Supplementary Material: Face Aging via Diffusion-based Editing

Xiangyi Chen[1,2]
xiangyi.chen@telecom-paris.fr
Stéphane Lathuilière[2]
stephane.lathuiliere@telecom-paris.fr

[1] Shanghai Jiao Tong University
Shanghai, China
[2] LTCI, Télécom Paris
Institut Polytechnique de Paris
Palaiseau, France

In this supplementary material, we report additional qualitative examples.

1 Additional Comparisons with CUSP [1]

In Figure 1, we compare with CUSP [1] on the FFHQ-aging dataset for images of people with different initial ages and ethnicities. In line with the observation discussed in the main paper, FADING is able to generate images with fewer artifacts and better adherence to the original identity across the lifespan. Specifically, we show the results on rare cases (see the last row for photos of profiles). While CUSP fails with such extreme poses, FADING still manages to generate realistic aging results.

2 Ablation Studies: Additional Examples

Ablation of *Specialization (Spec.)* and *Double Prompt (DP)* In Figure 2, we present additional results of ablation experiments performed on the use of *Specialization (Spec.)* and *Double Prompt (DP)*, with different initial ages: young, middle, and old. This further showcases the effectiveness of our specialization step and double-prompt scheme in tackling difficult age-transformation tasks. For example, when the initial age is extremely young (see the first row where the input image is an infant) or when the age gap is big (see the last row where the age difference exceeds 50 years), the specialization step noticeably mitigates the occurrence of artifacts in the generated output. Moreover, we observe that in certain cases where the non-specialized model fails to accurately address age changes (see second row), *Spec.* combined with *DP* contributes to successfully addressing the age alteration.

Ablation of *Enhanced Prompts (EP)* and *Initial age (IA)* In Figure 3, we present additional results of ablation experiments conducted on *EP* and *IA*. When *EP* is removed, we observe that different generated outputs for the same input image exhibit either a different gender compared to the original image (see first example middle column) or gender inconsistencies among the various age-transformed results (see the second example, young and

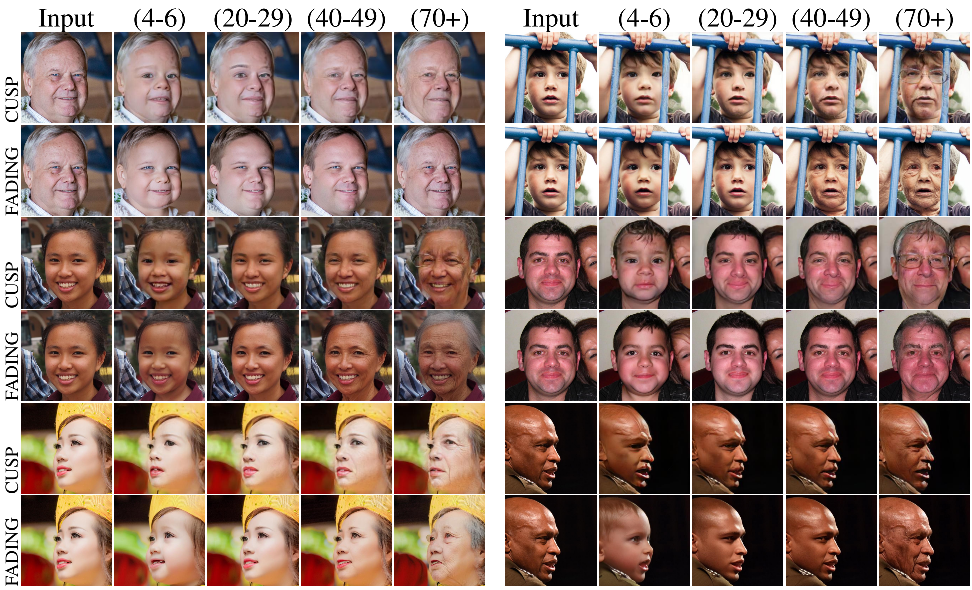


Figure 1: Supplementary qualitative comparison with CUSP [1] on FFHQ-Aging. For CUSP, we translate each image to the corresponding age group. For FADING, we translate to the central age of each group. For the oldest age group (70+), we translate to 80 years old.

middle-aged results). This underscores the crucial role of *EP* in maintaining gender consistency throughout the age transformation process. On the other hand, when *IA* is ablated, the model struggles to effectively alter the age, particularly when dealing with young initial ages. This indicates that *IA* plays a significant role in facilitating successful age changes, and its removal severely hampers the model's ability to perform accurate age transformations.

