

Mapping and Exploring Visual Design Spaces with Deep Generative Models

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MOTIVATION

Deep generative models have shown the great capability to generate random examples recently while the interpretation of the design space remains unknown. We hope to build a tool for fashion designers to explore the design space and generate fashion items according to their aesthetic in a fast and automatic way.

METHOD

High-quality images are generated through Style-GAN. The 512-dimensional latent space in the Style-GAN generator is taken as the design space where PCA is applied to reduce the dimension and to find meaningful directions.

Images can be selected from text description by ranking the random images with matching scores through the CLIP model which measures similarity between texts and images. The latent codes of multiple images are given in different layers in the neural network to achieve style-mixing.

RESULTS

Searching in the first 20 dimensions, a series of meaningful principle components are found, such as sleeve, pattern, color, etc. We build a 2D canvas for users to explore different meaningful dimensions so they can modify their fashion items easily in a fine-grained way by moving the image around in the space.

To generate styled images for primary control, a text-to-image interface is implemented for designers to get desired images. Style-mixed images can be generated from multiple images by changing their percentages freely.

