

Age Group and Gender Estimation

Team members:

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1. Main Paper:

Age Group and Gender Estimation in the Wild With Deep RoR Architecture.[1]

2. Problem Statement:

Automatically predicting age group and gender from face images acquired in unconstrained conditions is an important and challenging task in many real-world applications. Nevertheless, the conventional methods with manually-designed features on in-the-wild benchmarks are unsatisfactory because of incompetency to tackle large variations in unconstrained images[1].

3. Approach:

3.1. Load the data set:

- 3.1.1. download image dataset from UTKFace[2], classify the images according to age group and gender, and separate them into training/validation/testing subsets.

3.2. Construct the network:

- 3.2.1. Construct the RoR neural network demonstrated in the paper.[1]

3.3. Pre-training with gender:

- 3.3.1. Because real world age estimation for men and women are not exactly the same.
- 3.3.2. First manually separate the data set according to the gender labels,
- 3.3.3. Then train an age estimator on each subset separately.

3.4. Fine-tune the model:

- 3.4.1. In order to reduce the overfitting problem, use another image dataset Audience[3] to fine-tune the model.

3.5. Estimate the random resource face images.

- 3.5.1. Randomly choose some images from the internet, estimate the age group and gender using the RoR architecture model.

4. Data:

UTKFace: This dataset is a large-scale face dataset with a long age span (range from 0 to 116 years old). The dataset consists of over 20,000 face images with annotations of age, gender, and ethnicity. [2]

Audience: This dataset published in 2014, contains 26,580 photos across 2,284 subjects with a binary gender label and one label from eight different age groups, partitioned into five splits. The key principle of the data set is to capture the images as close to real world conditions as possible, including all variations in appearance, pose, lighting condition and image quality.[3]

5. References:

1. K. Zhang et al., "Age Group and Gender Estimation in the Wild With Deep RoR Architecture," in IEEE Access, vol. 5, pp. 22492-22503, 2017, doi: 10.1109/ACCESS.2017.2761849.
2. "UTKFace | Large Scale Face Dataset." UTKFace, <https://susanqq.github.io/UTKFace/>. Accessed 28 Oct. 2022.
3. "Face Image Project." *Adience*, <https://talhassner.github.io/home/projects/Adience/Adience-main.html>. Accessed 31 Oct. 2022.
4. Tal Hassner, Shai Harel*, Eran Paz* and Roei Enbar, *Effective Face Frontalization in Unconstrained Images*, IEEE Conf. on Computer Vision and Pattern Recognition (CVPR), Boston, June 2015.
5. Keras Team. "About Keras." *Keras: The Python Deep Learning API*, <https://keras.io/about/>. Accessed 27 Oct. 2022.

6. Team Member responsibilities:

Yale Li: collect data, data analysis and preprocessing, visualize the intermediate result.

Zhong Zheng: Design, train, validate and test RNN model. Conduct results explanation and analysis.