

ABSTRACTS

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Exploring the significance of pen lifts as predictors of signature simulation behaviour

Tahnee N. Dewhurst, Kaye N. Ballantyne, Bryan Found

Historically, pen lifts have been considered valuable predictors of simulation behaviour. Despite this belief, there exists only limited empirical data available to characterise the extent to which unexpected pen lifts contribute to evidence in support of simulation behaviour. This study was devised to examine the frequency with which pen-lifts are observed in a population of 2280 simulated signatures as compared to a genuine signature population of 285 signatures (by 19 authors). It was found that 12% of simulated signatures featured less pen-lifts than their comparison genuine signatures, whilst 22% of simulated signatures featured more pen lifts than their genuine counterparts. The variance in pen lift incidence in the simulated signatures, as compared to the known model signatures, was found to be non-significant for both over and under representation of lifts. Sixty-seven percent of the simulations were found to successfully replicate both the number and placement of the pen lifts, when compared to their respective models. Despite the lack of statistical significance, 33% of simulations were observed to have more or less pen lifts than their genuine model counterparts and should be explored further. The results gained provide an insight into the significance of pen lifts with respect to whether or not they appear in a questioned signature, and whether the occurrence of pen lifts in questioned signatures independently provides evidence of simulated writing behaviour.

Keywords: Signatures, handwriting, pen lift, simulation, validation, questioned document examination.

Offline Signature Verification based on Centerline Similarities

Erika Griechisch and Gábor Németh

Digital signatures are becoming increasingly common in author identification. However, handwritten signatures play an important role in different aspects of life like business and the banking sector. Offline signature verification methods analyze the images and shapes of the signatures. Several methods called skeleton that is a frequently used shape descriptor that summarizes the general form of objects.

Here, we present an offline signature verification method which is based on similarity measures designed for a comparison of 2D skeleton-like shape features. The proposed method was evaluated on the publicly available SigComp2011 and SigWiComp2013 databases. The results that we obtained are competitive with those got from the systems submitted to two recent signature verification competitions.

Organising a proficiency testing programme on Chinese handwriting and signature examination in accordance with ISO/IEC 17043 requirements

Chi-keung Li, Lai-ping Chan and Siu-Kay Wong

Proficiency testing is an essential aspect of laboratory practice in all areas of testing including not only chemical analyses but physical examinations as well. Given the fact that Chinese handwriting is widely used among a quarter of the global population, the possibility exists that forensic document examiners might encounter cases involving the examination of Chinese handwriting and signatures even though the examiners might be foreign to the Chinese language and characters. Because of this, there is an imminent need of relevant proficiency testing programmes for the forensic laboratories to demonstrate their technical competency in this test area. This paper reports the details on the design and operation of a recent proficiency testing programme on Chinese handwriting and signature examination which is the first of its kind at an international level, having been conducted in accordance with ISO/IEC 17043 by an accredited provider. Feedback and comments received from the participating laboratories are also described.

Keywords: Chinese handwriting and signature examination; proficiency testing programme; ISO/IEC 17043; technical competency.

Stability, Speed and Accuracy for Online Signature Verification

Antonio Parziale, Angelo Anatrella and Angelo Marcelli

We suggest a model of signature verification based upon handwriting generation studies and derive from it the characterization of the signing habits of a subject. Such characterization is given in terms of the signature's stability regions, which are obtained by exploiting shape and temporal information conveyed by the genuine signatures captured by a writing pad. The effectiveness of the proposed method for characterizing the signing habits of a subject has been evaluated in a signature verification experiment on the Sabaci University Signatures (SUSIG) database. The experimental results, obtained by using very simple decision criteria in order to stress the role of stability regions on assessing the authorship of a signature, confirm that the proposed method captures to a large extent the behavior of the subject.

Keywords: on-line signature verification, forensic handwriting examination, signature stability.

Measuring magnetic properties to discriminate between different laser printers

Koen Herlaar, Miriam Mieremet and Mignonne Fakkell

Magnetism used to be a qualitative property to discriminate between different laser printers: magnetic single-component toners versus non-magnetic bi-component toners. Within the examination of security documents, quantitative measurements of magnetic properties are used to discriminate between genuine and counterfeited documents. The question has risen whether quantitative measurements of magnetism can also be used to discriminate between printers which use magnetic single-component toner. This paper presents a preliminary evaluation of this technology on normal laser printed documents.

This study used 72 print samples from 19 different laser printers which all use magnetic toner. For each sample the flux and magnetic induction of the toner was measured on several locations with the Regula Magmouse Model 4197. Different comparison algorithms to discriminate between printers were studied within the Bayesian Likelihood-Ratio framework. Furthermore, repeatability and reproducibility of the Magmouse were studied. This study shows that this technology has the potential to discriminate between different printers. The Magmouse is easy to operate and measurements can be done quickly without contaminating, damaging or destroying other traces on the document. However, the range of application is limited to documents printed with magnetic single-component toner.

Extraction of Signatures from Document Images for Real World Applications

Sheraz Ahmed, Muhammad Imran Malik, Andreas Denge and Marcus Liwicki

Various automatic methods for signature verification have been reported in the recent past. A common issue with nearly all of these methods is that they are built on the assumption that signatures are available pre-segmented or pre-extracted from document images. Accordingly, such systems are refined and tested on data containing signatures on the foreground and very little, to ideally no other, information in the background. The authors argue that these settings are not realistic and, in reality, experts encounter cases where signatures are written on documents having a lot of other information, than just the signatures, e.g., machine-printed text, ruling lines, logos, etc. We believe, to better assist forensic experts, a system should have the capability to automatically extract/segment signatures from documents like bank checks, forms, bills, wills, etc. This paper identifies that automatic signature extraction/segmentation from document images is a relevant problem faced by forensic document examiners and compares the various approaches currently available. Furthermore, we present an alternative method for extracting signatures from document images. The proposed method is capable of distinguishing machine-printed text from signatures and is based on a well known local feature descriptor, Speeded Up Robust Features (SURF). We evaluate the proposed method on the publicly available Tobacco-800 dataset in order to compare it to the currently available extraction methods. The research found that the proposed method was able to find all of the signatures in the document images tested. The authors see the application of the proposed method as a tool for document examiners to automatically extract signatures from document images.