J14   Normalization and Comparability of Digitally Captured Signatures (DCS)

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Learning Overview: The goal of this presentation is to introduce attendees to the problem of comparability and the necessity for normalization of DCS from different sources. Furthermore, the necessary requirements to achieve such comparability will be discussed, and, finally, the methodology to achieve normalization will be presented.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by familiarizing attendees with the problems of different DCS sources to equip them with the knowledge of how to apply the normalization methodology and achieve comparability of DCS from different sources.

When it comes to signatures, the shift from pen and paper to digital media is attainable but not trivial. In the physical world, different writing instruments of the same class form the executed signature in the same manner, but this cannot be said for biometric signatures (also known as DCS) when captured with different software and hardware solutions (or even using the same hardware but different software only). This issue must be dealt with as DCS are increasingly used worldwide to replace pen and paper signatures, and both national and international legislation recognizes their equivalence as legally binding biometric data.

This study addresses two aspects of this problem. The first part of the study involves the comparison of 1.200 samples created with an XY-plotter (AxiDraw® v.3), which were collected from six identical digitizer pads (Wacom® STU-530) and the same software suite (Namirial® FirmaCerta Forensic) with different combinations of the six default styli provided with the pads and four inking pens (Wacom® Bamboo Spark). The comparison of the collected data from the same repeatable stimulus discusses the repeatability and the accuracy of the recorded stimuli from the Wacom® STU-530 digitizer. The second part of the study involved the analysis of the extracted (unnormalized) Comma-Separated Values (CSV) data from different software and hardware solutions and the construction of a normalizing procedure for those to be accurately analyzed under the same DCS software analysis suite. Through the analysis of the actual method of recording the biometric channels (X, Y, F, and T), the construction of a translation spreadsheet allows the accurate rearrangement of the collected data so that they can be read and analyzed in the International Organization for Standardization (ISO) 19794-7:2014 compliant CSV format of Namirial's® FirmaCerta Forensic DCS signature analysis software.

Finally, as a result of the study, the necessity to calculate the exercised force/pressure-level correlation function (zeta function) is recognized, and the calculation process of that function and its inverse is presented with practical examples that lead to DCS normalization and therefore comparability.

DCS, Biometric, Signatures