Pokémon Sprite Generation

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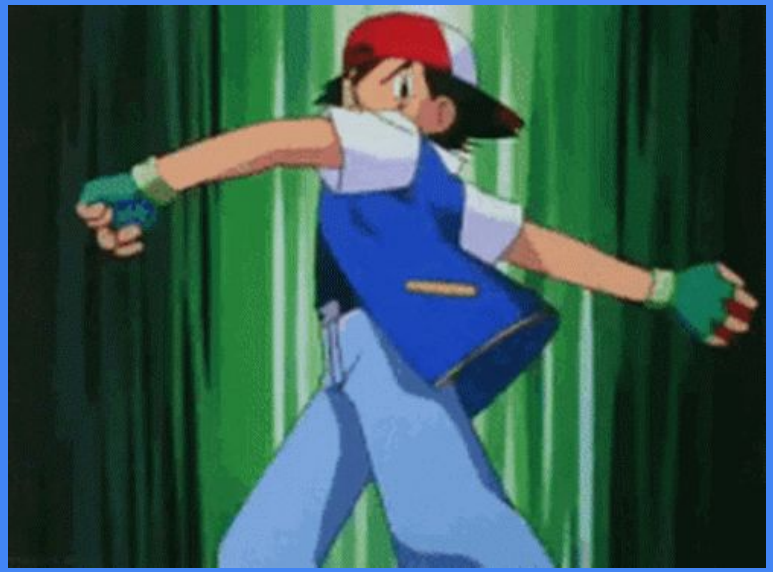
Introduction



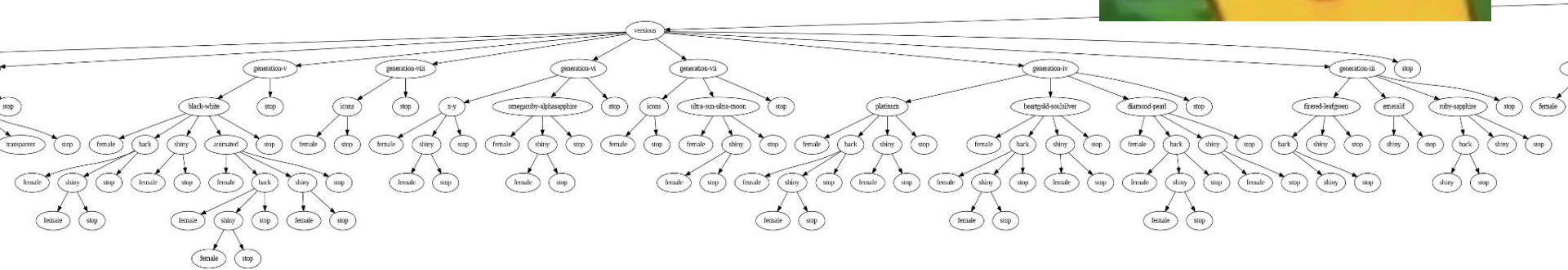
An Extensible Project

Our original vision included not only generating the sprites, but also incorporating them into an open source game, Pokémon Showdown.

We remain committed to this vision, but have prioritized generating original, high quality sprites.

Producing original artwork from a limited and heterogeneous dataset is a challenge, which highlights the limitations of certain models.

Obtaining data from PokeAPI



We obtained sprites from generations 4-7 of the handheld games. This means we rejected many more recent, sophisticated images as well as many very early sprites in order to encourage similarity within the dataset.

This resulted in approximately 13k images, with sizes ranging from 80x80 to 256x256.

