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Reliability of forensic facial identification from CCTV recordings with implications for admissibility to court

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Abstract

Forensic facial comparison aims to associate a suspect to a crime scene through photographic or surveillance data. Morphological analysis (MA) of facial features is considered the go-to method for forensic facial comparison (FFC) as other techniques underperform in uncontrolled real-life scenarios. Current MA guidelines include a yet to be rigorously tested facial feature list developed by the Facial Identification Scientific Working Group (FISWG). The present study aimed at validating facial comparison by MA with the use of the FISWG facial component list.

The sample comprised of a multimodal high-resolution photographic and video recording face database specifically developed for this study. Standardised and matching non-standardised facial photographs (n=6220) and CCTV video recordings (n=334) of 622 consenting informed participants were compiled into the Wits Face Database. CCTV recordings included standard CCTV setups with an average surveillance camera, high-definition eye-level height CCTV camera and a low-resolution analogue camera. Some participants were also recorded wearing sunglasses or caps. Photographs and images from the recordings were compiled into 485 face pools. Each face pool contained one target image contrasted to 10 potential matching images. Nine of the potential matches were foils and one was a correct match across most face pools, approximately 9% contained no correct matches to prevent forced matches. Target images were individually compared to each potential match using the FISWG feature list and the South African Police Services criteria. Trial outcomes were analysed in confusion matrices and test performance statistics were computed.

MA was found to be highly accurate and reliable for FFC under optimal conditions such as photographs, high-resolution eye-level CCTV, and standard CCTV, while underperforming across analogue CCTV and disguised faces. False positives were less common than false negatives. These results agreed with other studies identifying feature lists to benefit the facial comparison process. FFC in sub-optimal settings was less accurate. Facial information was lost when recording conditions were subpar and when obstructed by caps with drastically decreased accuracy and increased false negatives.

This study has established MA and the FISWG feature list as a valid and accurate method for use in forensic facial identification when high quality data are available.