

Discussion on “Quantifying the weight of fingerprint evidence”

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We congratulate the authors on this application of the logical approach in comparing forensic fingerprints. In 1995 two of us tried to make clear that logic applies to any forensic area of expertise [1]. Given any particular level of knowledge and understanding, however, it may be more difficult to apply in some areas, such as fingerprints, than in others. Some have interpreted this concession as making an exception for fingerprints, and have suggested extending the same exception to other areas, such as tool marks and shoe marks [2]. Such an exception was not intended, is undesirable and, as the present paper clearly demonstrates, should not be necessary.

Several forensic disciplines have since developed objective methods of interpretation based on probability. The International Association for Identification has rescinded the resolution that forbade members to give testimony in terms of probability and has now resolved that

‘The use of mathematically based models to assess the associative value of the evidence may provide a scientifically sound basis for supporting the examiner’s opinion’ [3].

The Board of the European Network of Forensic Science Institutes – an organisation with 58 member laboratories in 33 countries – has engaged itself to implement the logical approach in its member laboratories. Clearly, though, more work is still to be done.

The present paper is an important step towards determining the value of fingerprint evidence.

We would like to ask the following questions.

- (a) The value of the evidence depends crucially on the within-source variability, and the authors attempt to model variability due to distortion and *minutiae* assignment. However, the performance of the model is discussed qualitatively in terms of misleading evidence. Is it possible that the same performance would have been obtained without taking these sources of variability into account?
- (b) How do the authors view the magnitude of the likelihood ratios considering the spread in their values, and the nine out of 122 instances of misleading evidence in the ‘small experiment’?
- (c) Could the authors compare their work to that of Ref. 4?
- (d) Why did the authors not use one of the existing fast computer algorithms that can produce thousands of univariate comparison scores per second in favour of their own comparison algorithm?

References

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- [2] Interpretation of scientific evidence, D.A. Rudram, *Science & Justice* 1996, 36, 133-138; and correspondence following it: F. Taroni, C.G.G. Aitken, *Science & Justice* 1996, 36, 290-292; R. Davis, O. Facey, P. Hamer, D.A. Rudram, *Science & Justice* 1997, 37, 64; C.G.G. Aitken, F. Taroni, *Science & Justice* 1997, 37, 65.
- [3] International Association for Identification (IAI), Resolution 2010-18, Passed July 16, 2010.
- [4] Bayesian analysis of fingerprint, face and signature evidences with automatic biometric systems, J. Gonzalez-Rodriguez, J. Fierrez-Aguilar, D. Ramos-Castro, J. Ortega-Garcia, *Forensic Sci Int.* 2005, 155, 126-140.