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Tool for Document Examination

A new tool is at hand to assist questioned document examiners in the analysis and comparison of handwriting samples.

CedarFox is a system for analyzing complex documents, particularly handwritten ones, and will assist the forensic document examiner by greatly reducing evidence examination time. The system was developed by the Center of Excellence for Document Analysis and Recognition (CEDAR) at the State University of New York at Buffalo.

The research behind the technology development was done by Sargur Srihari, a professor of computer science and engineering, and his team using funding from the Office of Justice Programs' National Institute of Justice (NIJ). In turn, NIJ funded CedarTech to make the research findings and software available to questioned document examiners.

"At this point in time it is a technology that can be transferred to the end user," Srihari explains. "While we are still conducting research on difficult problems such as quantifying the degree of uncertainty and capturing subtle variations discernible only to the expert examiner, rather than wait for perfection, we felt that technology developed so far could be useful to questioned document examiners. So NIJ awarded a separate, relatively small project [$150,000], to CedarTech, the purpose of which was to make the research findings and software available to practitioners."

CedarTech, in collaboration with university researchers, created an installation version of the software that could be placed on a CD or downloaded from a Web site. CedarTech also publicized the technology through attending professional meetings and conducting workshops. Distribution of the software was done over a three-year period, and is available today. Interested parties can download the CedarFox software from www.cedartech.com with a password provided upon request.

CedarFox includes the following capabilities:

- Handwriting recognition, including automatic character recognition.
- Writer and signature verification. A questioned document can be compared against one or multiple known documents. Comparison is based on features such as character slant, connectivity and shape.
- Image processing, including underline and background removal.
- Handwriting segmentation, which can separate words of text in a handwritten document.
- Transcript mapping, which can associate handwritten word ima
- Searching, including keyword searches.

Several law enforcement agencies have experimented with the software and have done extensive testing, including the FBI and the Canada Border Services Agency in Ottawa. The Netherlands Forensic Institute has also obtained a copy, and the West Virginia University Forensic and Investigative Science Program has allowed students to use the software as a learning tool, according to Srihari.

The software is helpful for examiners because it can save time, but it does not replace the human examiner. For example, the computer can determine which of several large questioned documents are the most similar to a known document, and an examiner can then analyze the most similar ones.

"It's a tool, it's not the only thing they would have used to solve a case," Srihari says. "It's a tool for speed, because the computer can make a large number of matches that for humans would be quite laborious. Computer matching can be done fairly quickly and provide some preliminary indication of how similar the handwriting samples are."

The software also helps examiners to compare the most similar samples and has a scoring feature to compute how strongly the handwriting samples are matched.

Research continues in an effort to improve algorithms and develop new methods of comparison for handwriting characteristics and reporting results on an opinion scale, but the technology transfer of what has been done to date is complete.

For more information, contact Sargur Srihari at Srihari@cedar.buffalo.edu. To download the CedarFox software, visit cedartech.com.

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