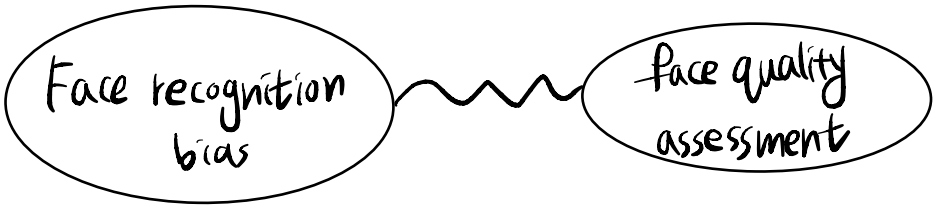
Face Quality Estimation and Its Correlation to Demographic and Non-Demographic Bias in Face Recognition

Open Source & Commercial face recognition solutions → strongly biased towards different demographic groups

Biases
- non-demographic: enhance the quality estimation process without discriminative consequences
- demographic: a serious impact on society



* a strong correlation between face recognition bias and face quality assessment.

  ⇝ Face images from the classes affected by the bias were estimated with lower quality values than unbiased images.

  ∴ Bias is transferred to the quality assignment process.

<Related Work>

1. Bias in face recognition
   - ~ non equally distributed classes
   - ~ demographic attributes

   } → Bias

2. Quality assessment

Quality < image-based (ex. illumination, occlusion)
        < subject-based (ex. pose, expression, accessories)

metric < Objective
       < relative

best quality estimates ⇝ adapt to the utilized face recognition model.

Face quality assessment → aims at estimating the usability of an image for the purpose of recognition.

<4 latest face quality assessment approaches>

1. COTS
2. Best-Rowden
3. Face Qnet
4. SER-FIQ

deployed face recognition ⇝ unintended bias transfer.

∴ If the face quality assessment approach is trained on face embeddings, the major influence of the quality estimation bias was observed to originate from the face embeddings, not the training data.

(f)

The classes that are affected by face recognition bias are also getting lower quality assignments.

} possible solutions ↓

a. development of face quality assessment solution that does not adapt demographic bias.

b. Strengthen the focus on bias mitigating face recognition models since an unintended bias transfer will not happen with an unbiased face recognition model.