Feature-point geometrical face recognition with local invariant features

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Abstract

Face recognition is essential for human to communicate with each other,
and due to its impotantance and applicability, many methods have
been propsoed in the last three decades. Among various research
directions, feature extraction plays an important role because it
correlates to the recognition accuracy considerably. However, only a
few efforts were devoted to extract the personalized land-mark facial
points and further use the geometrical information of them to perform
recognition. In this paper, a novel feature-point bilateral recognition
(FPBR) method for recognizing human faces is proposed. At first, a set
of distinct feature points is extracted from a test image. Then, from
every training face image each detected feature point finds its best
matched position through a block matching operation. Further, from the
detected feature points and their matched ones, two geometrical
models for describing their structure relationships are constructed
respectively. With a geometrical model comparison design, the
difference of the two geometric models is computed. Then, by
associating the average matching strength and the difference of
geometric models, the score of forward recognition is produced.
Similarly, the score of backward recognition can be also produced by
just detecting feature points from a training image and locating their
individual matched ones from the test image. By summing up the scores
of both forward and backward recognition, a bilateral recognition
score is obtained and is used to produce the final recognition result.
Beside the bilateral recognition, the used feature, called local vector
pattern (LVP), will also be introduced which encodes various pairwise
directions of vector as a facial descriptor to strengthen the structure of
micropatterns. Experiments on the famous Feret face databases show

that the proposed algorithm produce an excellent recognition result and performs much better than two other well-known face recognition methods.

Keyword：Face Recognition,　Geometrical Model, Local Vector Pattern