3 Additional Examples on out-of-distribution images

To further evaluate the performance of FADING on images outside common face datasets, we conducted additional experiments on two out-of-distribution images, a publicly known figure and a movie character (Figure 4). Our method successfully achieved aging transformations on the image of the publicly known figure, demonstrating its generalization beyond dataset limitations. Furthermore, the model effectively handled the unique features and heavy makeup of the movie character, showcasing its adaptability to unconventional facial appearances. These experiments highlight the flexibility and robustness of FADINGwhen applied to images beyond traditional datasets.

References

[1] Guillermo Gomez-Trenado, Stéphane Lathuilière, Pablo Mesejo, and Óscar Cordón. Custom structure preservation in face aging. *Computer Vision–European Conference on Computer Vision (ECCV)*, 2022.

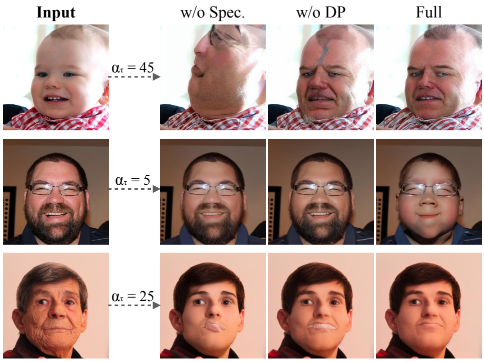
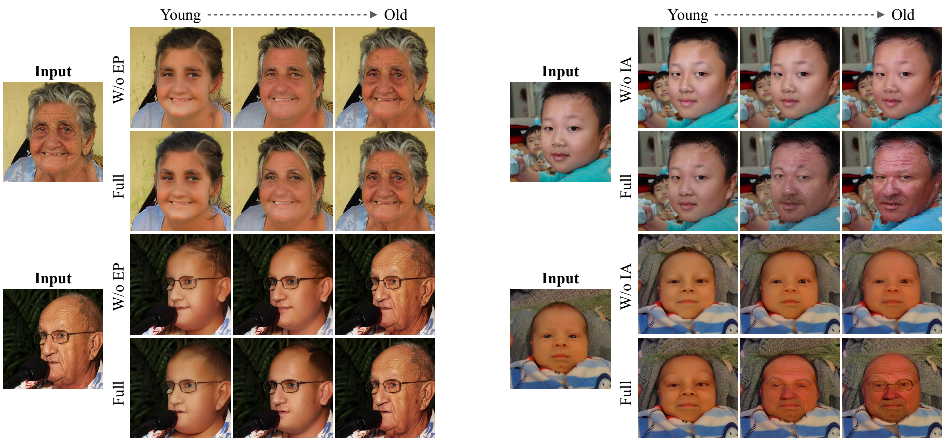


Figure 2: Supplementary qualitative ablation studies on the impact of the specialization step (*Spec.*) and the use of Double Prompt (*DP*).



(a) Enhanced Prompts

(b) Initial Age

Figure 3: Supplementary qualitative ablation studies on the impact of the Enhanced Prompts (*EP*) and the use of the Initial Age (*IA*).

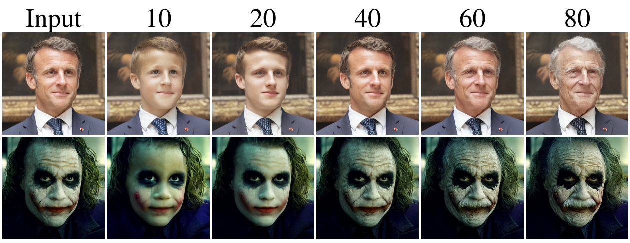


Figure 4: Supplementary qualitative results on images outside common face datasets