Preprocessing

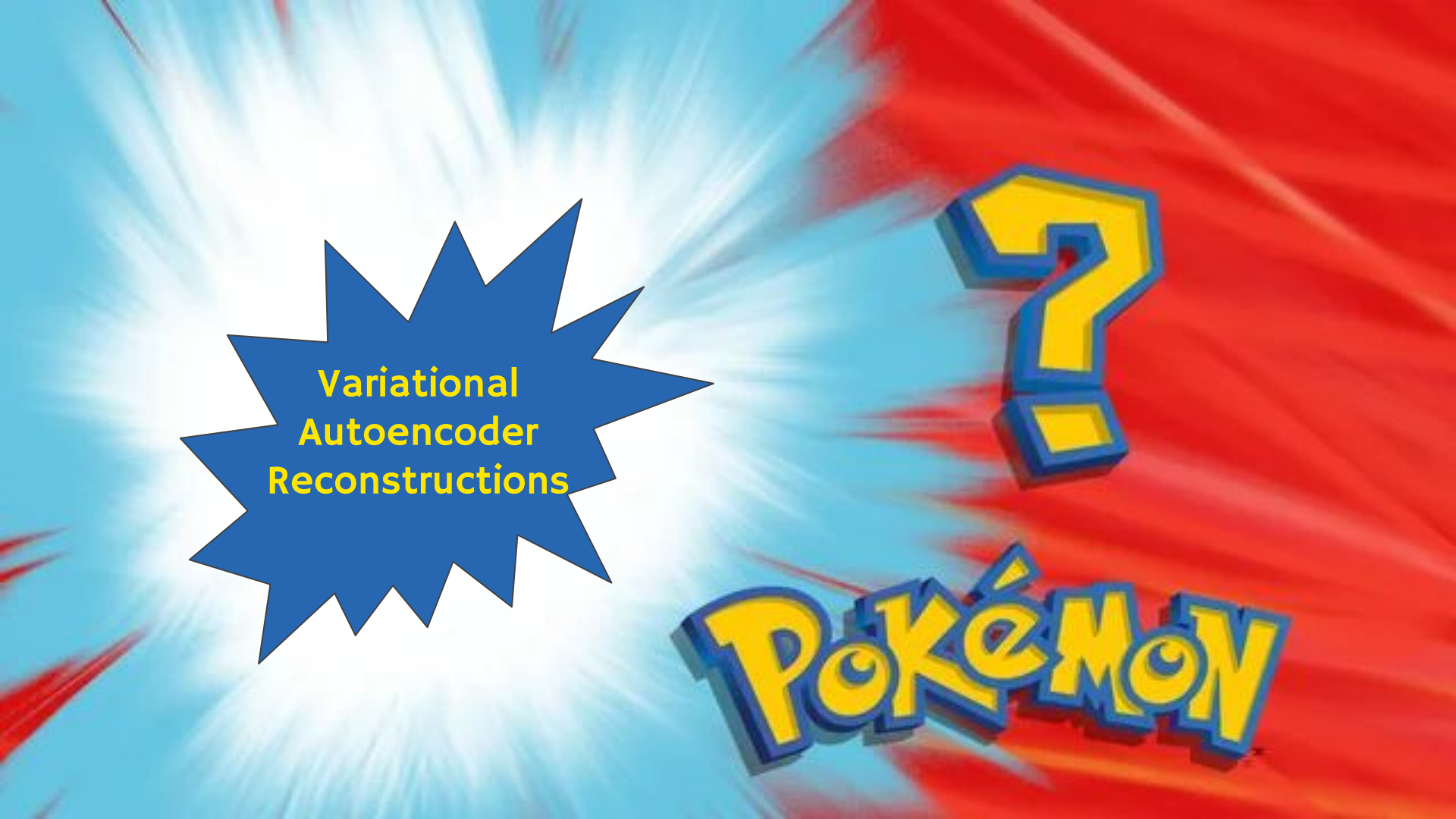
1. Remove alpha channel, and replace with white background.

