

7th IAPR International Workshop on Computational Forensics

Document Fraud :

Reality And Challenge For Companies

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- Business Security Overview
- Document Fraud Map
- Document Fraud Detection
 - Technologies Status
 - Discussions
- Conclusion



Business Security Overview

- Confidentiality Privacy
- Data Integrity
- Availability
- Authentication
- Authorization



Global Security





Fraud Evolution



*Source: PwC's 2018 Global Economic Crime and Fraud Survey

Companies today face a perfect storm of fraud risk –internal, external, regulatory and reputational*



Digitalisation of processes in compagnies has certainly contributed to productivity efficiency and cost reduction

... but also open up to cyberattacks.

Recent studies conducted by DFCG, and the insurer Euler Hermes draw up an inventory of fraud in companies:





Mechanism that thwarted these fraud attempts

Étude Euler Hermes - DFCG 2018 La fraude, un phénomène en voie de professionnalisation !





Top 5 fraud attempts





Top 5 fraud attempts



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The main fraud types

Document fraud comes in the first position



- Document Fraud
- Companies (Family, Fictitious,...)
- Convencency Affiliation
- Sinister Abroad
- False Dead and False Sick



What prevention and detection strategies?



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Technologies share in the fight against fraud

The Financial services and Technology industries are finding the most value in AI and Advanced analytics



Source : PwC'2018 Global Economic Crime and Fraud Survey

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Who are the fraudsters?

Fraudster Profile



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Document Fraud Detection

Identity Documents, Invoices, Forms, emails,...

- Paper, Image, Email, PDF, XML,...
- E-signature : any mark signifying the approval of a document

	John Clark.	JC	I Agree
Personal ID	Hand Signature	Initials	Checkbox

Digital Signature, Visible Digital Seal, Hash







ID Documents







Residence permit



- ID authentication solutions are based on checking :
 - MRZ lines keys...
 - Series of validation checks:
 - Presence of certain security points on the document,
 - Specific char font,
 - Photo Borders analysis,
 - • •

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ID documents : Market Leaders



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ID Validation : Performances?



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Discussion...





Efficient Technologies

- Smart Capture
- Accurate Data Extraction
- Specific OCR



Scalability : any country, any language



Digital Documents





Digital Signature

Signing Document



Verify Signed Document

The Viewer verifies the document. The verifier compares the current document to the digital signature and determines if the document has been changed since signing.







Limitations

- Physical security is too expensive to put in place for the most documents
- The printing or copying of originals documents poses an authenticity problem's.



Hybrid documents: Others security tools

Visible Digital Seal









Why Visible Digital Seal 2D-DOC?

A lot of supporting documents that are printed are falsified and used fraudulently.



Supporting documents are the initial evidence that are required as proof of identification and as justification of eligibility for a benefit.



Digital Seal 2D-DOC

- Developed by AriadNEXT and the French <u>National</u> <u>Agency for Secured Documents (ANTS)</u>
- 2D-Doc delivers a tamper-proof printed or electronic document.
- A 2D-Doc visible digital seal is a 2-dimensional bar code containing the essential information of the document on which it appears. It also includes the sender's the digital signature.



Digital Seal 2D-DOC: How does it work?

Generation

- Based on client data.
- Application
 - 2D-Docs on printed or electronic documents.

Check







Semantic Hash for Advanced Document Electronic Signature

- Based on S.Eskinazi PhD Works and it's cooperation project: L3I, LIPADES, ITESOFT,...
- Goal : Securing hybrid documents with a hash based on the document's contents (text, graphic, structure).
- Because of hashing of the document's information during signature computation, no information from original

document will be deduced from its

signature alone.





Challenges : Stability & reliability of basic document analysis algorithms.

- The calculation of the hash value's must be no sensitive to quality image degradation:
 - Print/Scan noise
 - Image Deskew, Shift...





Physical/Digital Documents: Types Of Forgeries

Tél: 03 20 90 47 88

Replacement of text from another (or the same) document. (Copy-Paste-Inside, Copy/Paste-Outside)

e	HT	TVA	TOTAL		-
0	0.50	0.00	0.50	bon de préparation-livraison	760
0	77.57	5,43	1083.00	034084	100
0	0.50	0.00	0.50	facture nº 125524 du 22/1	10/2009
0	77.57	5.43	83.00	Notre B.P. Nº 63469401 du 28/	/10/2009
1	5.02	0.98	0.00		
			1173.00	résentant : 75 FRANCOIS XAVIER Pl locuteur : DAISY VANHEE Tél : 03 2	RONCE 0 90 47

Removal of text areas. (CUT)

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n° client

7699

Addition of text with a text tool. (IMI)

EX.

DELL Comité d'Entreprise Le Seguoia Parc D'Andron 30470 DAIMAR DES Représenté par Mme DEILHS , Secrétaire du CE

Ci-après appelé le client,

inservent le fournisseur) qui dispose directement su par tre d'hébergement, de mayens matériats et logroets arror uns générales du contres. Les porties s'y engegent par le par codet à la more en stere, dans son rentre Votre n° de compte : 30679891

Votre référence : NEANT. Date Commande : 21/03/2007 Contact : M. CHALLET

N° compte client installé 30679890 ITESOFT 43 BO DES BOUVETS 30470 AIMARQUES

Pitney Bowes Service Clients E-mail: administratif@pb.com Tel::0.825.850.825 Fax::0.825.850.823 www.pbmyaccount.fr

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Fraud detection : Image analysis technologies

Patch/Character-based classification approach

- Features that capture intrinsic fingerprints of the manipulations
 - Histogram equalization
 - Error level analysis
 - Noise Analysis
 - Luminance gradient
 - Principal component analysis
 - Detecting double JPEG compression,...
 - **...**

Content authentication based on device analysis and stability of distortion (printing/scanning devices)

Steganography,...



Ballistic trace



Compression

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PDF Documents



Metadata Streams

- Text stored as content streams
- Vector graphics for illustrations and designs (shapes and lines).

PDF contents analysis

- Raster graphics for photographs and other types of image.
- Interactive Elements :

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AcroForms, Fill and Sign,...







Detected Fraud Samples



Example of modifications using different tools



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PDF Form

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Need to develop a set of techniques for each scenario...

- Assumptions may not be enough due to more sophisticated forgeries?
- Need, no or very few false alerts? How to reduce FP?
- Cross fraud detection decision with customer validation rules (Activity area,...)?



Conclusion

- Any project of digitalization and automation of processes can no longer be considered independently of a powerful system of automatic fraud detection
- Without industrialization, without reliable tools, ... stalking fraud resembles the loneliness of the goldsmith.





THANK YOU

