

2. Normalization Results of MultiPIE

In this section, we demonstrate the normalization results with pose variations in Fig. 2, simultaneous pose and expression variations in Fig. 3 and simultaneous pose and illumination variations in Fig. 4



Figure 2. The normalization results of MultiPIE with pose variations ($-45^\circ, -30^\circ, -15^\circ, 0^\circ, 15^\circ, 30^\circ, 45^\circ$). For each subject, the first row is the input images, the second row is the normalization results. Note that faces in -45° are directly mirrored

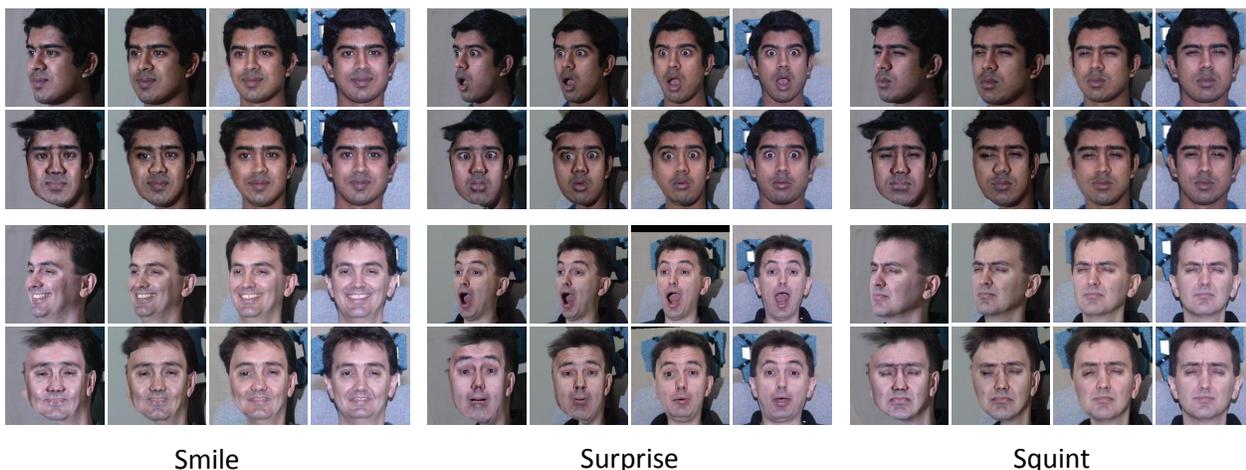


Figure 3. The normalization results of MultiPIE with pose and expression variations. We only demonstrate the most representative expressions of “Smile”, “Surprise” and “Squint” at ($-45^\circ, -30^\circ, -15^\circ, 0^\circ$). The first row is the input images, the second row is the normalization results.



Figure 4. The normalization results of MultiPIE with pose and illumination variations. We demonstrate faces in poses of ($0^\circ, -15^\circ, -30^\circ, -45^\circ$) under illuminations from 1 to 7. The first row is the input images, the second row is the normalization results.

3. Fail Results

Since the 3DMM fitting directly depends on the detected landmarks which may be inaccurate in some cases, we demonstrate some fail normalization results due to bad landmarks, see Fig. 5.



Figure 5. Some fail normalization results due to bad landmarks in the LFW database. The first row are the input images, where the blue points are detected 2D landmarks. The second row are the normalization results, where the blue points are the landmarks of 3D model

By checking the detected 2D landmarks in the lfw database, we find that face contour and open mouth are the most difficult to align. If the fail landmarks are still inside the face region, the normalization results do not deteriorate much since we keep the external face region, see the first row of Fig. 5. However, if the face contour landmarks are outside the face region, poisson editing will keep the wrong filling boundary which in fact lies on the background, leading to non-neutral results.

Occlusion could also lead to fail normalization results since we fill the invisible region with face symmetry, see Fig. 6.



Figure 6. Some fail results due to occlusion in LFW database.