## Attribute Augmented Convolutional Neural Network for Face Hallucination Supplementary Material

Cheng-Han Lee<sup>1</sup> Kaipeng Zhang<sup>1</sup> Hu-Cheng Lee<sup>1</sup> Chia-Wen Cheng<sup>2</sup> Winston Hsu<sup>1</sup> <sup>1</sup>National Taiwan University <sup>2</sup>The University of Texas at Austin

<sup>1</sup>{r05922077, r05944047, r05922174, whsu}@ntu.edu.tw <sup>2</sup>cwcheng@cs.utexas.edu

## 1. Overview

This supplementary material shows more visual results of comparing with state-of-the-art methods on both global and local regions. Fig. 1 shows comparison with the state-of-the-art methods on hallucination global test dataset. Fig. 2 shows comparison with the state-of-the-art methods on hallucination local test dataset which is eyeglasses on "eye" part. Fig. 3 shows comparison with the state-of-the-art methods on hallucination local test dataset which is goatee on "mouth & nose" part. Fig. 4 shows comparison with the state-of-the-art methods on hallucination local test dataset which is heavy makeup on "face" part.

## References

- [1] W.-S. Lai, J.-B. Huang, N. Ahuja, and M.-H. Yang. Deep laplacian pyramid networks for fast and accurate super-resolution. *arXiv* preprint arXiv:1704.03915, 2017.
- [2] X. Ma, J. Zhang, and C. Qi. Hallucinating face by position-patch. Pattern Recognition, 43(6):2224–2236, 2010.
- [3] X. Yu and F. Porikli. Ultra-resolving face images by discriminative generative networks. In *European Conference on Computer Vision*, pages 318–333. Springer, 2016.
- [4] X. Yu and F. Porikli. Face hallucination with tiny unaligned images by transformative discriminative neural networks. In *AAAI*, pages 4327–4333, 2017.







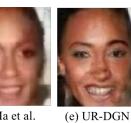




(f) TDN



(a) LR



(b) Bicubic

(d) Ma et al.



(f) TDN



(g) AACNN

-  $L^{SR}$ 



(h) AACNN -  $L^{SR} + L^{adv}$ 







-  $L^{SR} + L^{adv}$ 

(e) UR-DGN

(g) AACNN (h) AACNN - *L*<sup>SR</sup>



(c) LapSRN

(f) TDN

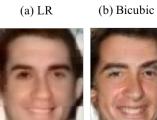
(a) LR





(c) LapSRN





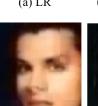
(d) Ma et al.







Figure 1. Comparison with the state-of-the-art methods on hallucination global test dataset. (a) Low-resolution inputs images. (b) Bicubic interpolation. (c) LapSRN [1]. (d) Ma et al. [2]. (e) UR-DGN [3]. (f) TDN [4]. (g) AACNN -  $L^{SR}$ . (h) AACNN -  $L^{SR} + L^{adv}$ . (i) High-resolution images.



(d) Ma et al.





(e) UR-DGN



(f) TDN





(a) LR	(b) Bicubic	(c) LapSRN	(d) Ma et al.	(e) UR-DGN
(f) TDN	(g) Baseline - L <sup>SR</sup>	(h) AACNN - L <sup>SR</sup>	(i) AACNN - $L^{SR} + L^{adv}$	(j) HR
(a) LR	(b) Bicubic	(c) LapSRN	(d) Ma et al.	(e) UR-DGN
(f) TDN	(g) Baseline - L <sup>SR</sup>	(h) AACNN - L <sup>SR</sup>	(i) AACNN - $L^{SR} + L^{adv}$	(j) HR
(a) LR	(b) Bicubic	(c) LapSRN	(d) Ma et al.	(e) UR-DGN
(f) TDN	(g) Baseline - L <sup>SR</sup>	(h) AACNN - $L^{SR}$	(i) AACNN - $L^{SR} + L^{adv}$	(j) HR

Figure 2. Comparison with the state-of-the-art methods on hallucination local test dataset which is eyeglasses on "eye" part. (a) Low-resolution inputs images. (b) Bicubic interpolation. (c) LapSRN [1]. (d) Ma et al. [2]. (e) UR-DGN [3]. (f) TDN [4]. (g) Baseline -  $L^{SR}$ . (h) AACNN -  $L^{SR}$ . (i) AACNN- $L^{SR}$  +  $L^{adv}$ . (j) High-resolution images.



(a) LR



(f) TDN



(a) LR



(f) TDN



(a) LR



(f) TDN



(b) Bicubic



(g) Baseline - L<sup>SR</sup>



(b) Bicubic



(g) Baseline - L<sup>SR</sup>



(b) Bicubic



(g) Baseline - L<sup>SR</sup>



(c) LapSRN



(h) AACNN - L<sup>SR</sup>



(c) LapSRN



(h) AACNN - L<sup>SR</sup>



(c) LapSRN



(h) AACNN - L<sup>SR</sup>



(d) Ma et al.



(i) AACNN - L<sup>SR</sup> + L<sup>adv</sup>



(e) UR-DGN



(j) HR



(d) Ma et al.



(i) AACNN
- L<sup>SR</sup> + L<sup>adv</sup>



(d) Ma et al.



(i) AACNN
- L<sup>SR</sup> + L<sup>adv</sup>



(e) UR-DGN



(j) HR



(e) UR-DGN



(j) HR

Figure 3. Comparison with the state-of-the-art methods on hallucination local test dataset which is goatee on "mouth & nose" part. (a) Low-resolution inputs images. (b) Bicubic interpolation. (c) LapSRN [1]. (d) Ma et al. [2]. (e) UR-DGN [3]. (f) TDN [4]. (g) Baseline -  $L^{SR}$ . (h) AACNN -  $L^{SR}$ . (i) AACNN- $L^{SR} + L^{adv}$ . (j) High-resolution images.



(a) LR



(f) TDN



(b) Bicubic



(g) Baseline - L<sup>SR</sup>



(b) Bicubic



(a) LR

(f) TDN



(a) LR



(f) TDN



2

(b) Bicubic



(g) Baseline - L<sup>SR</sup>



(c) LapSRN



(h) AACNN - L<sup>SR</sup>



(c) LapSRN

(h) AACNN

(c) LapSRN

-  $L^{SR}$ 



(d) Ma et al.



(i) AACNN -  $L^{SR} + L^{adv}$ 



(d) Ma et al.



(i) AACNN -  $L^{SR} + L^{adv}$ 



(d) Ma et al.



(i) AACNN -  $L^{SR} + L^{adv}$ 



(e) UR-DGN



(j) HR



(e) UR-DGN



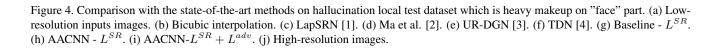
(j) HR



(e) UR-DGN



(j) HR



(h) AACNN

-  $L^{SR}$