J3 The Forensic Language-Independent Analysis System for Handwriting Identification (FLASH ID)

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After attending this presentation, attendees will have an understanding of the purpose and capabilities of FLASH ID.

This presentation will impact the forensic science community by providing information on a new system that can facilitate research on handwriting examinations and expedite handwriting comparisons involving voluminous evidence.

The Forensic Language-Independent Analysis System for Handwriting Identification (FLASH ID) is an automated handwriting comparison system that allows document examiners to compare voluminous pages of handwriting in a fraction of the time it would take using conventional manual methods. FLASH ID uses graph theory to measure topographic and geometric characteristics in handwriting and generates a confidence score that is used to rank suspect writers (similar to the Automated Fingerprint Identification System). This ranking is then utilized by document examiners to narrow down the list of potential authors of the questioned writing, thereby potentially eliminating the need to compare the writing of every writer in a given database. This software could prove useful for cases similar to the Weinberger kidnapping of 1956, whereby it took a team of people over six weeks to examine nearly two million pages of handwritten public records before identifying Angelo John LaMarca as the writer of the ransom notes. FLASH ID "sees" writing as graphemes, not characters, and therefore can conduct comparisons on any language. Operating FLASH ID begins by either scanning a document or selecting one from a file for comparison against a pre-loaded database. Once the metadata for the selected document has been entered, the user selects one or multiple databases for the document to be compared. Depending on the size of the database(s) and the performance of the computer, this could take anywhere from 30 seconds to hours. After the comparisons are complete, the ranked results are displayed along the right margin, and the user can double click on any of the documents for side-by-side view. Other select features of the FLASH ID user interface include the ability for users to select regions of interest for comparison, load multiple documents at one time for comparison (bulk load), and view the "heat map" of a document, which color-codes the strongest areas of similarity between the questioned and known writing. Current challenges include successfully extracting "clean" handwriting from a document for comparison. This is currently accomplished using over-the-counter image processing software; however, FLASH ID provides a "line removal" tool that eliminates concentric lines typically found on ruled notebook paper. Preprocessing of document ensures that scores are based on the comparison of handwriting and not extraneous markings or background noise on the page. Another challenge is interpreting meaning from the confidence scores. If a document scores relatively higher than the next closest score, then this can be interpreted that there is a significant amount of distinction. However, because each comparison depends on the quantity and style of handwriting, the scores cannot yet be used to establish a unilateral threshold for identity versus non-identity of handwriting. For the field of document examination, FLASH ID is a significant step toward the quantification of handwriting comparisons, and can be an invaluable tool for further research and validation of the principles of handwriting identification. For the forensic document examiner, FLASH ID has the potential to facilitate expeditious examinations of voluminous evidence, and may some day be used for objective verification of conclusions.

FLASH ID, Handwriting, Handwriting Analysis