



Physical Anthropology Section – 2011

H34 A New Method for Height Estimation Using Photogrammetry: Reliability and Validity

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After attending this presentation, attendees will gain knowledge of a new method, and its reliability, for height estimation using photogrammetry.

This presentation will impact the forensic science community by demonstrating how height estimation of the subject videotaped while in the act of robbery is a parameter that can be accurately estimated using the proposed method, respecting the experimental conditions described, and that it can consequently be utilized in probatory inquiries.

The identification of subjects by means of image comparison has already been used in the past; however, the advent of new software for the elaboration of images has provided a new impact and new resources useful for the application of techniques for the identification of the culprits. The sensitivity of the results of the investigations which, in association with other evidence, can point the judge towards a verdict of guilt or innocence, making the use of reliable scientific methods necessary, without neglecting to highlight the possible objective limits of the techniques used.

These scientific studies have had a particular impact in Italy, where the identification of the culprit by means of the comparison between the images of the arrested suspect and those of the subject videotaped in the act of robbery is allowed.

The application of such techniques; however, requires the permission of the suspect to be filmed by the bank surveillance system; in addition, the images filmed during the robbery need to be of excellent quality.

When this permission is denied, it might be useful to collect the information regarding the robber's stature from the images taken during the robbery itself.

During this study, the possibility of determining the stature of a subject by means of photogrammetry was investigated; such technique is defined as the procedures that make use of photographs in order to obtain the position, the shape and the dimension of a subject.

Preliminarily, actual heights (in cm) were obtained by measuring a selection of 288 people including subjects of a height ranging from 150 cm to 200 cm with a metallic pole; they were all photographed while standing in a doorway, so as to simulate the images of subjects taken in the doorway of a bank.

The selected subjects were measured by a standardized method. They were photographed (wearing shoes) positioned both standing still and in movement; another operator measured the actual height by using a metric pole, standing still, wearing the same shoes. The photographs obtained were examined (by another operator who was unaware of the actual heights) using a professional image editing software to determine the height of the people selected using the grid technique.

In the assessment of the height of a person in motion, it was attempted to standardize the measurement by filming the subjects placed in such a position that their center of gravity corresponded with the threshold of the door.

From what has been seen so far, the use of photograph for forensic purposes can be considered useful only when the subject is filmed in a static position (i.e., inside the bank doorway). The mean differential values between the actual height and the height measured in people standing, ranging from -0.90 cm to $+1.24$ cm, confirm the reliability of the technique. However, the validity of the technique for the measurement in motion is unreliable, owing to the high variability between the actual heights and the measurements obtained by a professional image editing software (ranging from -3 cm to $+6$ cm).

Height Estimation, Photogrammetry, Reliability