

1 **Appendix:**

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3 Table 1:

4 Patches size or shape guideline. W and H is the image width and height dimension.

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| Method | Dataset | Profile image size | Patches shape size |
|-----------|-------------|---------------------------|---|
| TP-GAN | • Multi-PLE | $128 \times 128 \times 3$ | <i>Eyes shape: $W40 \times H40$</i> <i>Nose shape: $W32 \times H40$</i> <i>Mouth shape: $W32 \times H48$</i> |
| | • FEI | $128 \times 128 \times 3$ | |
| LFMTP-GAN | • Multi-PLE | $128 \times 128 \times 3$ | |
| | • FEI | $128 \times 128 \times 3$ | |

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8 Table 2:

9 The $\{G_{\theta_E^l}, G_{\theta_b^l}\}$ structure of the local pathway. W and H is the image width and height

10 dimension.

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| Layer | Input | Filter size | Output size |
|--|-------|-----------------------|-----------------------------|
| <i>Local encoder $G_{\theta_E^l}$</i> | | | |
| conv0 | --- | $3 \times 3 / 1$ | $w \times h \times 64$ |
| conv1 | --- | $3 \times 3 / 2$ | $w/2 \times h/2 \times 128$ |
| conv2 | --- | $3 \times 3 / 2$ | $w/4 \times h/4 \times 256$ |
| conv3 | --- | $3 \times 3 / 2$ | $w/8 \times h/8 \times 512$ |
| <i>Local decoder $G_{\theta_b^l}$</i> | | | |
| deconv0 | --- | $3 \times 3 / 2$ | $w/4 \times h/4 \times 256$ |
| conv4 | conv2 | $3 \times 3 / 1$ | $w/4 \times h/4 \times 256$ |
| deconv1 | --- | $3 \times 3 / 2$ | $w/2 \times h/2 \times 128$ |
| conv5 | conv1 | $3 \times 3 / 1$ | $w/2 \times h/2 \times 128$ |
| deconv2 | --- | $3 \times 3 / 2$ | $w \times h \times 64$ |
| conv6 | conv0 | $3 \times 3 / 1$ | $w \times h \times 64$ |
| feat | conv6 | $3 \times 3 \times 1$ | $w \times h \times 3$ |

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Table 3:
The $\{G_{\theta_E^g}\}$ structure of the global pathway.

| Layer | Filter size | Output size |
|-------|------------------|----------------------------|
| conv0 | $7 \times 7 / 1$ | $128 \times 128 \times 64$ |
| conv1 | $5 \times 5 / 2$ | $64 \times 64 \times 64$ |
| conv2 | $3 \times 3 / 2$ | $32 \times 32 \times 128$ |
| conv3 | $3 \times 3 / 2$ | $16 \times 16 \times 256$ |
| conv4 | $3 \times 3 / 2$ | $8 \times 8 \times 512$ |
| fc1 | --- | 512 |
| fc2 | --- | 256 |

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Table 4:
The $\{G_{\theta_D^g}\}$ structure of the global pathway. The *convs* in *input* column refer to those in *Table .*
 I^P is the profile image.

| Layer | Input | Filter size | Output size |
|---------|----------------------|------------------|----------------------------|
| feat8 | fc2.x | --- | $8 \times 8 \times 64$ |
| feat32 | --- | $3 \times 3 / 4$ | $32 \times 32 \times 32$ |
| feat64 | --- | $3 \times 3 / 2$ | $64 \times 64 \times 16$ |
| feat128 | --- | $3 \times 3 / 2$ | $128 \times 128 \times 8$ |
| deconv0 | feat8, conv4 | $3 \times 3 / 2$ | $16 \times 16 \times 512$ |
| deconv1 | conv3 | $3 \times 3 / 2$ | $32 \times 32 \times 256$ |
| deconv2 | feat32, conv2, I^P | $3 \times 3 / 2$ | $64 \times 64 \times 128$ |
| deconv3 | feat64, conv1, I^P | $3 \times 3 / 2$ | $128 \times 128 \times 64$ |

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Table 5:
The structure of 5, 6 and 7 ConvNet-layers. I^P is the profile image.

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| Layer | Input | Filter size | Output size |
|-------|------------------------------|------------------|----------------------------|
| conv5 | feat128, conv1, local, I^P | $5 \times 5 / 1$ | $128 \times 128 \times 64$ |
| conv6 | --- | $3 \times 3 / 1$ | $128 \times 128 \times 32$ |
| conv7 | --- | $3 \times 3 / 1$ | $128 \times 128 \times 3$ |

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