# A view to the future: standardizing 3D-3D superimposition for identification from next generation video surveillance systems

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The identification of culprits from videosurveillance systems brings about relevant problems for what concerns the reliability of comparison and quantification of the degree of match between the culprit and the suspect. The actual videosurveillance give only 2D images of the culprit, which can be compared to a 3D model of the suspect's face in 2D-3D superimposition. However, in the next future the videosurveillance systems will provide a 3D image of the filmed persons, which may allow the operator to perform 3D-3D superimposition.

This study aims at exposing a pilot study based on 10 male subjects: the face from each individual underwent two acquisitions by stereophotogrammetry. On each 3D facial model, 9 landmarks (right and left: en, ex, ch: midline: se, gn, prn) were identified by VAM® software; the acquisitions of each individual were then superimposed with the models of all the other subjects in order to reduce the distance between the corresponding points. The RMS value (Root Mean Square) between the two models was then calculated. When the two superimposed models belonged to the same individual, RMS value was in mean 1.58 mm (SD: 0.61 mm), whereas when the two models were taken from different persons, the same value was 4.54 mm (SD: 2.02 mm) with a statistically significant ($p < 0.0001$).

This pilot study shows that the judgment of identification based on 3D-3D superimposition may provide reliable results. The improvement specific methods of 3D-3D comparison may provide in the next future relevant advantages in this field of forensic anthropology.