Beholder-GAN: Generation And Beautification Of Facial Images With Conditioning On Their Beauty Level

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• Generating human faces conditioned on their beauty level scores.
• Gain insights into what humans consider beautiful and reveal human biases with regards to age, gender and race.
• Beautification of real face images using the trained random generator, with no further training!

Motivation

Semi-Supervised Learning

• No large enough dataset with annotated beauty scores
• We trained a beauty predictor using a small dataset
• Used it to annotate more data (then used to train the GAN)
• Observed high agreement between model predictions and human annotators

Synthetic Faces Generation

• Generating High-resolution images using Progressive growing of GANs.
• Condition vector added as input to G and predicted by D.
• Ability to control the beauty level of a generated image.

Beautification of Real Faces

• For a given real image \( x \) we use gradient descent on the pre-trained G to recover \( \hat{\beta}, \hat{z} \)
• To help focus on the important features we also apply a VGG loss of a pre-trained face recognition VGG
• Beautified face is generated by \( G(\hat{\beta} + \Delta, \hat{z}) \)

Our implementation is available on https://github.com/beholdergan/Beholder-GAN