Existing face recognition systems are faced with several image quality variations due to pose, illumination, age, expression, occlusion, etc. These variations have reduced biometric system performance during real time deployment especially in applications of large databases with reduction in recognition accuracy and increased computational cost. This study proposed a decision tree approach for facial image retrieval from large databases. A top-down approach was adopted for the design of the decision tree, namely image selection, distance measurements, clustering, level of impurity and information gain. The SCface surveillance camera database of 4,130 images from 130 subjects was employed and divided into training and testing datasets respectively. The decision tree was designed based on the information gain calculated using the pixel coordinates of the face geometric features and the K-means
method was used for cluster analysis. The system was successful implemented using Microsoft
C# and appropriate user interfaces were incorporated. The performance of the system in
retrieving 879 images from the test dataset shows a confusion matrix with 863 true positives
(TP), 3 false positive (FP), 24 true negative (TN), 7 false negative (FN) and over-all accuracy of
0.9889. The system performance was satisfactory and the study concludes with
recommendation for future studies.

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Decision Tree Approach to Facial Image Retrieval from Databases


Index Terms

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