

25th March 2021

Online Meeting 10:00 – 16:00 CET

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Event Overview

The Innovation – Law Enforcement Agencies’ Dialogue (i-LEAD) project organised “i-LEAD Research Day” to complement the series of 5 online meetings dedicated to Industry that took place in October 2020. Find out more about i-LEAD [here](#).



Over 320 Registrants



Demonstrations,
Presentations & Discussion



9 Research Initiatives and 5
Round Table Participants

Associated Partner



INNOVATION LAB

The Research Day aimed to review the **cross-cutting technologies** relevant to all of the crime domains i-LEAD reviews, specifically, the areas connected to the Practitioner Workshops from 2019/2020. **The Research Day was a supplementary session to the previous [Industry Day](#)** and would have originally run in parallel as a physical meeting but was moved online because of the COVID pandemic.

Focus Areas

- **AI powered by and Machine Learning and Deep Learning**
- **Automation**
- **Decryption**

Executive Summary

The **Innovation – Law Enforcement Agencies’ Dialogue (i-LEAD)** project, consists of a network of police forces and related specialists, funded by the European Commission under the Horizon 2020 Programme - it belongs to a group of Coordination and Support Actions projects.

i-LEAD organised “**i-LEAD Research Day**” to gain awareness of the technologies and innovative solutions under development that promote the functionality relevant to the theme of the event (AI & Decryption).

The event was hosted in association with the **Europol Innovation Lab**. The Lab was created following the JHA Council’s support for an initiative within Europol to monitor new technological developments and drive innovation.

The purpose of this report is to summarise the rationale behind the event, the methodologies used in its organisation, the key lessons learned and finally, the next steps that will be taken by i-LEAD to build on the initiative.

Event Rationale

The event was created to support the output of the [Practitioner Workshop Report](#) (PWR) from 2019, plus the outputs of the Crime Scene Recording workshop at the start of 2020. The PWR identified numerous [gaps](#) and opportunities for improvements in the technology used by Law Enforcement.

Irrelevant of the crime domain, i-LEAD identified several reoccurring requirements that were discussed in each session. They were often worded differently depending on the subject, but the root of the requirement spawned from the same requests:

1. To speed up processes / operations / investigations using artificial intelligence (AI) or machine learning – supported by workflow automation.
2. To decrypt the communications between criminals, allowing officers to gain awareness of the interactions and intentions of organised crime.
3. New techniques and approaches to gain access to encrypted data stored on hardware devices.

In the final quarter of 2020, the i-LEAD team and associated partner, **Europol Innovation Lab**, organised [Industry Days](#)– a series of 5 sessions dedicated specifically to the crime domains in the PWR – **Drug Crime, Digital Forensics, Financial Investment & Virtual Currencies, Crime Scene Recording & Documentation and Public Order**. Rather than repeat the same approach, the organisers decided to focus on the topics that span the crime areas. AI, machine learning and decryption are truly horizontal matters, and we encouraged any related entities to submit their ideas on how concepts and prototypes (not ready-made solutions – TRL 6 or below) that are on the horizon could be exploited to improve policing capabilities in Europe.

The goal of the meeting was to foster cooperation, supporting ongoing dialogue between LEAs and the research market.

As Europol’s Innovation Lab has a mandate from the JHACouncil to enhance innovation and make use of existing structures, they were perfectly suited to support Research Day. Background on the Innovation Lab mandate can be found [here](#).

Work package 3 (WP3) of the i-LEAD project is dedicated to monitoring research and innovation related to security technology solutions. This group was responsible for the work involved in organising and preparing Industry Days. The Polish Platform for Homeland Security led activities, publishing and disseminating the event. Initially, the idea was to hold a physical meeting in 2020 at The Hague, The Netherlands, in association with Hague Security Delta. Due to the COVID pandemic, the event switched to an online meeting and teamed up with the Europol Innovation Lab to run the virtual meeting.

Event Methodology

The event was organised with an agile and pragmatic approach. As this was the **first edition of the i-LEAD Research Day**, the team was open to adjust according to the number of relevant applications that we received. Thus, the organisation started with making an application to present available on the [event's dedicated web page](#).

The organisation team and i-LEAD project partners helped to raise awareness by disseminating the event's details through existing channels and networks such as the **Europol Platform for Experts**, **ENLETS**, and the project's website and social media channels.

As the applications were received, the organisers reviewed how relevant the topics were to AI and Decryption. In parallel, the team analysed whether the event was to run for a couple of hours or if a longer session was needed. However, as the meeting was organised virtually, it was important to keep the agenda fluid and the sessions short.

