

**IDENTIFICATION OF MISSING CHILDREN:
A QUANTITATIVE APPROACH TO THE ANALYSIS OF FACIAL MORPHOLOGY**

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Keywords: *Personal Identification, Face, Missing Children, Matlab®*

The problem concerning missing children is a very sensitive issue from a social point of view, often embraced with different fields of criminality, since the organ trafficking to minor prostitution and illegal adoption. Since in June 2014 29763 persons were still missing, among whom more than one half were minors¹: the relevant social impact of this phenomenon is therefore clear, which brings about several limits to identification both from a technical and scientific point of view. Two main problems affect the identification of missing children: the limited chances of recognizing a growing face by comparison with photos taken sometimes years before, and the need for quantifying the judgment of positive identification.

This study aims at developing and testing a method of comparison between images of minors, based on stable facial markers (in detail, nevi were used). The project took into consideration 143 photos of the same face performed at different ages by 41 subjects. A sample of 110 images from 16 individuals with facial nevi were selected, and then analysed by software MATLAB® R2014b. Ten facial landmarks were used in order to predict variables concerning the orientation of face and growth. Distance between the nevus and the predicted area was calculated and quantified by a score between 0 (highest distance between the position of nevus and the predicted area) and 1 (highest concordance between the two areas). In total 68 comparisons were performed (27 between photos of the same subject at different ages, 22 between photos of the same subject at the same age and 19 between photos of different subjects at different ages).

Results show that comparison of photos of the same subject provide score was equal or higher than 0.2, whereas in cases of different persons the score was always equal or lower than 0.3.

The study shows an attempt at quantifying the judgment concerning identification based on photos of minors in growth, applicable to every stable individualizing marker of face: further studies are needed in order to test the method and reduce the errors.

¹ Ministero dell'Interno, Commissario Straordinario per le Persone Scomparse, Relazione 2014