2. Find the bounding box of the sprite, and crop the smallest square containing it.

3. Resize the square to 128x128.

Results

Variational Autoencoder Reconstructions

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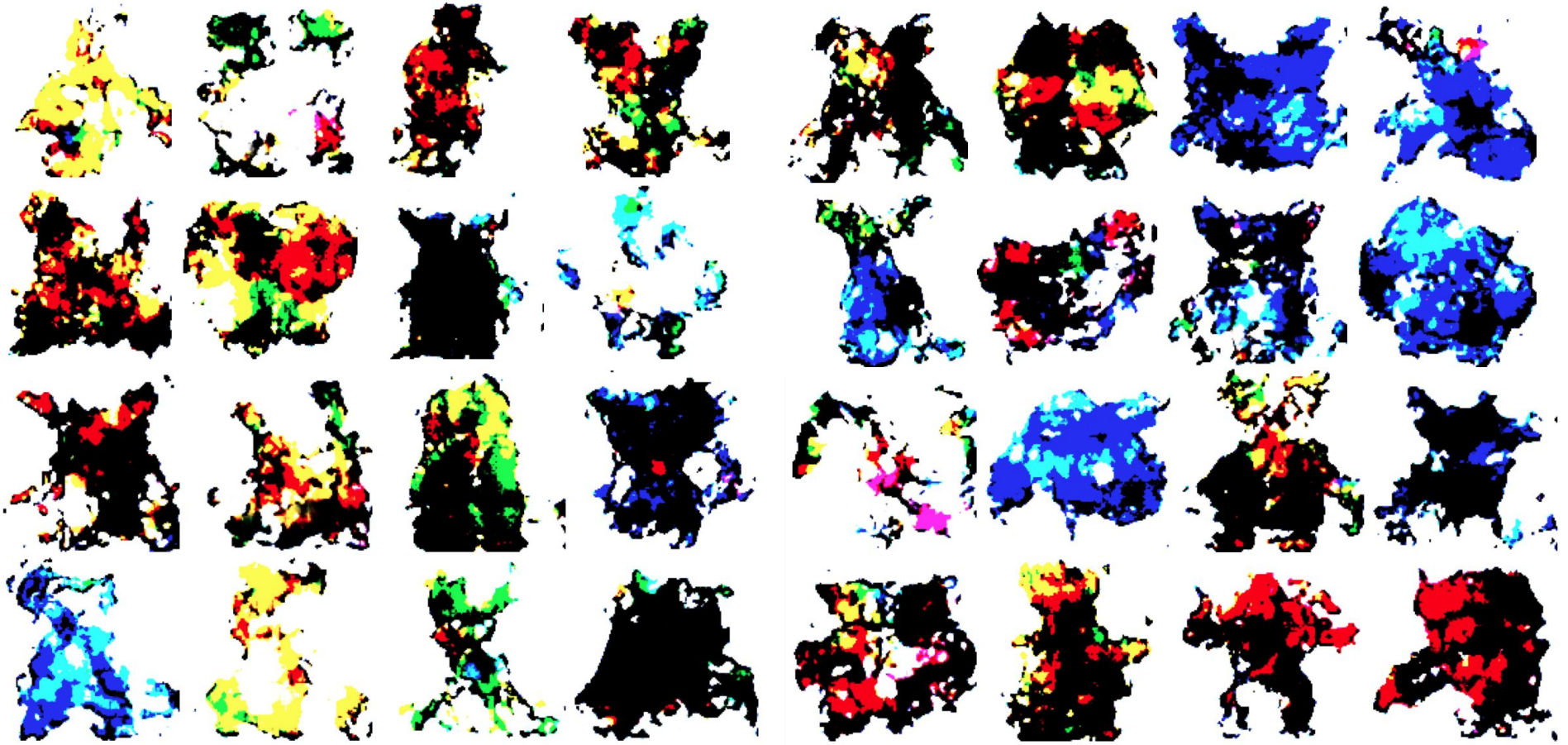
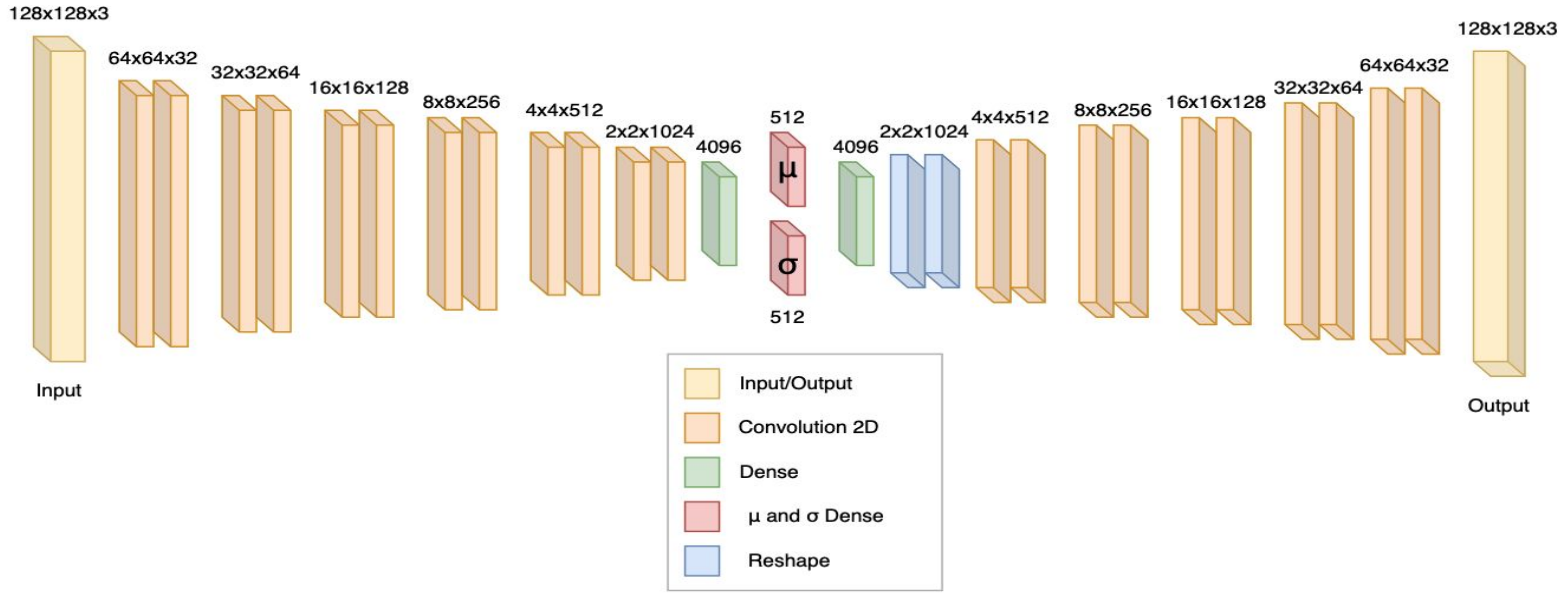
Welcome to the
VENTURA
Region