In the end, the team ascertained that **9 live presentations** of 20 minutes were possible. There was a compromise with the time of the slots; to provide all applicants relevant to the event with an opportunity to present.

Each of the presenters was given dedicated space on the event's website to showcase their other work and broader projects. The aim of this was two fold – to provide the audience with supplementary materials to understand the project and to reduce the time spent on general remarks at the beginning of each presentation, maximising the use of the 20-minute slots.

To supplement the presentations and demos, the team decided that a **Round-Table** session would be a useful tool to discuss and review another horizontal topic that is especially pertinent with AI and innovative technology – **data protection**.

For the applicants that were not successful, we also offered them the opportunity to join the Round-Table discussion if they wanted to provide input.

The event was organised through the Microsoft Teams application. Although the Teams application is not a dedicated webinar tool, the team was happy to use it as the open environment - where all participants are visible, and the numbers of people in the meeting is shown – is conducive to the 'community' feeling i-LEAD wants to foster throughout its network.

As the event's presentation slots were short, the team decided to utilise a **dedicated networking area** separate from Teams for participants to meet and engage each other. [SpatialChat](#) was the application used for the networking sessions.

From the applications received, 9 research projects were selected and invited to present during the live sessions - furthermore, 5 participants took part in the Round Table session.



**RESEARCH DAY
2021**

10:00 – 16:00 CET

10:00 – 10:30 CET	Introductions
10:30 – 12:10 CET	Presentations
12:15 – 12:55 CET	Networking Lunch
13:00 – 13:55 CET	Round Table
14:00 – 15:20 CET	Presentations
15:20 – 16:00 CET	Networking

- 10:30 – 10:50 Locard : NLP
- 10:50 – 11:10 AIT : AI GraphSense Cryptoasset Analytics
- 11:10 – 11:30 MAGNETO : Semantic Engine
- 11:30 – 11:50 NFI : NAND Flash Emulator
- 11:50 – 12:10 MKLAB : AI Visual Analysis
- 12:15 – 12:55 LUNCH & Networking with Q&A Opportunity
- 13:00 – 13:55 'Round Table' : Emerging Technology & Big Data – Ensuring Innovation While Preserving Fundamental Rights and Preventing Algorithmic Biases.
- 14:00 – 14:20 DARLENE : Improving Situational Awareness
- 14:20 – 14:40 PREVISION : Prediction & Visual Intel
- 14:40 – 15:00 ENG : ANITA
- 15:00 – 15:20 Roxanne : Automated Evidence
- 15:20 – 16:00 Networking with Q&A Opportunity

Associated Partner



Presenters

The event began with a brief introduction from the i-LEAD team before moving to a short overview from the i-LEAD coordinator, Patrick Padding. Following this, the session began with two quick introductions before moving to the presentations.

Introductions

Europol Innovation Lab leader, Grégory Mounier – Innovation-lab@europol.europa.eu



Development

- Act as monitor of new technological developments and drive innovation
- Develop common technological solutions for member states in the field of internal security

Cooperation

- Ensure cooperation of all relevant actors
- Avoid duplication of existing structures
- Stronger cooperation with the private sector



Introductions

Presenter

i-LEAD Work Package 2 Leader, Shaun Mallinson UK Home Office – project@i-lead.eu

The main objectives of WP2 are to collaborate with LEA practitioners from European states through five operationally focused themes. Practitioners are invited to:

Define present capabilities

What technologies, processes, methodologies are LEA's using now within their operational environment?

Identify gaps

What are the present challenges LEA's are facing on a day to day basis?

Determine future requirements

What are LEA's requirements that will enable them to enhance their work and contribute to making citizens safer and more secure
WP2 then disseminate findings of the above work to other WPs



