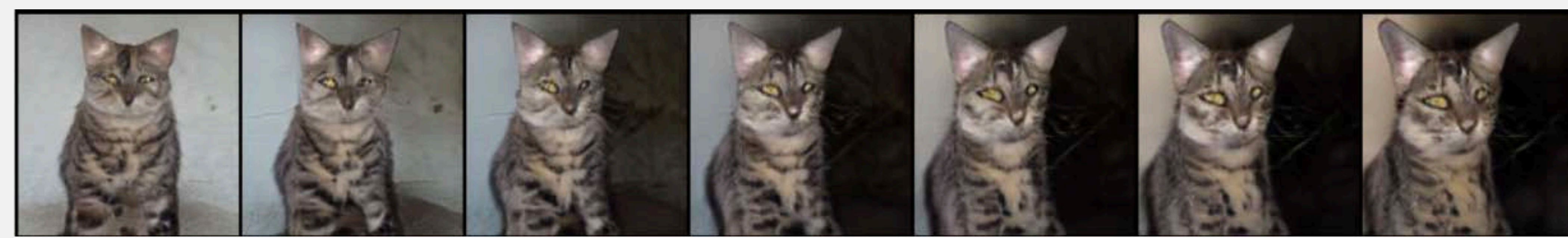


Can you steer a GAN with “semiotics” ?



- Evil +

- BigGAN cat class steered in “evil” semiotic direction
- latent space walks shift the generated image distribution
- latent space trajectories in GANs correspond to novel image transformations
- Cat pose seems to become more sinister and ears more pointy

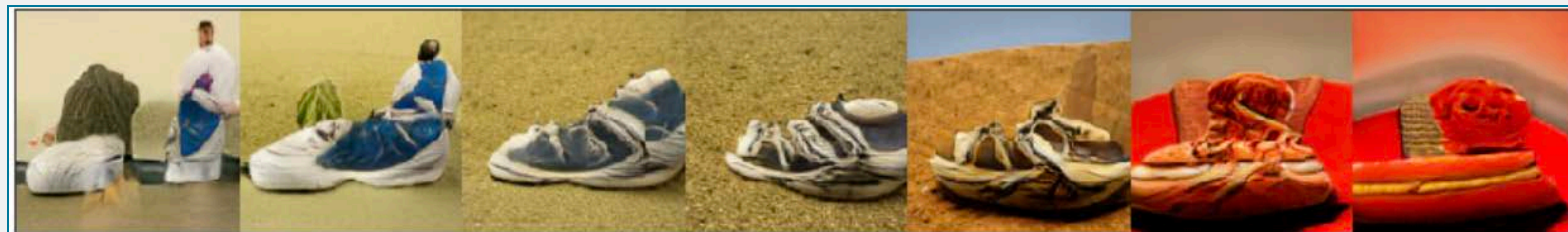
Graphic Transformations



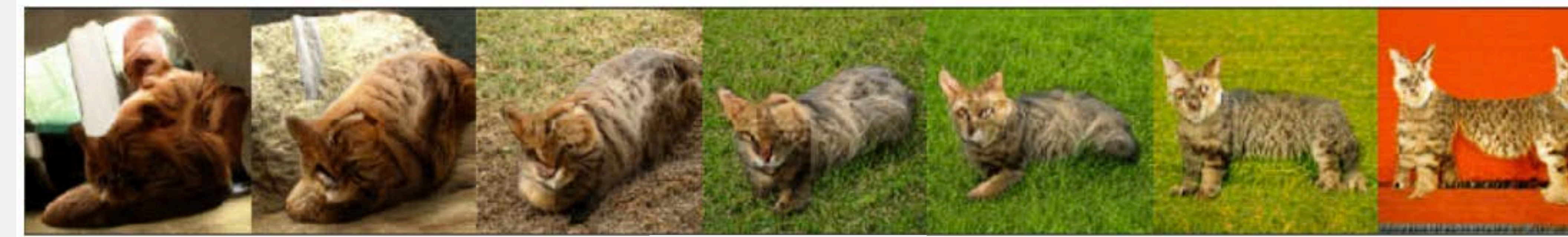
- Radiant +

- Qualities such as radiance transform in ways that deviate from simple brightness values
- The image transforms depth perception, focus and color for an overall luminous transformation not reducible to any one of those surface qualities.

