Microsoft

Cross-Age Face Recognition Challenge

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Outline

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What is Cross-Age Recognition

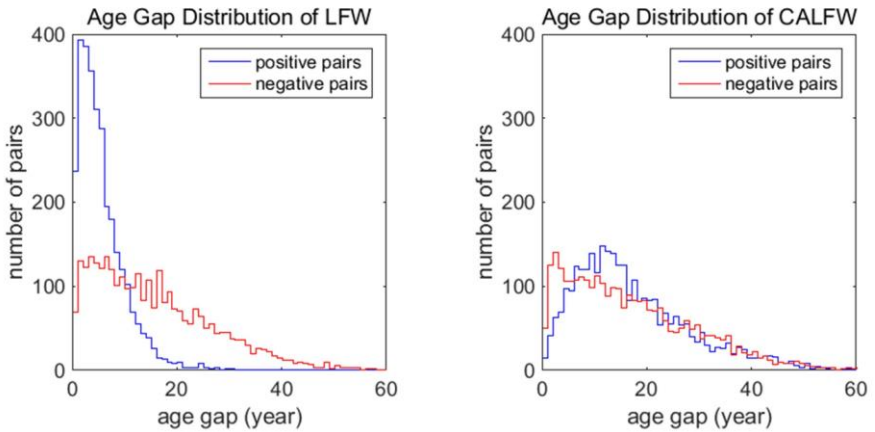
Facial recognition is a way to identify or confirm an individual's identity using their faces. In order to minimize the affect of age variation in face recognition, some works encourage models to extract identity-related features and remove age-related components. Face age synthesis or prediction are also common ways to help train age-invariant face representations.

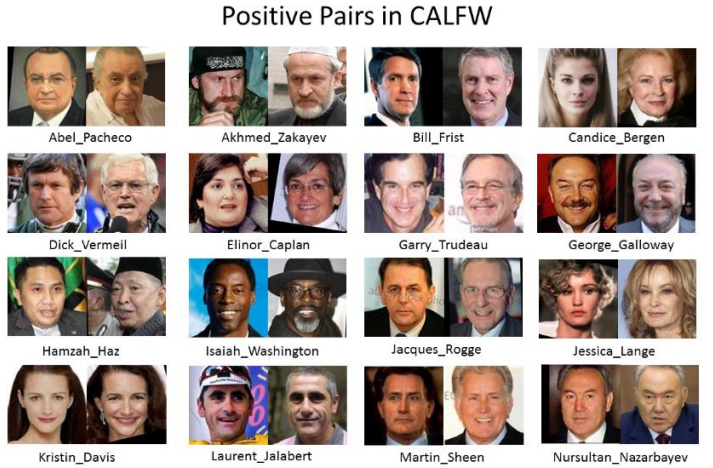
Training/Validation Datasets - CALFW

Labeled **F**aces in the **W**ild (LFW) is a famous standard for unconstraint face verification.

Cross-**A**ge **LFW** (CALFW) follows the protocols from LFW and selects 3,000 positive and negative face pairs with larger age gaps than LFW.

(Positive pair: a pair of same ID, negative pair: a pair of different IDs)





Zheng, Tianyue, Weihong Deng, and Jiani Hu. "Cross-age lfw: A database for studying cross-age face recognition in unconstrained environments." arXiv preprint arXiv:1708.08197 (2017).

Common Evaluation Matrix

In CALFW/LFW, 10-fold cross validation are used in evaluation. There are 300 positive and 300 negative pair in 1 fold. Each time, 9 folds are used for training and 1 fold for testing. The **mean verification acc./AUC** are used for comparison.

Rank-n recognition rate are another evaluation method. Comparing the target image Img_T with all other images.

If the ID of Img_T matches at least one of the top n images' IDs, this query is correct. Otherwise, this query is incorrect. Compute all images in the same way and calculate the overall score.

Challenge Protocol

1. Identities from CALFW are split into 80% and 20% as the training and validation dataset
2. You can **only** use the CALFW to train
3. The testing set will be provided in the last 3 days (without GT), please submit the similarity scores table to the TAs according to the given pair list
   - The sample of testing set will be provided in the last 2 weeks. The final test set contains 124,750 image pair, please make sure you can complete the computation in 3 days.
4. Please **DO NOT** use external recognition data/pre-trained model to train/tune your models
   - Face Detection, Object Classification, Age Detection, … are fine to use

Bonus

- Besides recognizing two faces are same the ID or not, grouping is another application, especially on personal photo collection. Some researches focus on constructing facial representation using multiple faces and improve the model's description ability.
- Testing Datasets
  - Given 120 images, please group them into **at most 20** groups. There are 20 identities, and each id has 6 images. You can put **more than 6 frames** into 1 groups. But each image can **ONLY** be put into 1 group. (We'll provide the dataset in the last 3 days)
- Evaluation
  - For each group, you get the score equal to the maximum number of same id.
    - If you group 5 frames into 1 group, include 2 Aaron, 2 Eric, and 1 Sylvia. The score you got in this group is "**2**"
  - Sum all scores of groups and get the final score.