Practitioner Workshops

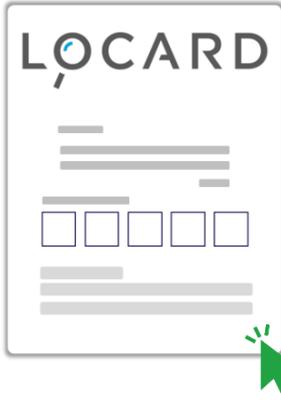
YEAR	PRACTITIONER GROUPS and SUB-GROUP TOPICS (25 WORKSHOPS)					The Practitioner Workshop Matrix
	FrontLine Policing (PG 1) UK	Cross Border (PG 2) Spain	Cybercrime (PG 3) Netherlands	Crime (PG 4) Romania	Forensics (PG 5) Belgium	
2018	Mobility for officers 20 th – 21 st February 2018 UK	People trafficking 13 th – 14 th March 2018 Spain	OSINT 17 th – 18 th January 2018 The Netherlands	Intelligence analysis 13 th – 14 th June 2018 Romania	Emerging DNA Technologies 20 th – 21 st September 2018 Belgium	Delivered
2019	Public order 29 th – 30 th May, 2019 Poland	Drug Trafficking 20 th – 21 st March, 2019 Spain	Financial Investigation 23 rd – 24 th January, 2019 Italy	Digital investigations Held online in July 2020	Digital forensics 10 th – 11 th July 2019 Portugal	Delivered
2020	Vehicle mitigation 18 th November, 2020 Held Online	Firearms trafficking To be held on 10 February, 2021	Cybercrime: CaaS 24 th September, 2020 Held Online	Digital investigations 2 nd July, 2020 Held Online	Forensic crime scene recording 11 th – 12 th March 2020 Belgium	Delivered
2021	Topic TBC 30 June, 2021 Venue TBC	Child sexual exploitation 17 th November, 2021 Venue TBC	Topic TBC 5 May, 2021 To be held online	Topic TBC 22 September, 2021 Venue TBC	Future individualisation techniques 23 March, 2021 To be held online	Scheduled
2022	Police use of firearms	Counterfeit goods	Credit card fraud	Crime prevention	Drug analysis NPS	TBC Oct 2021

Tip – Click on the mini reports to view the content hosted on the event's web page



Presenters

LOCARD - NLP, Constantinos Patsakis – info@locard.eu



Detection of Deviant Online Behaviour

Research and tools for detecting deviant online behaviour from the LOCARD project - mainly focused on NLP.

NLP methods have made huge steps forward and present very good results when handling large chunks of data **BUT** what happens with short messages? Also, when we exchange messages, is it always verbal?

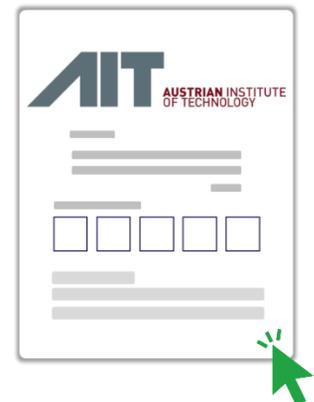
This presentation looked at the work that LOCARD has done to understand the relevance of short messages, text and emoji; particularly connected with grooming of minors and illegal online marketplaces.

AI GraphSense Cryptoasset Analytics, Dr Bernhard Haslhofer – contact@graphsense.info

Open Source Platform to Track Crypto Transactions

What is Cryptoasset Analytics? Where does money come from, where does it go?

In his presentation and live demo, Bernhard Haslhofer presented the GraphSense platform developed by AIT. This included information about the data sovereignty, algorithmic transparency, scalability, the dashboard for investigations and the advanced analysis capabilities of this free open source platform made in the EU.



MAGNETO Semantic Engine, Christian Rabini (MPD), Francisco Pérez (UPV), Dirk Pallmer (IOSB), Krishna Chandramouli (VML), Nikos Peppas (ICCS) Project Coordinator: Dr. Konstantinos Demestichas – cdemest@cn.ntua.gr



Multiple Solutions for Analysis & Reasoning

LEAs must deal with an extremely high amount of heterogeneous data. Magneto has multiple solutions to help:

- Facilitate the management of incoming data
- Offer three pillars of analysis: audio, text & video analysis
- Merge or fuse the results of the three types of analysis
- Cross-correlate results & create hypotheses.

Presenters

NFI: NAND Flash Emulator, Coert Klaver, Nikolaos Toulgaridis (Patras Uni) - coert@holmes.nl

Recovering Data From Encrypted USB Sticks

Organised crime needs to store information; they cannot have it all in their head. Encrypted USB sticks are a common way to ‘safely’ store information on transactions, money, etc. There are no commercial solutions for cracking these types of USB sticks. In the past NFI has successfully attacked some make/model sticks but saw the need for a universal tool to support the attacking of these USB sticks. The result is the universal **NAND Flash emulator**.



