CEASEFIRE

Introduction

The EC-funded R&D project **Ceasefire**, a 3-year Horizon Europe Innovation Action launched in October 2022, has been designed to improve the crime-fighting ability of European nations using modern technology. It brings together 21 expert partners from across Europe, including industrial partners, Law Enforcement Agencies (LEAs) and research universities or institutions, while focusing on combatting *firearms trafficking*. Ceasefire is coordinated by the *Centre for Research and Technology – Hellas* (CERTH, Greece).

Ceasefire use-cases

The project is building a system with advanced Artificial Intelligence (AI) and ICT components, focusing on 5 real-world use-cases.

Use-Case #1

Real-time systematic firearms incident and intelligence information collection and exchange.

Develop a near-real-time European-scale firearms incident tracking tool that will also support the efficient intelligence information exchange among the various (types of) LEAs.

Use-Case #2

On-the-spot firearm seizure registration and cross-border data search.

Develop a mobile application to automatically and on-the-spot identify the main characteristics (e.g., brand, model, caliber, location of the serial number, etc.) of a seized firearm at the crime scene), in order to subsequently facilitate automatic search/update of information in relevant (inter-)national databases.

Ceasefire use-cases

Use-Case #3

**Firearms purchase on Dark Web marketplaces.**

Develop tools for automatic analysis of on-line activities, in order to detect and reveal the real identities of individuals engaged in illegal firearms trafficking on darknet marketplaces.

Use-Case #4

Mail order and courier service firearms trafficking detection using scanning technologies.

Develop a tool for automatically detecting illicit firearms, ammunition or firearms components on X-ray scan images of parcels, which have been mailed with legit post and courier services.
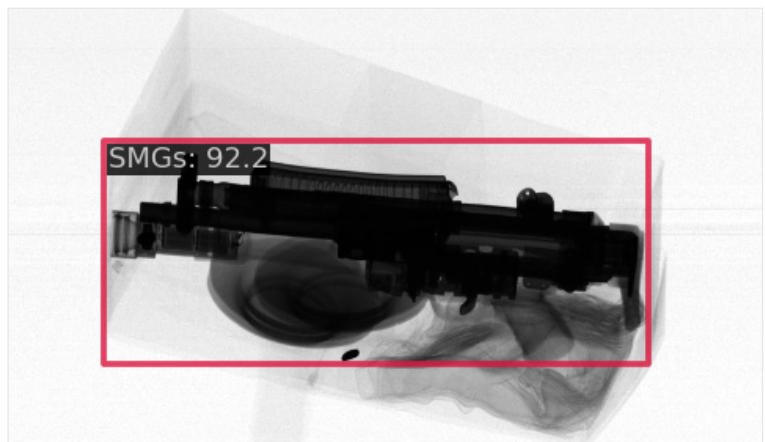
Use case #5

3D-printed firearm blueprints distribution.

Develop tools for automatically detecting and analyzing the on-line distribution of blueprints of 3D-printed firearms.
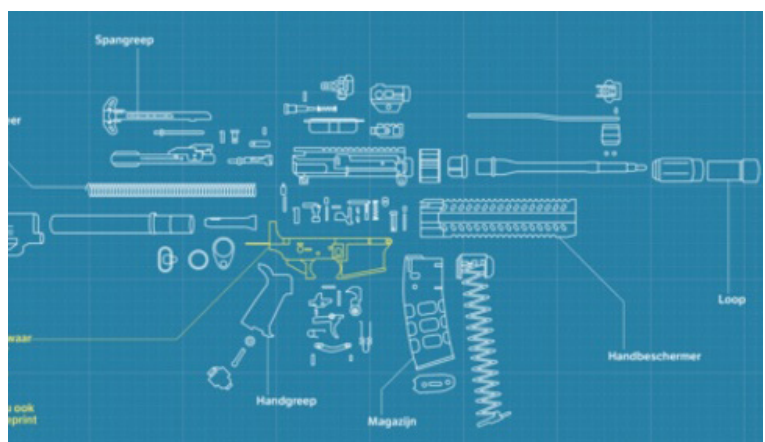
Exchanging ideas and working together

On November 30 - December 1, 2023, the Ceasefire consortium held its **4th physical plenary meeting in Toulouse, France,** organized by the project partner INPT (*Institut National Polytechnique de Toulouse*).

