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C17 Facial Comparison of Persons Using Non-Standardized Image Material

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The goal of this presentation is to describe quality issues and a standardized procedure to perform facial comparisons, in order to make the process of performing facial comparison as objective and consistent as possible.

This presentation will impact the forensic community and/or humanity by presenting quality issues and methods for visual comparison.

Facial recognition and comparison is still one of the 'promising' biometric systems considered, and even implemented, in security systems. Error rates at settings with equal percentage false accepts and false rejects (equal error rates, EER) of 5-10% are considered reasonably good, especially with long time-lapse (a year or more) between enrollment and surveillance. Four aspects of image acquisition are of major importance for automated facial recognition: background, lighting, camera position, and facial expression. The more variability in one of these factors, the higher the error rates. Most images of surveillance cameras are taken under suboptimal conditions at best: backgrounds vary, lighting is poor, camera position is mostly with a downward angle, facial expressions are variable, and added to that people wear hats or disguises, and finally most images are saved at high compression levels.

It is clear from the above, that biometric systems for facial recognition are not appropriate for forensic applications. Although maybe useful in the investigational stage, the error rates, even in reasonably well-standardized images, are too high for final legal proof.

This means that visual matching does the final confirmatory check of the identity of a person. Especially in criminal cases, where the available evidence mostly is limited, but the correct identification of the criminal is crucial, the final decision will also be made by means of a visual check. However, this process is still subjective, and clear guidelines on how to perform such a comparison are hard to find. Therefore, the authors have developed procedures to standardize facial comparisons as much as possible depending on the material available.

Preferably, a comparison will take place with pictures taken from the same camera position, and from the same distance. If a person and original camera equipment are available for comparison pictures, a three-point matching method is used to position the person according to the available pictures, and a more robust comparison can be made. This also provides the opportunity to validate the comparison using the actual system: also 5-6 foils are imaged under the same circumstances, and analysis results of the foils and the suspect are compared. This will give an indication of the reliability of the facial comparison with the available system set-up.

If the original equipment is not available, or the position of the person is hard to estimate, a 3-D laser scanner can be used to build a 3-D model, followed by calculation of the most likely camera position and properties. This provides the opportunity to position suspect and perpetrator images alike, improving the comparison process.

However, in many of criminal cases, no additional comparison pictures can be made (e.g., when a crime suspect is still at large), and comparisons have to be performed using pictures from different time periods, camera positions and camera distances. Therefore, the authors have developed a procedure to standardize facial comparisons as much as possible. The method comprises description of general information concerning the material, and a step-by-step comparison and scoring of general facial features (contours, relative measures, and positions), specific features (eyes, nose, ears, mouth, neck and throat), facial lines, folds and wrinkles, and typical like scars, moles, tattoos, and piercings. This approach has been compared the approach used in other countries. From this study it is clear that although the general approach is similar, the level of detail and the reporting of results can be quite different in different countries. In general it is recognized that direct measurements are not suitable for facial comparison, that consistent judgment of images is hard to achieve, and that there is a lack of statistical data for facial features. Implications and possible solutions to some of these issues are presented.

Facial Comparison, Identification, Objectivity