Image Reconstruction From Highly Censored Faces

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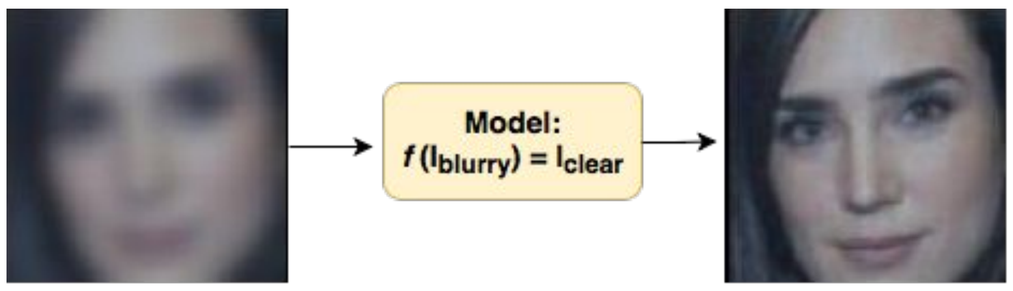
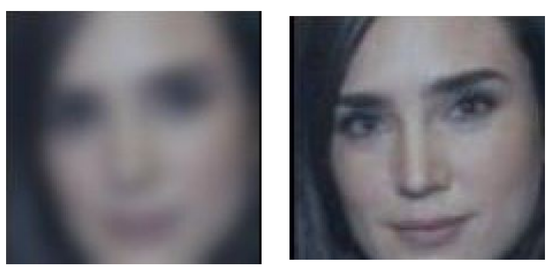
Overview:

Be able to build a model to reconstruct a blurry facial image



Data:



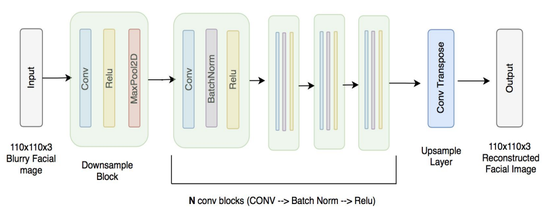
Blurred image Clear image

- ➔ **Labeled Faces in the Wild**
- ➔ **Crop to 110x110**
- ➔ **Normalize all images**
- ➔ **Apply Gaussian Blur**
  - ◆ Kernel Size = 4

Approach:

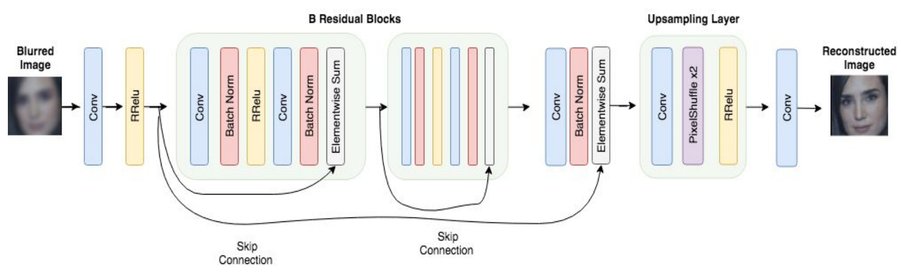
1

Regular Conv Net



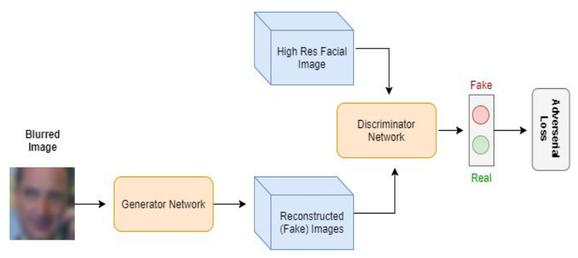
2

Resnet Model with Subpixel Convolution



3

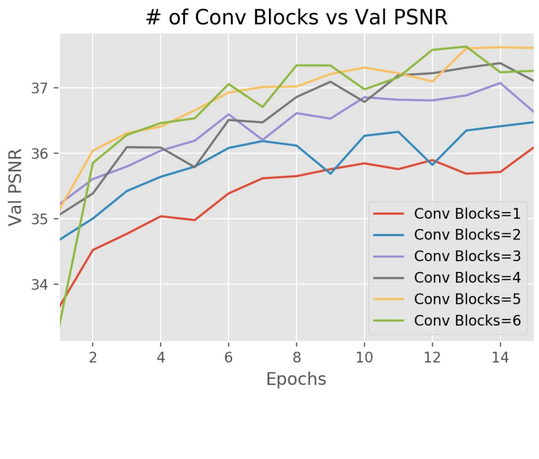
Generative Adversarial Network trained to reconstruct blurry faces

