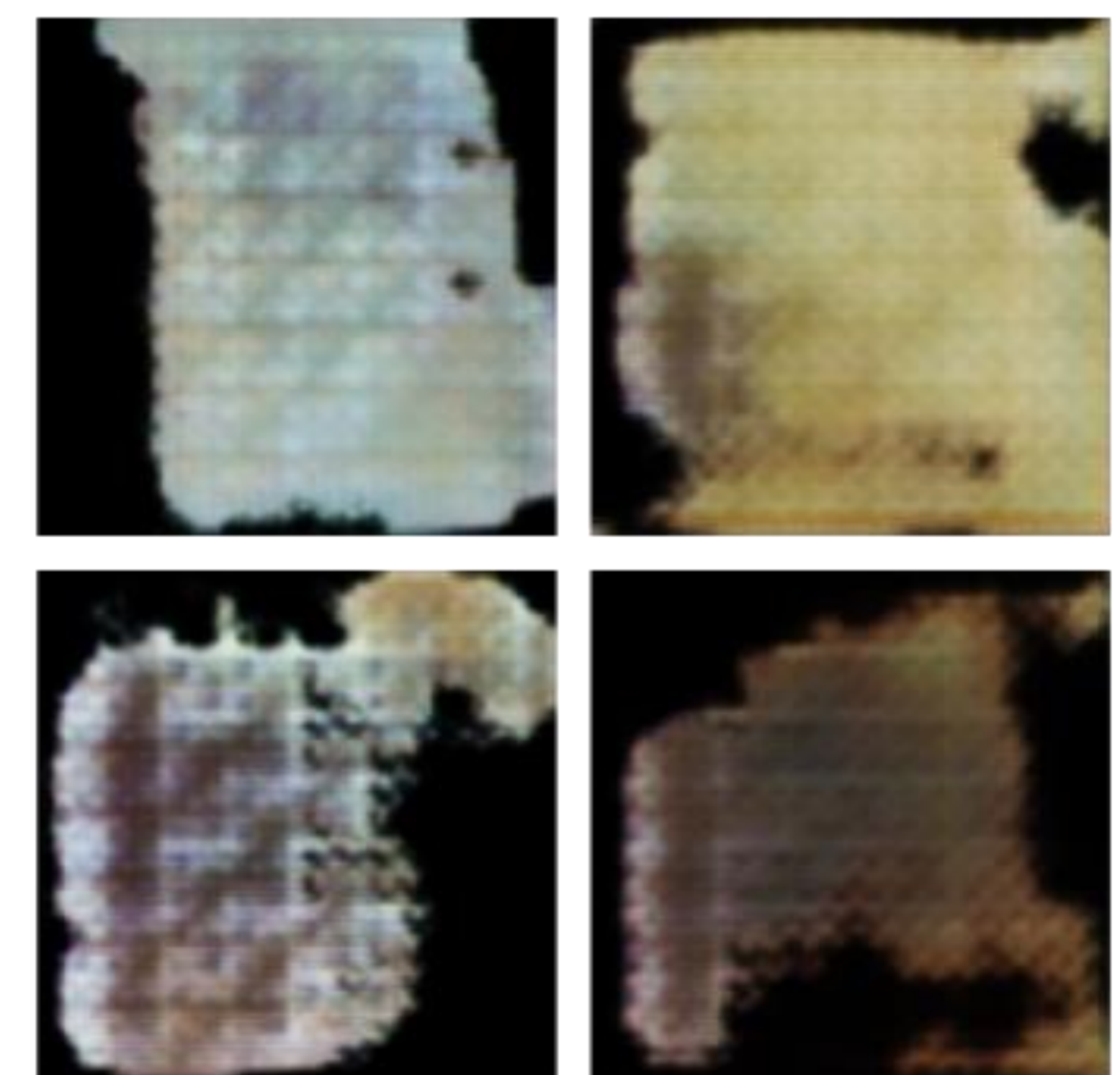
Statue (moderate):



Person (varied):



Book (narrow class):



### Analysis:

- Gown: Consistent shape & apparent texture, good outputs that are representative of the class
- Statue: Maintained overall shape but loses fine surface details
- Person: Highly diverse class, generated images lacking features
- Book: Limited training set, seems to generate only the pages
- Limited performance on less consistent/represented classes (books/people)
- Best performance on objects with consistent shapes and less fine detail (gowns, statues)
- More diverse and represented classes appear to yield more varied results
- Classes with few samples had more consistent but less representative output.

### Applications:

- Stylized content generation for graphic design
- Visual prototyping for projects
- Demonstration of generative modeling capability

### Future Work:

- Add attribute input (color, material, etc.) using cGAN
- Curate more consistent datasets for better training