E79 Visualizations for Introducing Database Concepts in Forensic Science

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After attending this presentation, attendees will be familiar with the attempts to expand the knowledge base within forensic science education by implementing exercises in database operations and querying via customizable animations.

This presentation will impact the forensic science community by illustrating the need for forensic science educators to fill a gap in computer science education within the forensic science discipline.

Databases are used by everyone in society today, from the home computer user organizing his or her household budget information or family images to the high-level scientist organizing his or her data from their research. The caching and querying of data from databases is also used in the forensic sciences in the form of Laboratory Information Management System (LIMS) systems in crime labs; discipline-specific, searchable databases such as Automated Fingerprint Identification System (AFIS) and Combined DNA Index System (CODIS); and by the criminal justice system as a whole. While databases are used extensively by many, it is fair to presume that not all of the users know how the database operates. By understanding how a database operates, a user may be able to take greater advantage of the power that databases can have.

College courses in database design and operation are available, but they are more readily available to upper-division students in the computer science majors. Students with a major in some type of natural science degree, such as biology, chemistry, or forensic science, do not have exposure to database design and operations unless they choose to take additional courses over and above their already stringent degree program.

The animations are the result of a collaborative National Science Foundation grant at Arizona State University and Villanova University to develop customizable visualizations to introduce the fundamentals of relational databases to students of many majors. The animations are available at the project website (http://databasesmanymajors.faculty.asu.edu/). One of the foci of the grant is to demonstrate to students outside of the computer sciences how relational databases operate and how to query such a database. The demonstration is achieved by animations which depict, step by step, how databases and database queries operate. By viewing these animations, the student gains a working knowledge of the use and development of databases being used in educational and professional settings. In gaining this knowledge, the student is better prepared to take advantage of the power that databases and database queries have to offer, and forensic science students, in particular, have yet another skill set to use in real-world applications.

Grant co-Principal Investigators (PIs)/volunteers from the faculty at Arizona State University in the areas of statistics, forensic science, and ecology were instructed to complete the database animation customizations and document the time it took for the customization completion as well as any other suggestions and comments. While attempting to perform the customizations for the database animations specific to forensic science examples, there were a number of challenges that arose in using a forensic science database as an exemplar. These challenges allowed both the forensic science faculty customization volunteer and the designer to explore the gaps in understanding between what may be considered “typical” databases that regularly have data deleted and overwritten versus a forensic science database that needs to maintain and archive any “mistaken entries” or “deleted” information due to the involvement of forensic science in the criminal justice system.

By exploring these differences that arise in forensic science regarding the use of databases, educators and students are better prepared to handle the unique issues within forensic science that may occur using this and other methods of information collection, filing, and storage, as well as information retrieval and querying.

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