



Forensic intelligence applied to questioned document analysis: A model and its application against organized crime



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ABSTRACT

The capability of forensic sciences to fight crime, especially against organized criminal groups, becomes relevant in the recent economic downturn and the war on terrorism. In view of these societal challenges, the methods of combating crime should experience critical changes in order to improve the effectiveness and efficiency of the current resources available.

It is obvious that authorities have serious difficulties combating criminal groups of transnational nature. These are characterized as well structured organizations with international connections, abundant financial resources and comprised of members with significant and diverse expertise. One common practice among organized criminal groups is the use of forged documents that allow for the commission of illegal cross-border activities. Law enforcement can target these movements to identify counterfeits and establish links between these groups. Information on document falsification can become relevant to generate forensic intelligence and to design new strategies against criminal activities of this nature and magnitude.

This article discusses a methodology for improving the development of forensic intelligence in the discipline of questioned document analysis. More specifically, it focuses on document forgeries and falsification types used by criminal groups. It also describes the structure of international criminal organizations that use document counterfeits as means to conduct unlawful activities. The model presented is partially based on practical applications of the system that have resulted in satisfactory outcomes in our laboratory.

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1. Introduction

1.1. Forensic science and criminal justice

From an etymological perspective, *science* aims to study and gather knowledge on the structure and the behavior of the physical world¹ using the scientific method² and logical reasoning [1]. Similarly, the development of *forensic* knowledge, from a *forensic science* perspective, results from the analysis of empirical data and the application of scientific principles and disciplines that focus on the discovery and analysis of

physical evidence. The goal is to generate objective and reliable *proof of fact* based on the data collected (that is, evidence-based knowledge).

As public providers of safety and security, law enforcement incorporate within their organizational and functional structures several units/divisions comprised of scientists with an expertise in a particular forensic discipline and specialized laboratories. Each unit or laboratory applies forensic knowledge in relation to their specific discipline with the purpose of assisting the judiciary and criminal investigations and establishing *proof of fact* based on the analysis and interpretation of physical evidence performed by qualified experts. In many cases, these units are grouped within a single department or section of law enforcement referred to as *forensic laboratories*.

Therefore, forensic laboratories bring together several forensic disciplines and experts who apply evidence-based knowledge to criminal investigations; this applied field includes the following objectives 1) obtain and analyze physical evidence, 2) identify criminals, 3) associate criminal cases that may appear to be unrelated and, 4) provide expert testimony in criminal proceedings. In certain countries, these tasks

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¹ Cambridge English Dictionary & Thesaurus (Online at <http://dictionary.cambridge.org>), accessed 16-03-2016.

² Defined as "a method or procedure that has characterized natural science since the 17th century, consisting in systematic observation, measurement, and experiment, and the formulation, testing, and modification of hypotheses" by Oxford English Dictionary.

may be performed by public/private institutions in addition to governmental agencies.

1.2. The necessary evolution towards forensic knowledge

In the past decade, government agencies have implemented austerity policies to their operational systems that have had a direct impact on the services provided. Internal operations are being evaluated, a reality particularly occurring during an economic recession. Any business and administration recommendation dictates that reform should focus on qualitative and quantitative improvements in order to enhance the effectiveness and efficiency of the responses/services provided to citizens. Public security providers are no exception to this assumption and experts associated with all forensic science disciplines (FSD) must collaborate with authorities to overcome the current challenges caused by diminishing budgets.

Besides technical and methodological enhancements, FSD should also focus on the adequate processing of information in order to generate forensic knowledge and intelligence. This knowledge and intelligence provides the foundation to build the necessary synergies for further operational and functional improvement, where interdisciplinary work is the key to success. In this context, we understand forensic intelligence as a scientific or technical³ processing of data and information that produces specific knowledge to complement the concept of criminal intelligence⁴ [2–4]. The process is based on the use of forensic data to cross-reference and relate crime scenes, physical evidence, and suspect identity. This opens the possibility of generating robust and evidence-based approaches to policing and security at both operational and strategic levels [5]. Unfortunately, forensic intelligence is currently in its infancy primarily because forensic science has traditionally focused on courtroom testimony and the resolution of crimes on an individual basis.

