Problem Statement

The development of computer technology and computer communication during the last decades has lead to many benefits to society. However, it has also provided new means for the spreading of child sexual abuse (CSA) images and videos. When police makes seizures in this kind of investigations the examination of the seized material typically involves a considerable amount of manual labor, which consumes time and resources for the police. New tools that support the police in their CSA investigations are thus needed.

Objectives

The FIVES project will develop a flexible software tool-set that allows law enforcement organizations to more efficiently handle large amounts of image and video material related to child sexual abuse. The tools will target both image and video material while applying sound forensic procedures in a robust and scalable processing environment.

The FIVES tool-set will have multiple user interfaces, catering for different categories of users. A basic interface can be configured for users such as vice detectives who are not necessarily specialized in computer forensics. This user interface will have a straight-forward design and contain a set of predefined processing chains targeted for child sexual abuse investigations. Specialized computer forensics investigators can work with an advanced user interface and get the full power and flexibility of the system. Generation of the various databases used in the system can also be performed via this interface. A simple boot version is also planned mainly for detecting known illegal material using fast file fragment matching.

The project covers both integration of already available software, as well as development of new functionality.

FIVES Partners

Karlstad University, Sweden

The Computer Science Department at Karlstad University is focused on computer networking and computer security, with a special interest in efficient techniques for file fragment matching.

Korps Landelijke Politiediensten, the Netherlands

The Digital Experts group of the KLPD conduct both investigations as well as R&D, and has expertise in digital forensics management. The group has developed the OCFA computer forensics architecture.

NetClean Technologies AB, Sweden

NetClean is a company that markets end-user software, as well as proxy- and carrier-based solutions, for combating the spreading of child sexual abuse material. NetClean also provides law enforcement organizations with CSA-related investigation tools at no charge.

Institute of Information Technologies at the Bulgarian Academy of Science, Bulgaria

The IIT-BAS has considerable experience in image and video processing, pattern recognition, and biometrics. In this project, IIT-BAS will work closely together with personnel from the Technical University of Sofia.

German Research Center for Artificial Intelligence (DFKI), Germany

The Image Understanding and Pattern Recognition group of DFKI conducts basic and applied research in pattern recognition, machine learning, image understanding, and artificial intelligence.

Federal Police, Belgium

The Federal Computer Crime Unit of the Federal Police investigates a broad spectrum of computer and Internet-related crimes. They also maintain the FCCU forensic distribution.

F I V E S

Forensic Image and Video Examination Support

Technical Overview

Computer forensic tools already developed by FCCU and KLPD serve as a base for the FIVES tool-set, which will be expanded to provide new functionality. The overall system architecture is illustrated in the figure to the right.

At the bottom there is a Linux forensic distribution comprising of a large set of general forensic utilities. On top of this sits the OCFA forensic framework, which handles per-file processing in a distributed fashion, routing the files betweens different processing modules and recording relevant meta-data for each file.

The processing modules provide different specialized functionality. Extractor (E) modules can for example automatically decompress archive files for further processing. Image (I) modules perform specialized image processing such as image similarity matching. Video (V) modules are similarly specialized on video processing. Hashing (H) modules provide specialized hashing functionality. GUI modules offer a set of differently tailored interfaces to FIVES.

The modular system design of FIVES provides considerable flexibility and adaptability. It is thus easier to tailor FIVES to the varying needs of the different national police forces. Since the police forces differ in organizational structure, workflow and legal framework, so do their needs.

Website

http://fives.kau.se
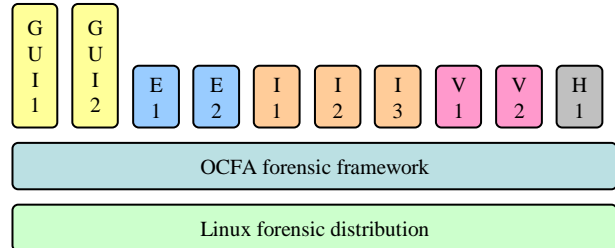
Dissemination

The FIVES tool-set makes extensive use of open-source technologies. Much of the developed software will also be released as open source, and a wide dissemination in the law-enforcement community is encouraged.

Several national and international police organizations are participating in the FIVES project as members of the end-user group. The project is open for any interested law enforcement professional. For participation in the end-user group please contact the project manager below.

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Project Time Line

Project start	User require-ments study	System development	First prototype	System development	End-user tests	Final software
Feb 2009		Aug 2009	Feb 2010		Aug 2010	Feb 2011