

A new technique identifies corpses by comparing the skull with a picture of the subject alive

February 13 2012

University of Granada researchers have developed a new forensic identification technique that compares the skull with one or several pictures of the subject while still alive. This system is based on the forensic identification technique known as craniofacial superimposition; this technique involves analysing the morphology of the face by locating a set of reference points either on the skull (craniometric points) and on a picture (somatometric points) of the subject alive.

This study demonstrates that the reference points currently employed for the analysis of face [morphology](#) do not correspond with the skin and soft parts of the subject. The researchers have determined the actual [correlations](#) between the reference points on the [skull](#) and the reference points on the face of the living subject. This is a highly reliable and rapid forensic technique based on the [comparative analysis](#) of reference points.

In addition, this study has demonstrated that the reference points on a skull have not a perpendicular relationship with those on the skin, as it has been asserted in previous studies.

Less Costly and as Reliable as DNA Analysis

The main author of this study, Fernando J. Navarro Merino, at the Department of Legal Medicine, [Toxicology](#) and Physical Anthropology

of the University of Granada affirms that craniofacial superimposition is faster and more reliable than other forensic identification techniques.

"As this technique is much less expensive, [forensic scientists](#) might use it firstly and, only when necessary, resort then to other techniques. This technique can be complementary to other techniques, as it can serve to discard potential identities before using more expensive or slower identification techniques, such as [DNA analysis](#)."

Particularly, this new technique allows the identification of a corpse from among several corpses; it significantly restricts the number of potential candidates for the identification of a skull. Finally, the results obtained can be verified using other techniques. This method might be very useful in the identification of missing people and mass disasters.

To carry out this study, the researchers used a sample of tomographies (CAT) of 500 Mediterranean individuals classified by sex and age, performed at the Servicios Centrales de los Hospitales de Castilla la Mancha (SESCAM), which have signed a collaboration agreement with the University of Granada [Physical Anthropology](#) Department. The researchers created a database using the tridimensional coordinates for both, the craniometric and somatometric points. Using these landmarks, the researchers determined the spatial relationship between each point pair (skull-face) to obtain a vector and a vectorial module that indicates the direction, course and distance between the points forming a pair. The goal is this vector (that extends from the skull to the skin of the subject) to serve as a reference when only the skull is available.

Identification with Living Subjects

Subsequently, to verify the results of the previous study, the researchers applied this technique to real cases where only a skull was available. They performed volumetric imaging of the skull with a tridimensional scanner. Then, they generated a 3D model of the skull (a "virtual skull").

The researchers located and marked the facial craniometric points on the 3D model and the somatometric points on the pictures (usually provided by the family and the police). The vectorial study previously performed allowed the enhancement of the reliability and time required to implement this identification technique based on a 3D overlay.

This is a pioneer study in the field of craniofacial superimposition, as this is the first time that the reference points on the skull are compared with the reference points on a real picture of the subject while still alive, using CAT scanning. Until now, only the [corpse](#) was used, which led to misidentifications. This research study was coordinated by professors Miguel C. Botella López, Inmaculada Alemán Aguilera and Sergio Damas Arroyo.

More information: The results of this study have been partially published in the journal *ACM Computing Surveys*. The published article is available at: dl.acm.org/citation.cfm?doid=1978802.1978806

Provided by University of Granada

Citation: A new technique identifies corpses by comparing the skull with a picture of the subject alive (2012, February 13) retrieved 23 April 2024 from <https://phys.org/news/2012-02-technique-corpses-skull-picture-subject.html>

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