StylePortraitVideo: Editing Portrait Videos with Expression Optimization

Supplementary Material

1. Video Results

The video results can be found in the accompanying HTML files. From the **main.html** file, you can navigate the figures using three hyperlinks listed at the top of the page. **Figure 1 (part 1)** and **Figure 1 (part 2)** show the full-frame videos for Fig. 1 of the main paper. **Figure 4 $\sim$ 12 (part 3)** shows the videos for the experiment section. In case the HTML does not work, the videos can be found in the figure folders (e.g., **figure_01**, ..., **figure_12**).

2. Analysis on Expression Dynamics Optimization

Expression dynamics optimization is expressed as

$$\arg\min_{\Delta w_{opt}} \lambda_{lip}\mathcal{L}_{lip} + \lambda_{eye}\mathcal{L}_{eye} + \lambda_{reg}\mathcal{L}_{reg} + \lambda_{temp}\mathcal{L}_{temp}. \quad (8)$$

$\mathcal{L}_{eye}$ is a perceptual loss [ZIE*18], and $\mathcal{L}_{lip}$ is a landmark loss [WSC*21]. More details are written in the main paper. To show the effectiveness of the formulation, we compare with two different variation to our optimization equation. First uses perceptual loss for both $\mathcal{L}_{eye}$ and $\mathcal{L}_{lip}$. Second uses landmark loss for both $\mathcal{L}_{eye}$ and $\mathcal{L}_{lip}$. As shown in Fig. 13, using perceptual loss for $\mathcal{L}_{lip}$ cannot preserve the lip contact. In the other hand, using landmark loss for both $\mathcal{L}_{lip}$ and $\mathcal{L}_{eye}$ shows similar results to ours. Thus, landmark loss is effective to preserve the position of the target landmark position. While using landmark loss for both $\mathcal{L}_{lip}$ and $\mathcal{L}_{eye}$ is comparable to ours, using perceptual loss for $\mathcal{L}_{eye}$ is much simple since face images generated from StyleGAN are well aligned to a fixed coordinate position.

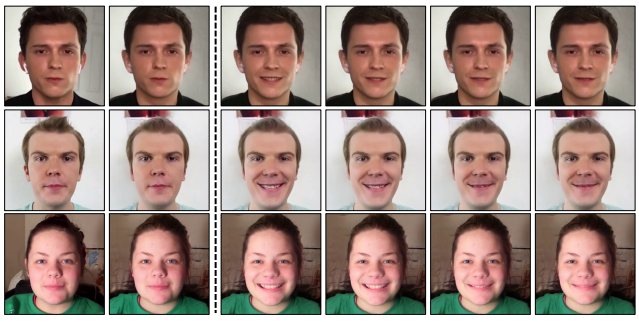

Figure 13: ***Different design choices for expression dynamics optimization.*** *The following shows the two alternative optimization results to ours.*

3. Source Code

The source code will be released in the project webpage: style-portrait-video.github.io.