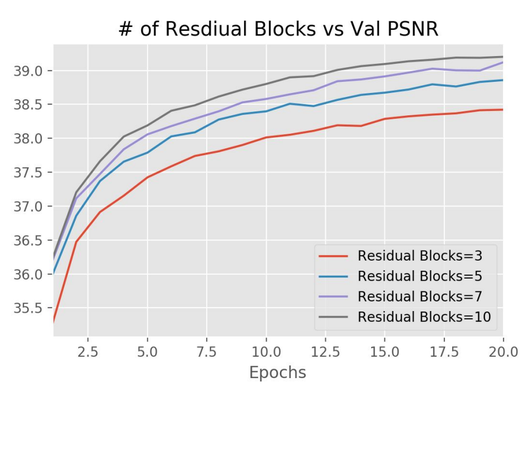


Empirical Results:

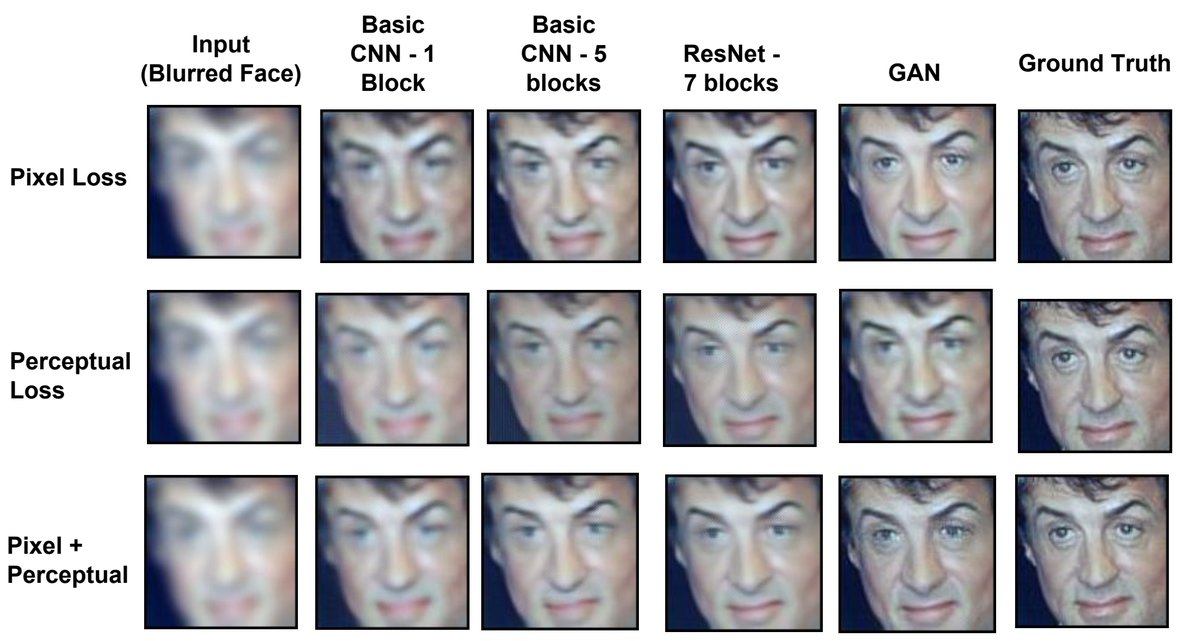
Model Performance - Evaluated on Validation Data using PSNR metric

Model	Pixel Loss	Perceptual Loss	Pixel+Perceptual Loss
Basic CNN Model (Conv Blocks=1)	36.0926	29.7932	34.8163
Basic CNN Model (Conv Blocks=3)	36.9886	31.3706	35.8333
Basic CNN Model (Conv Blocks=5)	37.5592	31.7753	36.4991
Resnet Model w/ Subpixel Convolution (ResBlocks=5)	38.8668	33.1807	37.2639
Resnet Model w/ Subpixel Convolution (ResBlocks=7)	39.0797	35.0907	37.4722
GAN	39.6642	36.0345	37.4543





Qualitative Results:



References:

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G. B. Huang, M. Ramesh, T. Berg, and E. Learned-Miller. Labeled faces in the wild: A database for studying face recognition in unconstrained environments. Technical report, Technical Report 07-49, University of Massachusetts, Amherst, 2007

J. Kim, J. Kwon Lee, and K. Mu Lee. Accurate Image super-resolution using very deep convolutional networks. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition, pages 1646–1654, 2016.

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