Proposal for a methodology to manage contextual information in forensic handwriting examination based on digitized documents

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Summary

1. Context Information Management

2. The problem

3. Forensic Handwriting Examination with digitized documents
   1. Image acquisition
   2. Image editing (CIM)
   3. Submission
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1. Context Information Management

Img. 1: Brandon Mayfield case fingerprints (http://science.sciencemag.org/content/sci/309/5736/892/F4.large.jpg)
1. Context Information Management

• General problem in Forensic Science: identification of the source of the evidence

• Comparison of physical features => objective methods, subjective judgements

• Contextual information => cognitive bias

• Empirical evidence of cognitive contamination

• Strategies: sequential unmasking, evidence line-up, context information management

Levels of contextual information
(Stoel et al, 2015)
1. Context Information Management

- A **context manager** filters out task-irrelevant information, before submitting case to examiner
- Fixed or rotative role
- Cognitive contamination minimized
- @ Victoria Police Forensic Services Department
- @ Netherlands Forensic Institute
- Mainly level 3 contextual information

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**VPFSD (Found & Ganas, 2012)**

**NFI (Mattijssen et al, 2015)**
2. The problem

- VPFSD and NFI: context information management mostly focused on level 3
- Documents and handwritings: context information of levels 1, 2
- FHE: *bias danger zone*
- How to hide task-irrelevant handwritings and printings that might bias the examiner?
3. FHE with digitized documents

- Image acquisition
- Image editing (CIM)
- Submission
- Image examination
3.1 Image acquisition

• Relevant details for FHE must be visible:
  • Elements of style: dimensions, spacing etc.
  • Elements of execution: pressure, stroke quality etc.
  • Elements of writing instrument: burr striations etc.

• Techniques and equipment:
  • Normal / oblique / transmitted / coaxial lighting
  • Visible / UV / IR
  • Scanning / macro photography / VSC / ESDA
  • Copy stand, scales

Context manager must be a Forensic Handwriting Examiner too!
Data Base: 01 / 04 / 05

15/12/2008; 15/12/2009; 15/12/2010
15/12/2001

15 P - M
CONTRATO

1 - IDENTIFICAÇÃO DAS PARTES CONTRATANTES

Contratante: CONSÓRCIO INTEGRADORA-UNI

1ª via - Contratante 2ª via - Contratado

2 - OBJETO DO CONTRATO

Apóio à Contratante na prestação de serviços de condonação na análise de documentação de propostas ao contrato.

Este contrato substitui integralmente o Contrato P-15159/00-MG.

ARQUIVADO:
Proposta ☐
Contrato ☐
Outros ☐
Não há ☐

3 - PRAZOS

Prazo de Execução: 26 meses
Início: 01/09/2012
Termino: 30/01/2012

4 - REMUNERAÇÃO

Valor do Contrato: R$ 1.810.500,00
Forma de Pagamento: Comunicação física e eletrônica desta instrumentação.
Valor Total: R$ 1.810.500,00
Valor Atrasado: R$ 0,00

5 - CONDIÇÕES CONTRATANTES

1.1. CONDIÇÕES CONTRATANTES GERAIS (Vale-Técnico)
1.2. CONDIÇÕES CONTRATANTES ESPECÍFICAS (Vale-Técnico)
1.3. CONDIÇÕES CONTRATANTES GERAIS (Vale-Técnico)
1.4. LOCAL PARA FIM (Vale-Técnico)

6 - RESPONSÁVEL PELA CONTRATAÇÃO

7 - ASSINATURAS

8 - ANEXOS

Contratante: CONSÓRCIO INTEGRADORA-UNI

1ª via - Contratante 2ª via - Contratado
mais perfeita saúde, incluindo gelose e pares. Incema
3.2 Image editing (CIM)

- Preparation of images, hiding task-irrelevant handwritings / printings
  - Obfuscation
  - Cropping

- Small adjustments might also be made by Context Manager
  - Brightness, contrast, white balance

- Software
  - Many available for these simple tasks
  - I recommend using GIMP
geloso

Amedita
MÁRCIO NEVES
CPF.926.

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3.3 Submission

- Submission of files from the context manager to the examiner:
  - Shared folders (intranet)
  - Cloud storage
  - Laboratory Information Management System (LIMS)

- Questioned handwritings and writing standards must be clearly identified
  - e.g., folder structure and filenames (e.g. “Q\doc_1\page_2\img_1.jpg”)

- And the form with relevant information about the case
  - Dates associated with handwritings
  - Conditions that may have affected handwriting, if known (illness, injuries etc.)
3.4 Image examination

- Examiner must be able to perform basic editions to carry out the examination
  - Brightness, contrast, white balance
  - Rotation, resizing

- Simple **image viewer** with basic editing options is OK
  - Examples: IrfanView, paint.net, Shotwell (Linux) etc.

- **Image editing** software is recommended
  - Examples: GIMP, Adobe Photoshop
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diferente, alguns achar

justo. E que ao seu

ordem e paixões que alteram as

determina estes direitos, procederá pe

em Londres vai seu Paulo e chegarão
eua e Berlim está Carl 27 de Novembro

viajar para sua devem ser euder

peramos boas notícias. Dragal quem + 3580
e maior justiça, que o saber de muitos homens divergentes, alguns acham justo, e alguns que ao se percorrerem, ao se fundarem, almejam a paz e a unidade que determina estes direitos. De até e de posição natural.

Em boares vai deu São Paulo e chegara deu e Berlim está cal 17 de Novembro desta viajou para sua demor eu percorreu boa notícia. Dragal seu 3580
Medir distâncias e ângulos

Distância: 821.4 pixels
Ângulo: 61.81°
Largura: 388 pixels
Altura: 724 pixels

Assinatura do Pai
Assinatura do Pai
3.4 Image examination

- The examiner may require the context manager to provide more/better images
  - Different lighting, magnification, wavelength etc.

- The examiner might request additional information to context manager
  - Context manager contacts investigator in charge of the case

- **Sequential unmasking** is possible
  - Submission of standard writings only after examination of questioned writings
  - Maybe not appropriate for all cases
3.5 Report

• Examiner submits draft report to context manager for review

• Context manager reviews the report, then submits all paperwork and original documents to examiner (physically or digitally)

• Examiner assesses if context management was effective
  • If the examiner considers that CIM was not effective, this must be reported to case manager

• If the examiner changes his opinion on the evidences at this point, this information must be included and explained in the final report.
4. Conclusion

• Pros:
  • Contextual information of levels 1, 2, and 3 are minimized
  • Examiner is less exposed to potentially biasing task-irrelevant information
  • Easier to create and assign fake cases to examiners (level 4 – base rate; blind testing)

• Other pros:
  • Original documents less manipulated
  • Possibility to distribute examination requests to other laboratories / agencies
  • Requests with multiple questioned and/or standard writings might be processed in parallel
4. Conclusion

• Cons:
  • Documents exposed in media reports (CIM ineffective)
  • Documents where the writings contain biasing contents (e.g. “suicide” note)
  • Examiners must be able to use image viewing/editing software efficiently
  • Minimum requirements / set of characteristics needed for images to allow reliable FHE still not defined (this could be very subjective...)
4. Conclusion

• Cons:
  • Resistance to change

“Many handwriting examiners, for instance, do not favor using digital scans of questioned documents, or only using part of the available handwriting. These may be legitimate concerns, and research should focus on such procedures, testing whether the expectation of a decrease in performance (in the eyes of the examiners) due to the absence of “holistic” information is justified.” – Stoel et al., 2015 [emphasis added]
Questions?
Thank you!

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