

In this issue of LASIE newsletter you will have the opportunity to read about two important milestones reached in the project during 2015:

1. The implementation of the first version of LASIE forensic data processing modules
2. The positive results of the 1st LASIE workshop, held last July in London (UK)

The newsletter provides also information about next dissemination actions planned by LASIE partners in the upcoming months.

LASIE FORENSIC DATA PROCESSING MODULES

During 2015, the first version of LASIE **forensic data processing modules** have been implemented. These tools support automated processing of large amounts of data. More specifically, they consist of advanced media analysis tools that extract relevant information for different types of content (text, audio, images, video, social and biometric data, etc.).

In particular, for the LASIE project, the following modules have been realised:

TEXT processing modules

- **Deep Natural Language Processing (NLP) Analysis module:** extracts semantics of text documents using linguistic analysis, extraction of all entities and their connections, and graph-representation of implicit knowledge. This module will facilitate retrieval of related documents (e.g. police/witness reports, web content, etc.) supporting user queries in natural language, such as “who is involved?” or “where/when did it take place?”.
- **OCR/ICR Content Digitisation module:** performs automatic character recognition. It is applied to cases where there is high availability of scanned documents, as a pre-processing step, in order to extract plain text for further processing.

AUDIO processing modules

- **Speech Analysis module:** performs speaker diarization on audio recordings; segments audio recording into homogeneous speech segment and groups together the occurrences of the same speaker. This module is used for speaker identification. It also performs post-processing on the audio signals extracted by the machine listening module to detect specific keywords covering various languages.
- **Machine Listening Module:** analyses the acoustical environment and contents of a scene, detects and classifies general audio event categories (speech, environmental sounds, music, etc.) but also specific audio events (gun shots, shouts, cries, etc.) which would contribute to abnormal situation detection. This module can also be used for source localisation, i.e. to automatically point some of the cameras to the regions of interest. The module can also process potential phone calls and extract contextual

information such as: indoors/outdoors conversation, number of different voices, emotional state of the voices, etc.

- **Speech to Text Module:** Transcription of the audio signal to text to be exploited by the text processing modules; NLP techniques will be applied for further processing.

IMAGE processing modules

- **Plate Detection Module:** detects automatically a car's plate within an image (or video frame) and segments it. This segmented plate can be used as input to an OCR to extract the plate information for use in querying existing police databases or extract traffic patterns in order to support a hypothesis.
- **Logo Detection Module:** detects logos and trademarks in image and video content and matches with existing logo repositories. This is expected to identify suspects wearing (or holding) clothes (or other products), which were stolen, e.g. during a riot.
- **Face Detection Module:** this module automatically detects (any) faces that exist within images, thus filtering out a significant amount of video footage (where no people/faces exist) and assist in faster examination of video footage by investigators. The outcome of this module can be further exploited for identification (recognition) of suspects that appear in other videos.

VIDEO processing modules

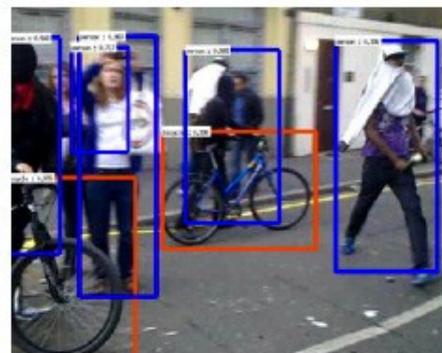
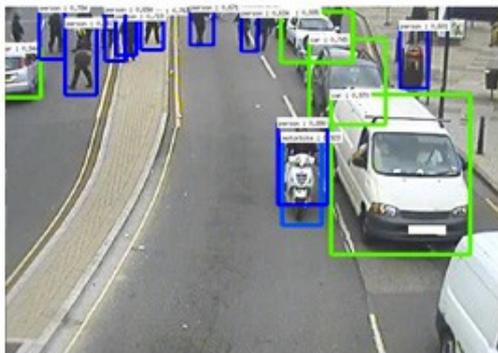
- **DROP Tracking Module:** the name of this module stands for Distinctive Region Or Pattern. This module tracks distinctive objects (colourful parts/regions in clothes/hats or objects that the suspect is holding, logos or tattoos) that will help detect/ identify a person with hidden face. This is expected to be one of the most important tools in image processing aided forensic analysis.
- **People Tracking Module:** tracks automatically people/objects within the Field-of-View of a camera. This module is useful for tasks of people re-identification, i.e. to find the same person (e.g. suspect or missing person) in another video (other location and time).
- **Vehicle Tracking Module:** tracks automatically vehicles based on colour, size, length, width, height, speed, direction. This module is useful for re-identification of vehicles that are involved in a specific crime.
- **Video Summarization Module:** provides the analyst only with interesting parts of the video in order to save time in scanning a huge video database. The module presents to the user either a set of keyframes that correspond to scenes with significant activity or shorter videos eliminating the insignificant scenes.
- **Behaviour/Event Detection Modules:** detects abnormal behaviour, primitive or complex activities, crowd behaviour, fighting, etc. This can assist in performing tasks such as to search within a large database only for specific abnormal activities (e.g. search for violence).
- **Abandoned Object Detection Modules:** detects potentially abandoned objects, e.g. baggage. This module is useful for scanning large video footage to detect potential terrorist activities.

