Deep Learning Face Attributes in the Wild

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IEEE 2015 International Conference on Computer Vision
ICCV2015 Santiago - Chile December 7-13, 2015

1. Overview

Problem

Face Attributes Prediction in the Wild

Arched Eyebrows? Big Eyes?

Receding Hairline? Mustache?

Performance

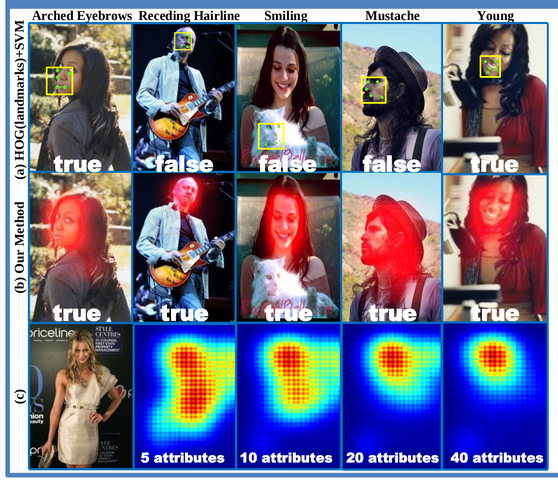
	CelebA	LFWA
FaceTracer [ECCV08]	81%	74%
PANDA-w [CVPR14]	79%	71%
PANDA-l [CVPR14]	85%	81%
SC+ANet	83%	76%
LNets+ANet(w/o)	83%	79%
LNets+ANet	87%	84%

Running Time

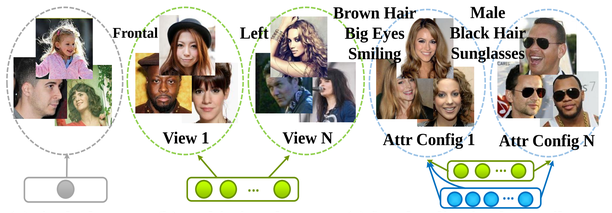
LNets: 35ms, ANet: 14ms

- **Project Page:** http://personal.ie.cuhk.edu.hk/~lz013/projects/FaceAttributes.html

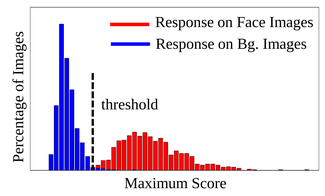
2. Motivation



- **Existing methods:** global and local methods
- **Global methods:** not robust to deformations of objects
- **Local methods:** rely on face localization and alignment, which would fail under unconstrained face images with complex variations
- **Our idea:** joint face localization and attribute prediction using only image-level attribute tags



(a) single detector (b) multi-view detector (c) face localization by attributes



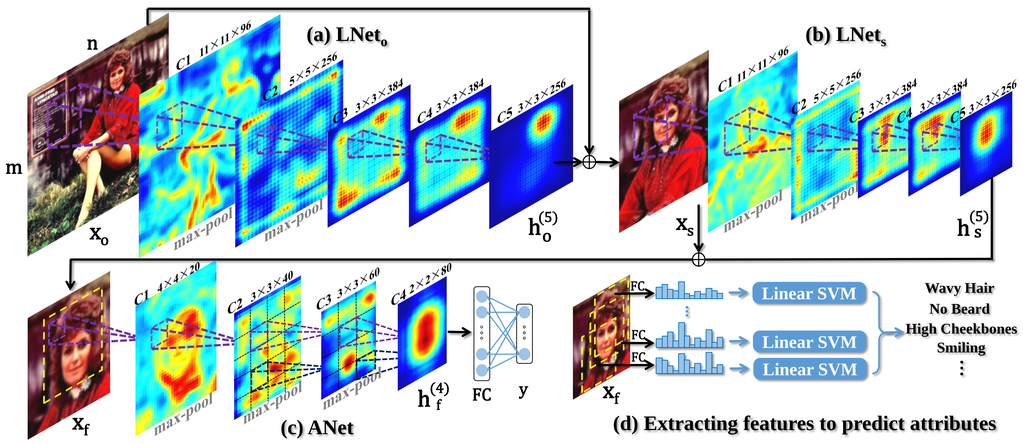
3. Large-scale CelebFaces Attributes Dataset

