A new computer-assisted technique to aid personal identification

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Abstract

The paper describes a procedure aimed at identification from two-dimensional (2D) images (videosurveillance tapes, for example) by comparison with a three-dimensional (3D) facial model of a suspect. The application is intended to provide a tool which can help in analyzing compatibility or incompatibility between a criminal and a suspect’s facial traits. The authors apply the concept of “geometrically compatible images”. The idea is to use a scanner to reconstruct a 3D facial model of a suspect and to compare it to a frame extracted from the video-surveillance sequence which shows the face of the perpetrator. Repositioning and reorientation of the 3D model according to subject’s face framed in the crime scene photo are manually accomplished, after automatic resizing. Repositioning and reorientation are performed in correspondence of anthropometric landmarks, distinctive for that person and detected both on the 2D face and on the 3D model. In this way, the superimposition between the original two-dimensional facial image and the threedimensional one is obtained and a judgment is formulated by an expert on the basis of the fit between the anatomical facial districts of the two subjects. The procedure reduces the influence of face orientation and may be a useful tool in identification.