H84 Postmortem Iris Recognition and Its Application in Human Identification

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After attending this presentation, attendees will have a general understanding of iris recognition and how iris recognition technology can be used to locate and detect iris codes in postmortem globes (eyes).

This presentation will impact the forensic science community by demonstrating that iris scans collected from an individual at different postmortem time intervals can be identified as the same iris initially enrolled and by providing insight on how postmortem iris identification could be implemented in a forensic setting.

Iris recognition is a validated and non-invasive human identification method currently implemented for the purposes of surveillance and security (i.e., border control, schools, and the military).[1-6] Similar to Deoxyribonucleic Acid (DNA), irises are a highly individualizing component of the human body. Based on a lack of genetic penetrance, irises are unique between an individual's left and right iris and between identical twins, proving to be more individualizing than DNA.[4,7] At this time, little to no research has been conducted on the use of postmortem iris scanning as a biometric measurement of identification.

Research was conducted at the Dutchess County Medical Examiner's Office (DCMEO) in New York, NY. Only decedents with intact globes were analyzed and data collection was not limited based on a decedent's age, sex, race, or cause/manner of death. Initial iris scans were captured as soon as possible to minimize the Postmortem Interval (PMI) at the time of enrollment. Subsequent iris scans were collected periodically within 24 hours of the initial scan or until the decedent was no longer in the DCMEO custody.

Of the 43 cases involving 148 subsequent iris recognition scans, an 80% match rate was observed, demonstrating that iris recognition technology is capable of isolating and detecting an individual's iris code in a postmortem setting. A chi-square test of independence showed no significant difference between match outcomes and the globe scanned (left vs. right), and gender had no bearing on the match outcome. There was a significant relationship between an individual's iris color and match outcome, with blue/gray eyes yielding a lower match rate (59%) compared to brown (82%) or green/hazel eyes (88%); however, the sample size of blue/gray eyes in the study was not large enough to draw a meaningful conclusion. An isolated case involving an antemortem initial scan collected from an individual on life support yielded an accurate identification (match) with a subsequent scan captured at approximately ten hours postmortem.

Falsely rejected subsequent iris scans or "no match" results occurred in approximately 20% of scans; they were observed at each PMI range and varied from 19%-30%. The false reject rate is too high to reliably establish non-identity when used alone and ideally would be significantly lower prior to implementation in a forensic setting; however, a "no match" could be confirmed using another method. Importantly, the data showed a false match rate of zero, a result consistent with previous iris recognition studies in living individuals.

The preliminary results of this pilot study demonstrate a plausible role for iris recognition in postmortem human identification. Implementation of a universal iris recognition database would benefit the medicolegal death investigation and forensic pathology communities and has potential applications to other situations such as missing persons and human trafficking cases.

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Iris Scanning, Biometrics, Human Identification