- **202,599 face images**
- **10,177 human identities**
- **5 landmarks per image**
- **40 attributes per image**

20x larger than previous

- **Available at:** http://mmlab.ie.cuhk.edu.hk/projects/CelebA.html

4. Overall Pipeline

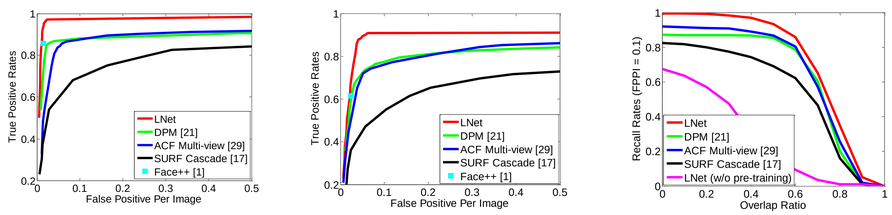


- **LNets:**
  (i) pre-trained with massive general objects
  (ii) face localization with weak supervision

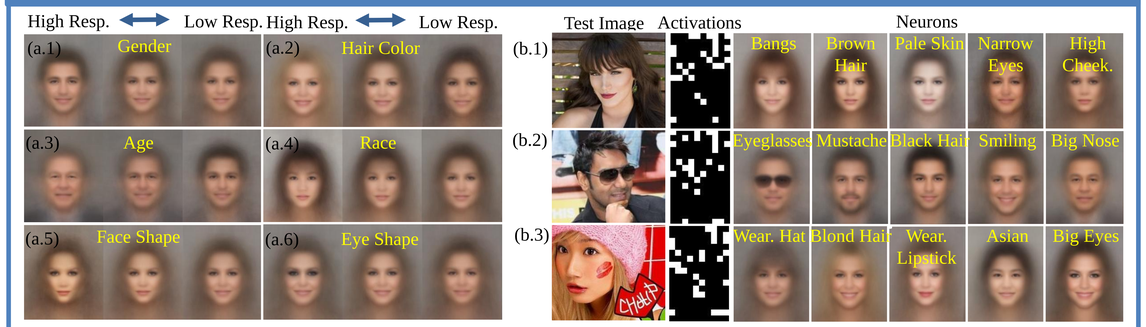
- **ANet:**
  (i) pre-trained with massive face identities
  (ii) attribute prediction by leveraging local features

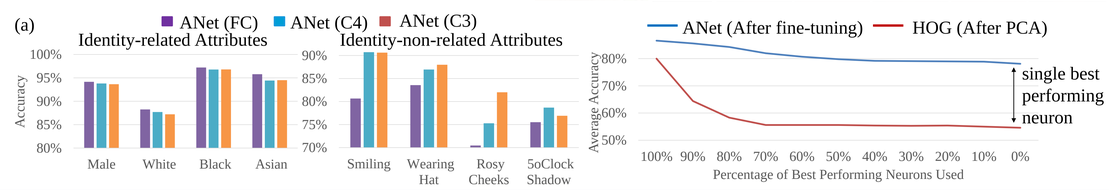
- **LNets** and **ANet** are jointly learned

5.1. Experimental Results (Face Localization)



5.2. Experimental Results (Attribute Prediction)





6. Conclusions

- With carefully designed pre-training strategies, our approach is robust to background clutters and face variations.
- We devise a new fast feed-forward algorithm for locally shared filters to save redundant computation.
- We have also revealed multiple important facts about learning face representation, which shed a light on new directions of face localization and representation learning.