Generative Face Completion

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Project webpage: http://bit.ly/FaceCompletion

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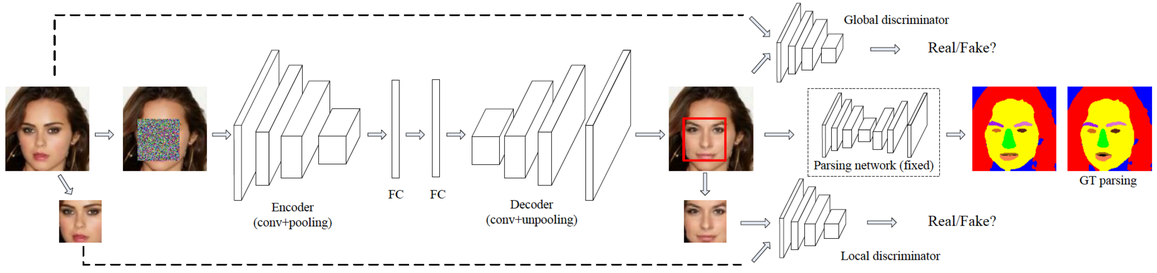
○ Framework

Globally and locally plausible and consistent face completion



***Loss** functions*:

L_r Reconstruction loss

L_{a_1} Local adversarial loss

L_{a_2} Global adversarial loss

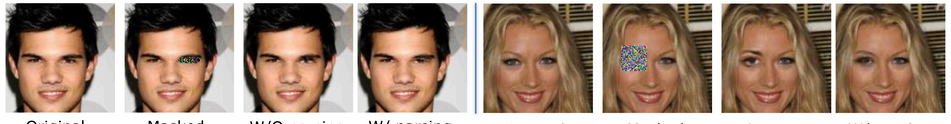
L_p Parsing regularization

- Trained on the CelebA dataset [Liu et al., 2015], cropped and aligned version
- ImageSize = 128x128, MaskSize = 64x64, mask randomly positioned
- Parsing network is pretrained on the Helen dataset [Le et al., 2012]

Three-stage training scheme

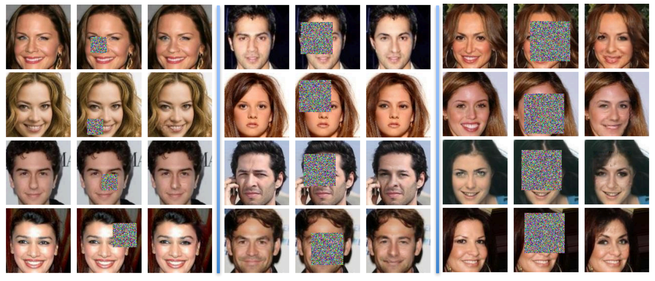
- Train with L_r
- Then, with $L_r+L_{a_1}$
- Finally, with $L_r+L_{a_1}+L_{a_2}+L_p$

○ Completion under different losses

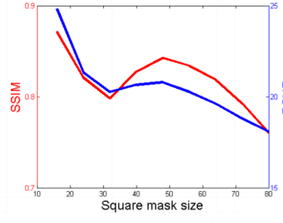


- M1 L_r
- M2 $L_r+L_{a_1}$
- M3 $L_r+L_{a_1}+L_{a_2}$
- M4 $L_r+L_{a_1}+L_{a_2}+L_p$
- M5 $L_r+L_{a_1}+L_{a_2}+L_p$ + blending

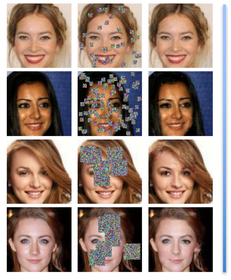
○ Qualitative results: In each panel from left to right <original, masked, completion>



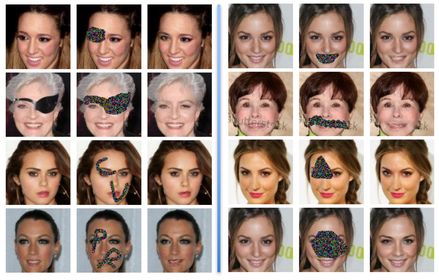
Smaller mask Medium mask Large mask



Evaluations on different square mask sizes



Multiple masks



Masks of random shape

○ Comparisons

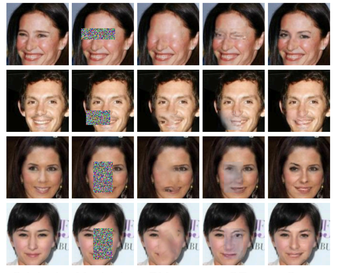


Table 1. Quantitative evaluations in terms of SSIM at six different masks O1-O6. Higher values are better.

	M1	M2	M3	M4	CE	M5
O1	0.798	0.753	0.782	0.804	0.772	**0.824**
O2	0.805	0.763	0.787	0.808	0.774	**0.826**
O3	0.723	0.675	0.708	0.731	0.719	**0.759**
O4	0.747	0.701	0.741	0.759	0.754	**0.789**
O5	0.751	0.706	0.732	0.755	0.757	**0.784**
O6	0.807	0.764	0.808	0.824	0.818	**0.841**

Table 2. Quantitative evaluations in terms of PSNR at six different masks O1-O6. Higher values are better.

	M1	M2	M3	M4	CE	M5
O1	18.9	17.8	18.9	19.4	18.6	**20.0**
O2	18.7	17.9	18.7	19.3	18.4	**19.8**
O3	17.9	17.2	17.7	18.3	17.9	**18.8**
O4	18.6	17.7	18.5	19.1	19.0	**19.7**
O5	18.7	17.6	18.4	18.9	19.1	**19.5**
O6	18.8	17.3	19.0	19.7	19.3	**20.2**