E90 What Do Latent Print Examiners Want in a Statistical Model?

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Learning Overview: After attending this presentation, attendees will have gained knowledge on the various statistical models currently in existence in the latent print community. This presentation will discuss scores derived from various statistical and probabilistic models and how they fit in the many available Bayesian Verbal Equivalent Scales utilized not only in the forensic sciences but other industries as well. Attendees will also be more familiar with recently published research surrounding how potential jurors interpret scores derived from a particular latent print statistical model.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by discussing current progress and inherent limitations of proposed statistical approaches to quantify fingerprint evidence with the intent to elicit candid discussion on what can realistically be achieved at this time and whether these limitations are "true" issues or merely byproducts of any acceptable scientific method. Shedding light on these perceived limitations may assist latent print examiners in their understanding of these statistical models and the imperfections and may be somewhat suitable in an attempt to satisfy some of the demands set forth by the National Research Council (NRC) and the President's Council of Advisors on Science and Technology (PCAST).

The search for a suitable latent print statistical model to assist in expressing the weight of friction ridge evidence has intensified since the 2009 NRC Report on Forensic Science, *Strengthening Forensic Science in the United States: A Path Forward*. The NRC report, along with the 2016 PCAST report, *Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods*, challenged the friction ridge community to become more objective and develop tools to express the strength of evidence that is communicated to stakeholder communities. As practitioners, there is a tendency to be concerned with how evidence can best be presented in a trial format in a manner that accurately conveys the strength of the evidence and is understandable by a jury.

From a practitioner perspective, there should be a model that: (1) supports an expert's opinion of source attribution, (2) does not over- or understate the strength of the evidence, (3) shields from *any* potential error, (4) provides the exact same results every time, and (5) is entirely objective. While all these criteria may be desired, can or will these requirements be met? Barring these achievements, are any statistical models "useless" or do practitioners need to curb expectations of what can be realistically achieved within the acceptable limits of science?

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Fingerprint, Statistics, Model