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# Age-invariant Face Recognition

**Student:**

**Mohammad Reza Shafie**

**Supervisor:**

**Dr. Sattar Mirzakuchaki**

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# Abstract

Despite the significant progress in face recognition technologies, face recognition in different ages is still a big challenge. A human's appearance changes significantly over time, resulting in significant intraclass variation. For this purpose, the age-invariant face recognition method has been introduced, and one of the applications of this method is to find missing children after several years. For this purpose, in this thesis, a method is presented that can learn age-invariant and identity-dependent features for face recognition, while also achieving face generation at the optimal age for model interpretation. In particular, in this method, feature analysis based on the attention mechanism is performed to decompose the mixed features of the face into two uncorrelated components, i.e., identity and age-related features, through a constrained method in the spatial domain. Also, unlike conventional methods that use one-hot encoding to generate faces in specific age groups, the presented method uses the identity-dependent module to achieve the generation of faces at different ages at the identity level, which changes the age of the generated faces smoothly while identity is preserved. The evaluation results of the presented method in the field of face recognition on benchmark datasets in this field indicate achievements such as 93.9% rank-1 identification rate on the FG-NET dataset and 96.875% accuracy on the CACD-VS dataset. Also, in order to evaluate the method on Iranian data, a data set of Iranian celebrities of different ages was collected, and the method was able to record 68.57% of the rank-1 identification rate on this data set, although these values are slightly different with the highest accuracy. But the near-real-time performance of the presented method while maintaining accuracy distinguishes it from other methods. The evaluations carried out in the field of face production also indicate the comparable performance of the proposed method with the proposed methods.