A217 Understanding the Concept of "Sufficiency" in Friction Ridge Examination

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After attending this presentation, attendees will have a better appreciation of the type of information that latent print examiners use during their examinations; more specifically, how examiners use that information to form opinions on the source of latent prints, while also realizing the amount of variability that exists between multiple examiners observing the same set of prints.

This presentation will impact the forensic science community by providing data on the variance in the feature selection, and the way these features are used by examiners when forming opinions on the same set of prints.

The examination of friction ridge skin impressions relies on the observation and comparison of various friction ridge features, such as the general pattern of the ridge flow, minutiae, number and location of ridge pores, and shape of ridge edges. The observation and comparison of such friction ridge features between skin impressions recovered on crime scenes and control prints from individuals enables latent print examiners to form opinion on the identity of their source.

Following the method formalized by David Ashbaugh, examiners generally claim to rely on: (1) the quality and quantity of friction ridge features in agreement; and, (2) the lack of significant differences between two skin impressions (usually a trace and a control impression) to form their opinion.[1] Pairs of impressions displaying *sufficient* features in agreement are deemed to be from the same source; pairs of impressions displaying *insufficient* information in agreement, but no significant discordances, are deemed to be inconclusive; finally, pairs of impressions displaying disaccording features are deemed to be from different sources.

Scientific and legal scholars regularly question the accuracy and reliability of this opinion-based process. In addition, the decision-making process lacks transparency in the sense that examiners cannot describe how the information observed on pairs of impressions is used to form their opinion. Overall, this has led some scholars to raise the possibility for examiners to be subjected to bias.

Recent research projects have aimed at measuring the accuracy of latent print examination and have reported error rates.[2,3] Other projects have resulted in models measuring the quality and quantity of information present in friction ridge skin.[4] Some of these models allow for the objective quantification of the weight of fingerprint evidence in casework. Data gathered during these projects have also been used to support the development of the new SWGFAST Standards for Examining Friction Ridge Impressions and Resulting Conclusions.[5] Nevertheless, the way examiners combine the quality and quantity of information to form their conclusions has only scarcely been investigated.

This particular project aimed at using the tools and results obtained from previous projects to investigate the use of friction ridge features during the very last stages of the decision-making process by latent print examiners. During this project, an online fingerprint comparison training system was used to gather data on the observations made on pairs of fingerprints and the subsequent decisions formed by examiners on the identity of their source. More specifically, approximately 100 examiners were tasked to: (1) compare a series of pairs of latent/control prints; (2) annotate the relevant friction ridge features (quality and quantity); (3) provide their personal evaluation of the quality and quantity of information; and, (4) report their final conclusions.

Several metrics were designed to measure examiners' consistency between the quality and quantity of their annotated features and the decisions made at various stages of the fingerprint examination process on the different test prints. This presentation will report the results of this study; more specifically, we will show the amount of variability within and between examiners when annotating the same set of prints and when forming conclusions on the identity of their source.

References:

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4. Neumann C, Evett I, Skerrett J. Quantifying the weight of evidence assigned to a forensic fingerprint comparison: a new paradigm. Journal of Royal Statistical Society: Series A 2012:175;371-415.
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Latent Print, Sufficiency, Variability

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