1.3. The new forensic paradigm

Our society is characterized by rapid technological, legal, and social changes where criminal groups easily adapt to any new surrounding context. They modify their modes of operation in order to avoid the legal control of their criminal activities. Similarly, police organizations must adjust to this constantly changing environment. Criminalistics should also experience an equivalent transformation to adapt to the ever evolving criminal activities. By doing so, law enforcement agencies would become more effective in responding competently to more demanding security requirements. This efficiency becomes especially relevant for organized crime, which establishes in a manner that is not easily detected in society and with the intention to remain inconspicuous while conducting criminal activities.

The forensic sciences must respond effectively to more demanding mandates from authorities. These are demands that cannot often be undertaken by FSD because of the limited (or inefficient) existing work systems and scarce financial resources. Further, FSD may not be prepared to assume such demanding tasks overall because of untrained experts, scientifically unproven techniques, etc. Therefore, the forensic sciences must embrace change and update practices and analytical techniques, including the acquisition of new instrumentation and equipment. This will result in greater proficiency in the collection and analysis of information that will in turn generate forensic knowledge. The essence of this new paradigm is the development and management of intelligence.

³ It deals with the collection and processing of data and information in the respective areas of interest for civil and military security purposes.

⁴ It is carried out by police intelligence services to solve crimes and fight against organized crime. It is characterized at the same time, as being of preventive nature of criminal activities and to complement legal repressive action by providing proof of the criminal actions of a suspect to justice.

1.4. The basis of the forensic intelligence applied to questioned document analysis

The current project is the result of a professional deliberation: how can FSD help fight against criminal networks? In an attempt to solve this issue, we have designed a methodology based on forensic intelligence specifically focused on questioned document analysis (QDA) and its practical applications; this reflects the approach developed by other disciplines, such as fingerprinting [6], DNA [7] and drug analyses [8–10].

The basis of the proposed model lies in the concept that any information extracted from the analysis of data generates knowledge. The appropriate processing and exploitation of forensic knowledge is likely to become truly (forensic) intelligence. Once generated, intelligence can be utilized within a government's institutional and logistic structures in order to improve and optimize their services and resources against crime. The Latin quote *mutatis mutandis* (i.e. things needing to be changed) clearly exemplifies this new vision of the model. We believe changes should be profound but keeping what is fundamental and already efficient.

There is an extensive bibliography on the mechanisms of development of intelligence. They discuss how best to examine information in order to generate knowledge and, in turn, intelligence [11–14]. Here, we introduce the application of these techniques of management and analysis of information in QDA to generate *forensic intelligence*.

1.5. The model of forensic intelligence

Forensic intelligence is the knowledge that derives from data processing and information obtained from the examination of physical evidence in order to better understand the fact(s) of a crime. Forensic intelligence can potentially lead to objective and consistent (novel) information in a timely manner [5,15]. The philosophy behind the shift towards a forensic intelligence model (scientific or technical) can be applied to all FSD. In varying degrees, all FSD should incorporate this concept to better comprehend criminal events and actions, beyond the standpoint of a single criminal case. The goal is to build institutional mechanisms to prevent and combat crime from a forensic science approach.

In this paper we propose a new model that aims to redirect efforts in order to generate more useful intelligence. The knowledge developed in each discipline will create new operational possibilities, establish new standards, and provide additional probative information. This will lead to a profound transformation of the mode of operation within each discipline.

The proposed model aims to generate knowledge, by promoting an interdisciplinary approach to gathering physical evidence data in order to facilitate enhanced forensic science-based intelligence. This necessitates collaborations among FSD where various sciences converge, interact and learn from each other and is the keystone to improve the effectiveness, efficiency and quality of the product to be delivered.

In order to demonstrate the application of the model, the stages shown (described below) are structured in line with the objective of creating operational strategies against organized crime, applied to QDA. Within the context of QDA, the model is described specifically as the *falsification model*. This has been designed to ease the collection and evaluation of data/information and the subsequent dissemination of the knowledge generated through suitable coordination channels.

2. Discussion

2.1. Forensic intelligence in law enforcement systems

The 2012 European Police Chiefs Convention at EUROPOL held in The Hague (Netherlands) highlighted the existing concern to strengthen intelligence in the structure of police organizations. In this regard, the

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