DARLENE: Improving Situational Awareness, Dr Nikolaos Dimitriou – nikdim@iti.gr

Deep Augmented Reality Law Enforcement Ecosystem



Motivation:

- Law enforcement officers often face high pressure situations where they are forced to make quick decisions
- Under such circumstances crucial information can be neglected or delivered too late

DARLENE’s Goal

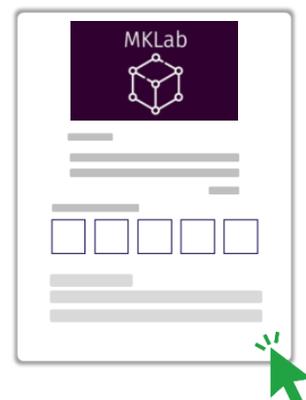
- Machine Learning (ML) and Computer Vision (CV) can analyse real world scenes in real-time
- Augmented Reality (AR) can enhance officers’ situational awareness utilizing virtual graphical elements for real-time presentation of crucial Information

Learn how with the presentation.

Multimedia Knowledge and Social Media Analytics Laboratory (MKLAB) : AI Visual Analysis, Konstantinos Ioannidis - kioannid@iti.gr

MKLAB is a pillar activity within the **Information and Technology Institute** of [CERTH](http://www.certh.gr). The **AI Visual Analysis** work consists of many functions that allow users to **detect and track objects plus smoke and fires from video streams and drones** in real-time. The visual analysis can also provide information on the possible activities of a group. Likewise, it is also used to detect violent behaviour within a crowd.

The results are achievable thanks to AI using deep learning techniques and cognitive information extraction in alignment with other security-related applications.



Presenters

PREVISION : Prediction & Visual Intelligence, Michael Schweer (IfmPt), Md Zia Ullah (CNRS), Axel Kerep (PARCS) - Konstantinos Gountakos (CERTH) gountakos@iti.gr



Extreme-scale heterogeneous data streams processing

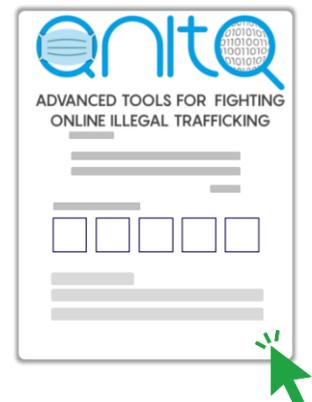
With PREVISION, you are able to execute several key actions:

- Analyse English texts, extract various linguistic features (>60)
- Detect whether two or more online user accounts potentially belong to the same natural person.
- Detect fire-related scenes
- Detect & recognise known human faces compared against the images in a gallery.
- Detect Orphan and Stolen Cultural objects in the fight against illicit trafficking of cultural goods.

ANITA, Ernesto Lamattina, Valentina Mazzonello (ENG) - ernesto.lamattina@eng.it

Innovative knowledge-based user-centred cognitive investigation system

ANITA aims to collaborate with Law Enforcement Agencies to design and develop a novel user-centred investigation platform to discover relevant data sources disseminated on the Web (including Darknet) and analyse, enrich and correlate them with the pre-existing officers' knowledge to support investigations on illegal trafficking activities. Engineering led the presentation and live demo of the ANITA platform. See the presentation for more information.



Roxanne : Automated Evidence, Costas Kalgiros (AEGIS) - ckalog@aegisresearch.eu



Real time network, text, and speaker analytics for combating organized crime.

In 2020, 121 responses were collected from 40 countries highlighting that amount of data to be processed and analysed is the main pain point.

ROXANNE aims to improve this and help to speed up the investigation of large complex criminal cases – providing a Platform to combine evidence extracted from multimodal sources with network analysis with a bi-modal interaction between processing technologies and network analysis. Costas Kalgiros provided a succinct overview during the presentation and live demo.

Round Table Discussion

To break up the presentations, the organising team introduced a discussion to change the dynamic and pace of the virtual meeting. The discussion was still very appropriate as the challenge of data protection and dealing with biases is very real and something research must consider.

The session provided a productive space to discuss and review pertinent topics. The goal was not to provide all the answers, rather create an opportunity to raise relevant matters that are and will impact future innovations.

Emerging Technology & Big Data – Ensuring Innovation While Preserving Fundamental Rights and Preventing Algorithmic Biases

KU LEUVEN

FOR MOBILE

Constella
INTELLIGENCE



EUROPOL

INNOVATION LAB



7 Experts



55 Minutes

KU LEUVEN

Stefano Fantin, Doctoral Researcher in Law and Public Policy

Katherine Quezada Tavárez, Researcher

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<https://www.kuleuven.be/english/>

FOR MOBILE

Denitsa Kozuharova (LIF) & Pieter Gryffroy (Timelex), Legal Experts

FORMOBILE is three year project dedicated producing an end-to-end forensics investigation chain for mobile devices. FORMOBILE creates cutting edge tools, a forerunner to a new standard and novel training for mobile forensics.

