Literature Survey

Age classification:

The problem of automatically extracting age related attributes from facial images has received increasing attention in recent years and many methods have been put fourth. A detailed survey of such methods can be found in [1] and, more recently, in [2]. We note that despite our focus here on age group classification rather than precise age estimation (i.e., age regression), the survey below includes methods designed for either task.

Early methods for age estimation are based on calculating ratios between different measurements of facial features [3]. Once facial features (e.g. eyes, nose, mouth, chin, etc.) are localized and their sizes and distances measured, ratios between them are calculated and used for classifying the face into different age categories according to hand-crafted rules. More recently, [4] uses a similar approach to model age progression in subjects under 18 years old. As those methods require accurate localization of facial features, a challenging problem by itself, they are unsuitable for in-the-wild images which one may expect to find on social platforms.

The best performing methods were demonstrated on the Group Photos benchmark [5]. In [6] state-of-the-art performance on this benchmark was presented by employing LBP descriptor variations [7] and a dropout-SVM classifier. We show our proposed method to outperform the results they report on the more challenging Adience benchmark, designed for the same task.

Gender classification:

A detailed survey of gender classification methods can be found in [8] and more recently in [9].One of the early methods for gender classification [10] used a neural network trained on a small set of near-frontal face images. In [11] the combined 3D structure of the head (obtained using a laser scanner) and image intensities were used for classifying gender..

CNN:

One of the first applications of convolutional neural networks (CNN) is perhaps the LeNet-5 network described by [12] for optical character recognition. One recent and notable examples is the use of deep CNN for image classification on the challenging Imagenet benchmark [13].

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