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# EVALUATION OF SIMULTANEOUS IDENTITY, AGE AND GENDER RECOGNITION FOR CROWD FACE MONITORING

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## Abstract

Nowadays, facial recognition combined with age estimation and gender prediction has been deeply involved with the factors associated with crowd monitoring. This is considered to be a major and complex job for humans. This paper proposes a unified facial recognition system based on already available deep learning and machine learning models (i.e., FaceNet, ResNet, Support Vector Machine, AgeNet and GenderNet) that automatically and simultaneously performs person identification, age estimation and gender prediction. Then the system is evaluated on a newly proposed multi-face, realistic and challenging test dataset. The current face recognition technology primarily focuses on

static datasets of known identities and does not focus on novel identities. This approach is not suitable for continuous crowd monitoring. In our proposed system, whenever novel identities are found during inference, the system will save those novel identities with an appropriate label for each unique identity and the system will be updated periodically in order to correctly recognise those identities in the future inference iterations. However, extracting the facial features of the whole dataset whenever a new identity is detected is not an efficient solution. To address this issue, we propose an incremental feature extraction based training method which aims to reduce the computational load of feature extraction. When tested on the proposed test dataset, our proposed system correctly recognizes pre-trained identities, estimates age, and predicts gender with an average accuracy of 49%, 66.5% and 93.54% respectively. We conclude that the evaluated pre-trained models can be sensitive and not robust to uncontrolled environment (e.g., abrupt lighting conditions). 

Author keywords

Age estimation; crowd monitoring; deep learning; facial recognition; gender prediction

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