<https://www.formobile-project.eu>



Round Table Discussion

Lindsay Whyte, UK Regional Director

Constella Intelligence is an identity intelligence software company built for law enforcement. With proprietary data sets, investigative tools and partners from across the policing and intelligence spectrum, accelerating OSINT investigations into criminal networks, victims and public disorder. Increasing numbers of European intel units are leveraging Constella's Hunter tool to uncover online aliases, surface contextual identity attributes and protect the public with a user-friendly toolkit. <https://info.constellaintelligence.com/2020-identity-breach-report>



Nikolaos Sgouros, Director of Development / AI & Software Solutions

Eight Bells offer closed loop secure communication products, AI powered solutions and services that deliver pre-, peri- and post- operational support for the creation and deployment of robust data models. The middleware solutions offer real time data manipulation of any type with augmented data cleaning and aggregation methods and tools. <https://www.8bellsresearch.com/>



Ruth Linden, Policy Advisor

Ruth works within the lab to make sure the voices of LEAs' is heard at the policy level.



[Europol Innovation Lab Overview](#)

Session Highlights

There was much discussion and many takeaways from the conversation. Although the intention here is not to provide a comprehensive overview, we want to highlight several key points that are of note and could be discussed in more detail in future sessions.

- Among the 'Emerging Technology', audio and visual data pose a unique challenge to law enforcement. Clear direction is required to outline how and when the data can be used and what the scope of investigations can cover. Furthermore, the internet content is prolific; the change in cultural and social interactions provides new challenges in gathering and understanding data. Consider TikTok vs Twitter.
- The security community must be mindful of encryption and the risks it creates – especially with minors and vulnerable members of society.
- Transparency in the technology is critical. If data is gathered and compiled in digital reports, a breadcrumb trail is necessary for audit and general understanding purposes.
- The lawyers and legal teams (judges and prosecutors) must be included in new developments and relevant training, so they better understand the tools and overarching technologies.
- Tools and technologies must be validated and evaluated against biases.
- Industry have to embed data protection and security by design principles and value into their software. For example, the ability to compartmentalise data and processes that can be used in applicable situations.
- If the data and infrastructure are designed and built in the EU, will this provide greater confidence levels in technologies such as facial recognition, CCTV, etc?
- The importance of accountability in producing technology and using tools/frameworks to govern their development. For example, checklist and assessments. (Europol is working on this with the project - *Accountability Principles for Artificial Intelligence (AI) used in the area of Freedom, Security and Justice (Europol)*).

Conclusions & Next Steps

Please note, the presentations and other materials that the presenters have shared are available on the event's [web page](#).

As the Research Day transitioned from a physical meeting planned for 2020, we would like to thank everyone for the patience while the event was organised in a virtual space.

For a first edition, the online event provided a useful overview of what is possible and we encourage all the registrants to provide their [feedback](#) to the event. Even if they were not able to attend, it is helpful to know why.

The team would also like to thank everyone who contributed to the event in some way. That, of course, includes the organising team at the Polish Platform for Homeland Security, the associated partner – Europol Innovation Lab all applicants and presenters, the Round-table participants and those that registered and attended the event.

The nature of the shorter presentations meant that many were left wanting more – this will be considered closely for future events. However, this can also be seen positively as a significant risk of organising online events is that people are disinterested. Moreover, the audience is free to reach out and engage the individual projects and initiatives. During the event, each speaker emphasised that they are happy to discuss their work further.

It is promising to see there are many novel approaches to support LEAs in their work and to match the elicited requirements. However, we can also see that there were fewer projects and initiatives associated with Decryption that applied and were willing to present. This observation could be insignificant, but it can be indicative of the lack of work that has reached a threshold where the team is ready to present their progress.

The modest amount of feedback received thus far highlights that the event was well-received, but the team is also keen to understand where to improve for future events; therefore, [if you have not completed the feedback yet, we encourage you to do so](#).

We encourage LEAs and project partners to help distribute and disseminate this report throughout the respective law enforcement channels. We invite everyone to join the [i-LEAD LinkedIn group](#). Feel free to share comments, literature, information and knowledge that will be beneficial to the network.

We will also be sure to inform those that have shown interest in future events and activities organised by the i-LEAD project.

For more information, feel free to contact i-LEAD at project@i-lead.eu and the Europol Innovation Lab on Innovation-lab@europol.europa.eu.

Thank you for being part of the dialogue.

Innovation - Law Enforcement Agencies' Dialogue



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