Limits of Steerability



- image transformations become less perceptually meaningful beyond a range of transformation
- while diverging from the semantic image class entirely, e.g. sneakers above, some transformations, seem to evolve into new images that do exhibit the expected attributes of semiotic shift, albeit outside the image class;
- note the positive evil direction displaced from center exhibits red, meat like visuals, while the negative evil directions evolves into a robed figure and

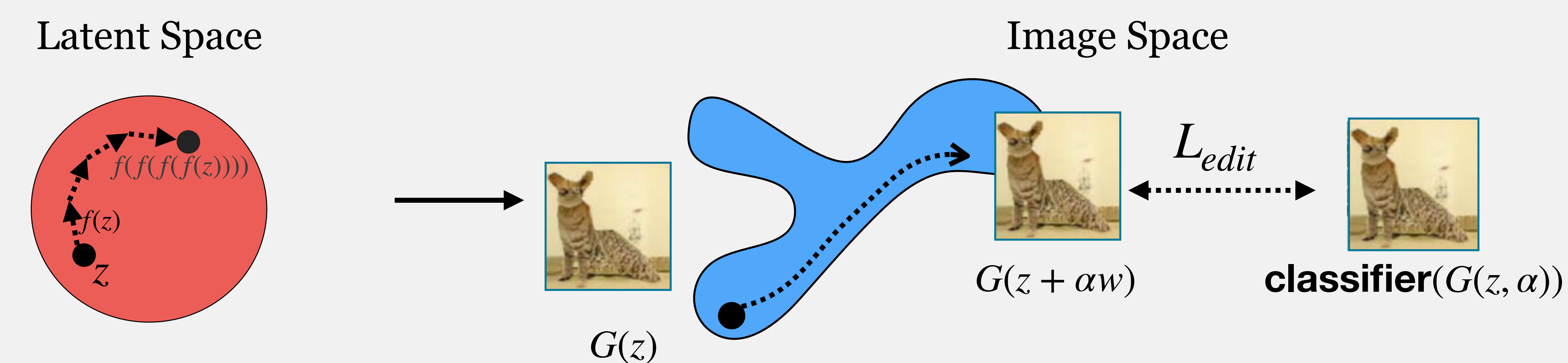


- Minimal +

The minimal transform applied to animals yields a flattened visual style, resembling cartoon-like images, with reduced texture and tonal range

The opposite of minimal gets fittingly more detailed, hyper-real resembling photorealistic imagery forming the opposite of the flattened “minimal.”

Objective Function



- We train a ResNet classifier to score image semiotics based on the Pixabay dataset of labeled images with categories “dense, minimal, evil and radiant.”
- We then use classifier scores to learn walks in BigGAN latent space

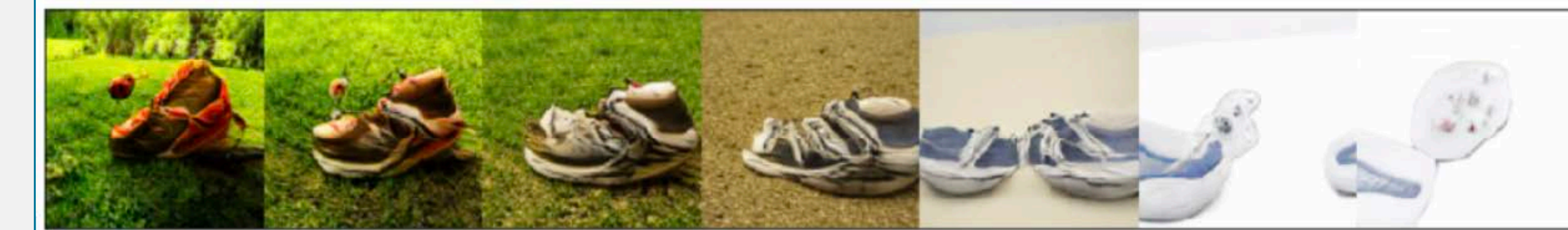
$$\min_w |1 - \text{classifier}(G(z+w))|$$

- Loss objective is given by difference between current and intended semiotic attribute score.
- We generate the displaced samples at inference time using $G(z+\alpha*w)$ where α serves as a dial to set the degree of semiotic attribute change.

Product Design with Semiotics



- Evil +



- Minimal +

Findings and Future work

- 1) A learned walk in the latent space of GANs achieves semiotic transformations in the output image space.
- 2) These walks are learned in a supervised manner with labeled attributes.
- 3) The extent of each transformation is limited, and in the future we will quantify the relationship between dataset variability and how much we can shift the model distribution.

