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Discussion on the Paper by Neumann, Evett and Skerrett

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Significance

Neumann, Evett, and Skerrett have made a major contribution to the art and science of fingerprint identification. This is an important—perhaps historic—step forward in the intellectual history of fingerprint identification and perhaps other fields of pattern matching forensic science.

Their work deals ingeniously with the elusive problem of placing forensic identification on an empirically sound, quantitative foundation. It paves the way for moving forensic identification away from a century of overwhelmingly subjective judgement and categorical conclusions. (The absolutist nature of fingerprint expert opinions is largely attributable to the imperatives of legal advocacy overpowering the imperatives of science.) It also directly confronts complexities in fingerprint observation and measurement that are glossed over in conventional forensic analysis: intraprint and intramark variation, variation between examiners, difficulty of harnessing available databases, quantification of the weight of the evidence, and so on. Other laudable aspects of the work include making explicit the authors' assumptions and acknowledging the complexity of the problems of *scientific* forensic identification.

Implications for the future

Most obviously, the approach of Neumann and his colleagues allows the fiction of absolute identification to give way and the results of fingerprint examinations to be expressed in probabilistic terms. The precise expression remains to be worked out, and the implications (if any) for the trial process need to unfold. Examiners who previously refrained from testifying be-

cause they felt less than 100% certain of identification can testify more often. Jurors might perceive reasonable doubt despite a fingerprint identification. The question arises, then, about how probabilistic forensic identification evidence will interact with other evidence in a case.

The new paradigm calls on us to consider potential difficulties surrounding implementation. Suppose that a cost-benefit analysis compared the computer-aided, quantified approach with the conventional approach and found higher costs but otherwise no differences. Is the justice system willing to pay more for something solely because it more closely approximates truth?

Even if the method of Neumann and his colleagues did not become the approach of choice in routine casework, it could nevertheless be used in research that would help to set lower and upper bounds on the weight of evidence, given certain facts about the print and mark under examination. That would permit experts to testify to weight-of-evidence within certain calculated bounds.

The ultimate destination of such research on forensic identification is full computer automation, free of idiosyncratic human judgement, and potentially offering full transparency—though susceptible to its own limitations and imperfections.