Investigative quality in digital forensics
Extended abstract

Stig Andersen

stigaan@stud.ntnu.no

May 2017

Investigating digital evidence is key to solving crime. However, experience shows that digital evidence is often misinterpreted by investigators, prosecutors and the court. Important information does not reach the decision-makers, and the capabilities of digital forensics is not properly considered when planning and executing criminal investigations. Also, little is known about the key quality factors of a criminal investigation, and even less about how digital forensics contributes to the quality of a criminal investigation. This makes it hard for practitioners of digital forensics to do the right things at the right time, and it makes it hard for criminal investigators to efficiently and effectively utilise digital forensics. The goal of this research project is to identify the key quality factors of criminal investigations and to improve digital forensics methodologies and tools accordingly.

There are three key subjects relevant to this study: Investigation, digital forensics and law. Investigation represents the goal and context that makes this study pertinent. It is also the overarching and unifying methodology of which digital forensics is one of many.

Digital forensics is the focal topic of this project. It is the methods and tools in this subject that ultimately will be examined and considered to ascertain their qualitative contribution to an investigation.

The third subject is law. National law defines the legal boundaries of an investigation and determines the rules on how investigative actions - including digital forensics - can, shall and cannot be executed. Because of the very nature of digital forensics as a subject, and the context in which it is applied, this study cannot be considered complete without proper reflection on relevant legal aspects. Details on legal issues are outside the scope of this project, but significant challenges will be described and references to relevant legal topics will be made wherever applicable.

The goals of criminal investigations are to ascertain if a crime has been committed and to enable a fair and impartial legal process. To reach these goals an investigation has to answer two core questions: Is the event in question a crime (legality) and can the person(s) who cased the event be held responsible (guilt)? An investigation will seek to answer these questions by breaking them down into subquestions (i.e. who, what, when, where, why and how) and systematically plan, execute, evaluate and correct investigative actions. Such actions are performed using a variety of different methods, including digital forensic methods.

For an investigation to be successful, these questions have to be answered with a certain level of quality. Beyond general scientific requirements that all forensic disciplines are held to, I have found no definition or study on the requirements for investigative quality in digital forensics. In addition, experience from the Norwegian police suggests that the people responsible for planning a criminal investigation rarely have the necessary competence to effectively and efficiently employ digital forensics. Further, the people conducting the digital forensic actions do not get the necessary information to execute digital forensic actions in a way that efficiently and effectively provides investigative quality.

This study will contribute to the solution of these problems by attempting to answer the following research questions:

- What are the factors that determine investigative quality in digital forensics, and how can they be measured?

- How do the investigative quality factors impact the digital forensics methodology?

- Do the digital forensics process and the criminal investigation process work together to produce high-quality investigations, and how can they be improved to provide increased investigative quality?

- How can digital forensics methodology be adapted or integrated into the criminal investigation process to contribute to the investigation with increased quality?

- How do the use of different types of tools impact on the quality of a criminal investigation?