Grading

- Performance on the Testing Dataset *
- Novelty of Technique
- Evaluation Methods
  - How do you measure the model's performance
  - Please provide the **rank-1 acc. and AUC on validation set** in the presentation
- Analysis of Improvement Reason or Other Observations
  - You can use your own face and compare with other team members
- Bonus
  - Performance* and analysis

** Please submit the required files, TA will provide the testing results*

Reference

- Dataset
  - CALFW: http://whdeng.cn/CALFW/?reload=true
- Methods
  - [2021] When Age-Invariant Face Recognition Meets Face Age Synthesis: A Multi-Task Learning Framework
  - [CVPR 2020] Groupface: Learning latent groups and constructing group-based representations for face recognition
  - [CVPR 2019] Arcface: Additive angular margin loss for deep face recognition
  - [CVPR 2019] Decorrelated Adversarial Learning for Age-Invariant Face Recognition
  - [AAAI 2019] Look Across Elapse: Disentangled Representation Learning and Photorealistic Cross-Age Face Synthesis for Age-Invariant Face Recognition

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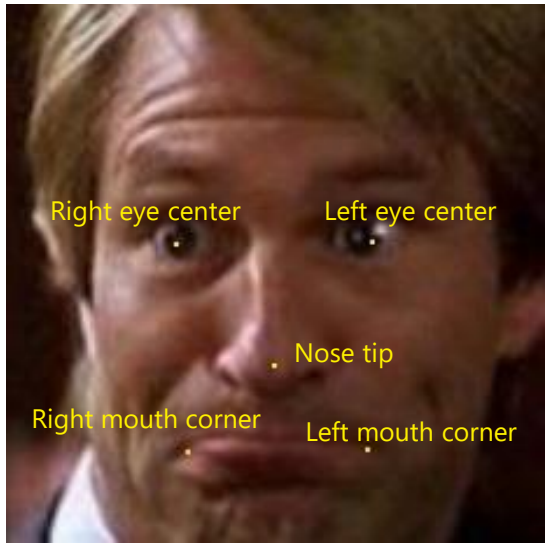
Supplement

Format of Training/Validation Set

- There are 12,174 frames with 4,025 Ids
  - CALFW_trainlist.csv, CALFW_validationlist.csv
  - Image1,id_name
  - Image2,id_name
  - …
- Face are used same affine transformation
  - Image name format: firstname_lastname_frmIdx.jpg
- Landmarks (Landmarks.txt)
  - All images are 231x231
  - Right eye center [72.829911, 102.7792227]
  - Left eye center [156.0531819, 101.3381292]
  - Nose tip [114.5739672, 154.0006314]
  - Right mouth corner [77.6964111, 191.7013791]
  - Left mouth corner [154.306845, 190.3732908]

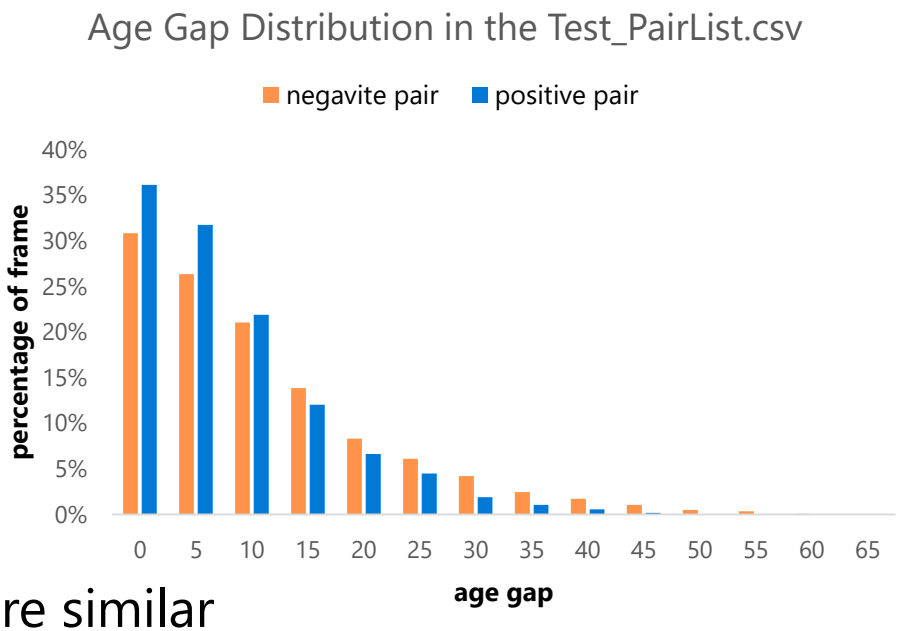
Set	#id	#frame
Train	3219	9739
Validation	806	2435



Sample:
Aaron_Eckhart_0001.jpg
Id's name Frame index

Format of Testing Set

- Same affine transformation as the training/validation set is applied (from same 5 landmarks)
- Pair list format
  - Test_PairList.csv
  - Pair1_image1,Pair1_image2
  - Pair2_image1,Pair2_image2
  - …
- Similarity score
  - Score should be between **[-1, 1]**, larger number means more similar
- Output format
  - Test_TeamIdx_results.csv
  - Pair1_similarity_score
  - Pair2_simialirty_score
  - …



Format of Bonus Protocol

- Same affine transformation as the training/validation set is applied (from same 5 landmarks)
- Image list format
  - Test_BonusList.csv
  - Image1
  - Image2
  - …
- Output format (group index: **[0, 19]**)
  - Test_TeamIdx_bonus_results.csv
  - Image1_group_id
  - Image2_group_id
  - …