The following images show some examples about how the VIDEO processing modules work.

VIDEO FRAME



EXAMPLE TRACKS



SOCIAL MEDIA and BIOMETRICS processing modules

- **Social Media Processing Module:** collection and filtering of multimodal information extracted from publicly available on-line social communities, such as blogs, Twitter, Flickr, YouTube. An example of use is a case where a person suddenly disappears and the Police searches within social media to identify connections and specific information exchanged (dialogs, posts, images, video recordings).
- **Soft Biometrics Processing Module:** focuses on soft biometric traits that are applicable to LASIE Use Cases, e.g. skin colour, clothes colour that can be extracted from the low-resolution and low-quality video footage. This module can be particularly useful since it can narrow-down the search space, filtering out irrelevant information (e.g. search for suspects that are wearing red jacket and blue trousers).

More information about the modules is available upon request by writing at: info@lasie-project.eu

RESULTS OF 1st LASIE WORKSHOP

The first LASIE public workshop on 'Supporting forensic analysts in digital evidence retrieval and analysis', took place in London last 15-16 July 2015 at the Queen Mary, University of London.

The workshop itself was meant to communicate the project's developments thus far to the end-users and to seek their feedback.

The event was attended by around 30 representatives of law enforcement authorities, expert research institutes, forensic scientists, ethical experts and technology experts from several EU countries (Spain, UK, Italy, Portugal, Estonia, France, Germany, Netherlands, Greece and Lithuania). Seven relevant EU projects, active in the security field, were also represented in the audience.

The workshop was structured in three sessions with the aim to allow attendees to participate in the meeting of major interest and to have the opportunity to share opinions and knowledge with other professionals within the sector:

- **Training session** aiming at informing and increasing awareness of LASIE potential end users.
- The training session was positively evaluated by participants; more than 80% of people attending the session stated that LASIE project met their goal of the first period
- **Roundtable "Ethics vs. efficiency in content extraction for digital evidence"**, whose participation was restricted to only invited EU projects, policy makers and ethical and privacy experts as well as end users in the security field.
- The roundtable session consisted of two parts: the first panel was composed by end-users, i.e. representatives from law enforcement authorities (LEA) with the aim to discuss LEA's respective needs and requirements relating to privacy, personal data protection and ethics.
- The second panel was composed by experts in ethics, privacy, personal data protection and forensics, as well as by policy makers and academics (researchers) working on European projects related to security and surveillance, who have agreed to response to the end-users' statements made in first panel.
- Appreciations regarding the Roundtable session came from the whole audience and all speakers. A public report with the roundtable outcomes, prepared by the Peace Research Institute Oslo and Queen Mary, University of London (both partners of LASIE), is available at the link: http://www.lasie-project.eu/wp-content/uploads/2015/12/Lasie_1st-workshop_Roundtable-session.pdf . Feedback and suggestions are welcome.
- **EU session**, a special session of EU co-funded projects, was organised within the ICDP (Imaging for Crime Detection and Prevention) international conference, devoted to networking and knowledge sharing among relevant EU projects that attended the conference. Participants to the EU session expressed satisfaction about contents discussed and networking opportunities to collaborate with other projects/organisations in the future.

The LASIE consortium considers the event very successful and therefore it will continue its efforts to organize or to take part in similar events in the future.

LASIE UPCOMING EVENTS

LASIE project will be present at the **P-REACT pilots trials** which will be held in Athens (Greece) on 25 February 2016 and in Bologna (Italy) on 31 March 2016. More information about the event is available at: <http://p-react.eu/>

LASIE project will be presented also at the **CBRN conference**, on 15 March 2016, in Brussels (Belgium). More information about the conference is available at: <https://giftforensics.eu/events/>

2nd LASIE workshop will be organised in June 2016 in London (UK), more information will be available soon in the project website: www.lasie-project.eu



LASIE is a project funded by the European Commission. This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement nr. 607480