

## Data-Knowledge Fusion—an Integrated Intelligent Systems Approach to Analysis, Modeling, & Simulation of Databases



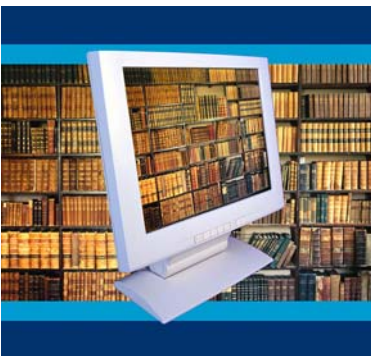
*Software to assist FBI and forensic professionals using large data bases of information*

Subjectivity issues in forensic science are prevalent in the community. Human decision-making is under constant scrutiny. Computer technologies, as well as information systems, have been used as support systems for this decision making. These are usually completely data-driven or they process human knowledge using rules to assist the decision-making. To fuse these processes and have a more complete methodology, datamining is used. Datamining will take data and fuse it with expert knowledge via a computer database.

A project is currently underway at West Virginia University which will enable researchers to build software to assist the FBI as well as forensic professionals to execute datamining on glass traces. Using artificial intelligence, computers will be trained to think by themselves with just a small amount of data. From data, information is deduced, and from that information, knowledge is deduced. The datamining proposal will fuse the knowledge and data into a greater pool of information presented through a database. The research is being conducted by Dr. Shahab Mohaghegh of the Department of Petroleum and Natural Gas Energy in the College of Engineering and Minerals Resources.



The research team is in place and has a roadmap to stay on schedule. Over 80% of the project is building the software. This step is taking place at this time. As of now, the researchers have the basic look of the software completed. The software portion of the project is anticipated to last for about eighteen months. From there the researchers will communicate with forensic experts to complete the 20% of the project which involves the data.



Upon its completion, the Data-Knowledge Fusion project will enhance forensic glass identification databases. Other evidence types could be datamined leading to novel methods of assessing significance for court proceedings. Once this is accomplished, the methodologies may be used for various type of forensic evidence databases, this expanding the knowledge and processes of the forensic science community.

Contact Max M. Houck, Director, Forensic Science Initiative, 304-293-5927 or [max.houck@mail.wvu.edu](mailto:max.houck@mail.wvu.edu) for more information.

*This research was funded by the National Institute of Justice (2001-RC-CX-K003). The opinions are those of the researcher only.*