A Hidden Markov Model (HMM) Scheme for Lip based Identification Utilizing Vertical Grooves Angles

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Abstract

As the lips move too quickly, the shape of lips images may differ from one situation to another for an individual such as the cases of smiling or frowning. In this paper, we propose a novel approach to automatic classification of lips images which are captured by digital camera. We focus on the lower part of lips based on morphological features of the grooves. Image processing techniques are employed to replace the traditional lip-prints to detect human identification with intelligent systems. Presented methodology takes lower part of the lips as an input to process their orientation of grooves. Morphological and structural features are considered to describe the lips. A Hidden Markov Model is proposed for classification and training. Results show the proposed algorithm is robust against scale changes, noises and multiple orientations of lip images for each person. With this approach 93.4%, 88.3% and 85.1% accuracy is achieved in classification of 5, 10, 15 class respectively on 75 lip samples. Presented algorithm may contribute significantly for the development of applications related to human identifications or can be used as a supplement to lip identification systems (for example, methods which are using contour of the lips) to reduce the error rate of classification.
References


Index Terms

Computer Science
Image Processing

Keywords

Pattern recognition, Image processing