Latent Diffusion Decoded Images

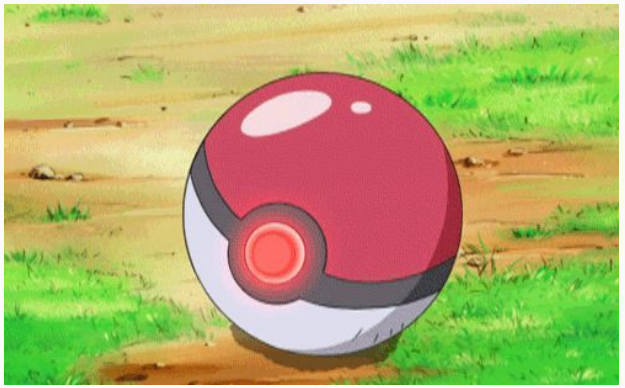


Method

Variational Autoencoder Model



A Pokeball is a Perfect Autoencoder?

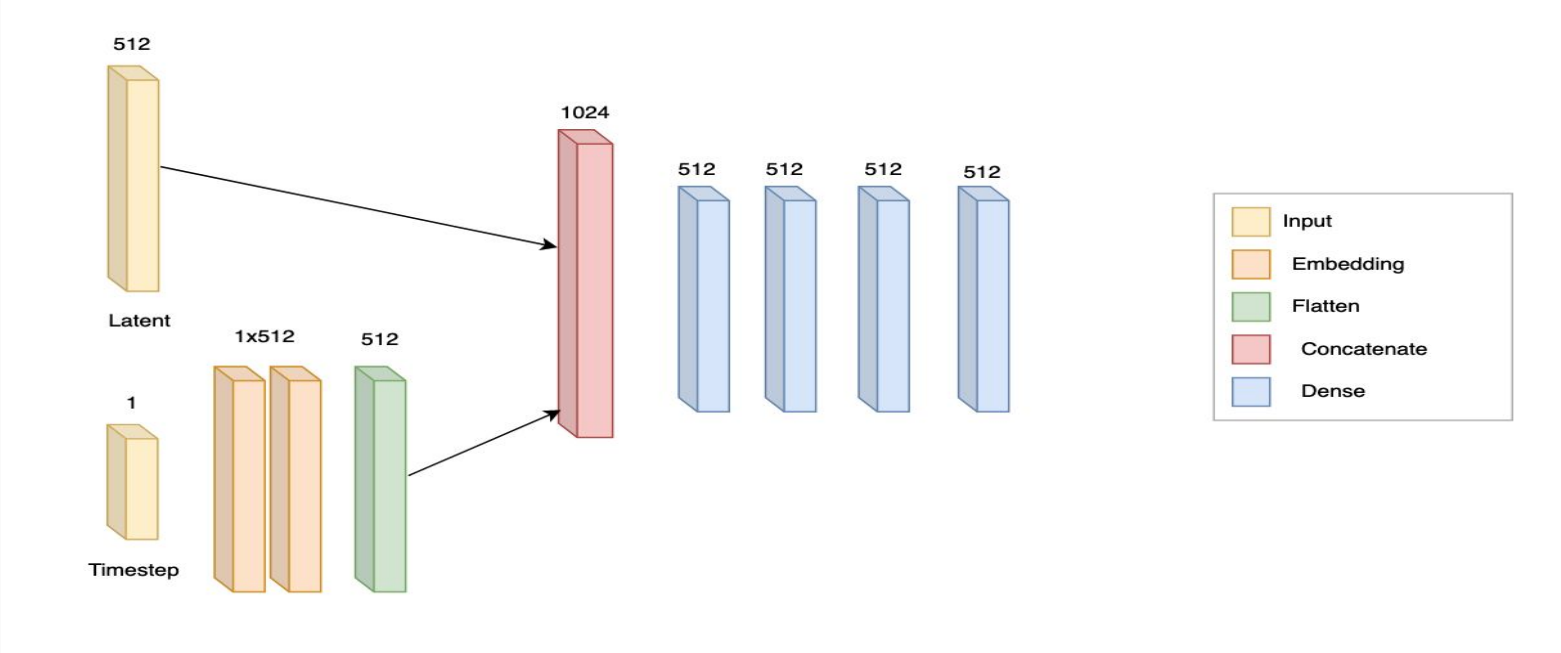


Encoded

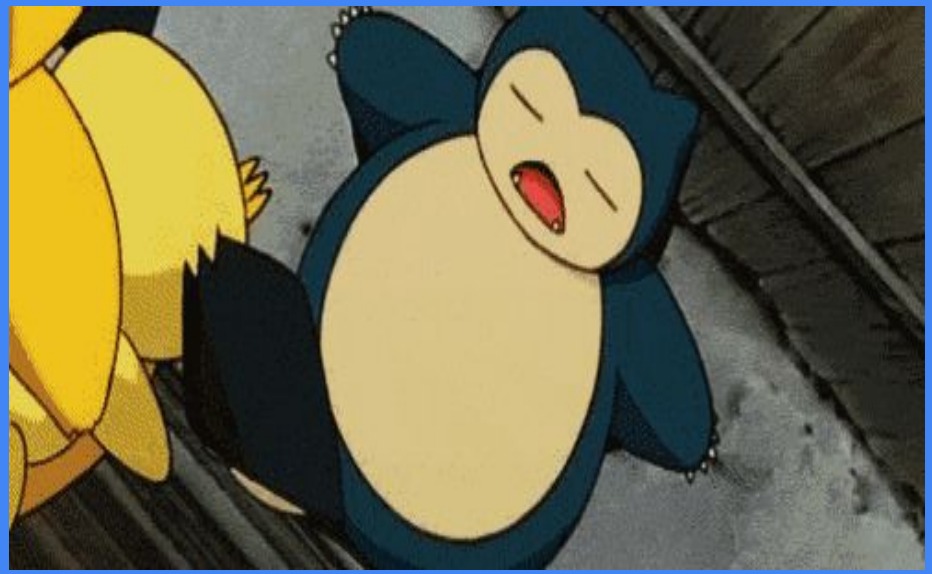
Stored in lower dimensional space

Decoded

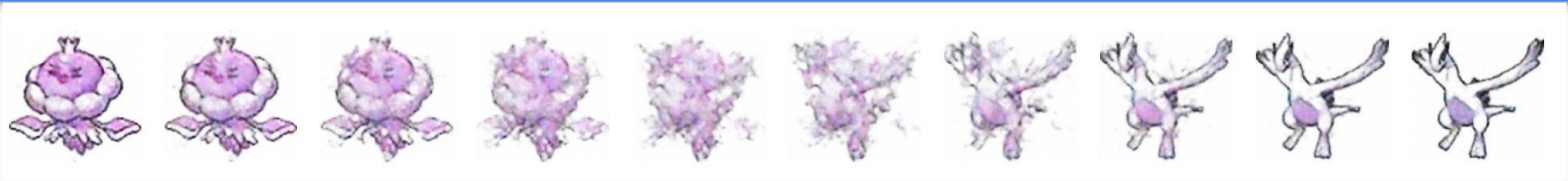
Latent Diffusion Model



Evaluation



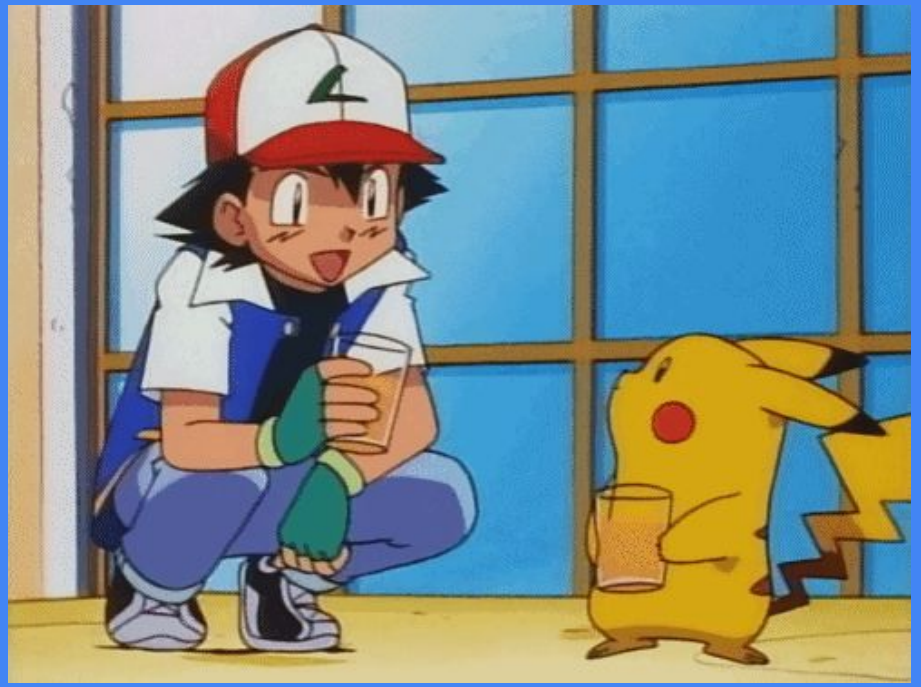
Interpolation and Observation



Interpolating between two sprites in the VAE embedding space results in one sprite fading while the other materializes.

The sprites do not actually change shape.

Context



Future Iterations

- Add complexity to the latent diffusion reverse process model
- Enhance the variational autoencoder to acquire better reconstructions
- Investigate combined loss methods and activations
- Integrate our new Pokemon from the Ventura region into Pokémon Showdown
- Map out the latent space in terms of Pokémon element types and forms
- Generate Pokémon according to a type and form specification
    - Similarly, generate type/Pokédex entry according to sprite

Thank you for listening!