Ceasefire participants shared ideas, assessed their advancements and aligned their actions to propel the continued development of the Ceasefire system. Emphasis was placed on strengthening cooperation and coordinating with the LEA end-users, to effectively address the project's ambitious objectives in combating firearms trafficking through the utilization of advanced Artificial Intelligence (AI), ICT and criminological analysis.

The law enforcement technology symposium

On 8 December 2023, the Ceasefire project was presented at the Law Enforcement Technology Symposium in The Hague, to an audience of law enforcement practitioners and policy-makers.

Ceasefire project coordinator CERTH presented the technological design of the project's applications, which are based on five distinct use cases, and explained their functionality for law enforcement. Project partner TRI (*Trilateral Research*) presented the ethical and legal frameworks underpinning the AI technologies developed, including the European Commission's Guidelines for Trustworthy AI, as well as the EU's AI Act and GDPR. TRI also introduced the work that is being carried out to assess social impact of Ceasefire technologies beyond the end-users. The presentations enjoyed audience interest and a lively discussion afterwards, with questions revolving around both the technical aspects of Ceasefire technologies and the challenges of investigating firearms trafficking.

The 1st online Ceasefire training session for LEAs

The first CEASEFIRE online training session for Law Enforcement Agencies (LEAs) took place on December 12, 2023, focusing on familiarizing end-users with CEASEFIRE's AI-based tools and their application in combatting illegal firearms trafficking. This session, virtually attended by 32 people and organized by project partner IANUS, marked the beginning of a comprehensive series of modules, designed to empower LEAs with the expertise needed to effectively leverage cutting-edge technology in their operations.

Throughout the session, participants gained invaluable insights into the functionalities,applications, and capabilities of CEASEFIRE's advanced tools. Led by the project's technical partners, thetraining provided a detailed overview of the AI-based tools that form the foundation of theCEASEFIRE project, alongside discussions on the ethical and legal considerations surroundingtheir usage.

Attendees had the opportunity to develop a profound comprehension of the functionalities,applications, and capabilities of advanced CEASEFIRE tools, enhancing their awareness of howthese tools

can positively influence law enforcement outcomes. Through guided exploration,they navigated the intricacies of CEASEFIRE's AI-driven technologies, acquiring the skills to seamlessly integrate these tools into their operational frameworks and gaining anunderstanding of the legal and ethical aspects associated with CEASEFIRE's AI-driventechnologies.

The success of this training session underscores the consortium's commitment to equipping LEAs with theknowledge and tools necessary to combat illicit firearms trafficking effectively.

Mining patterns, insights and correlations from an ocean of data

In the ever-evolving battle against illicit firearms trafficking, the Cease-fire project aims to breaknew ground with technologies such as *Large-scale Graph Data Mining* and the *Graph Correlation Engine* (GCE).

The former leverages sophisticated algorithms for the synthesis and structuring of extensive data-sets into a comprehensive database, enabling advanced data analytics for predictive insights. Mean-while, the GCE employs state-of-the-art machine learning techniques, including scoring and clustering algorithms, to extract and visualize complex correlations from vast amounts of data. These tools, devel-oped under the coordination of project partner EXUS, are critical to our platform, combining real-time data aggregation, data pre-processing, and visualization technologies to assist law enforcement agen-cies in identifying and combating firearm-related incidents with higher efficiency.

Charting the Unseen - Large-scale Graph Data Mining

Our world is woven with invisible threads of data waiting to be discovered and understood. Ceasefire's Large-scale Graph Data Mining component serves as a cutting-edge loom, bringing together disparate strands of information from the various tools developed in the project. By synthe-sizing information from various sources and tools devel-oped in the project, this component constructs a compre-hensive database, revealing patterns and insights.
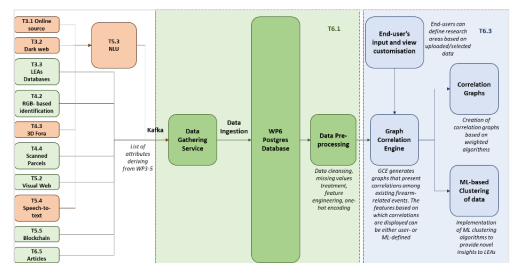
Clarity in Complexity - The Graph Correlation Engine

If knowledge is power, then understanding is the key that turns it. The Graph Correlation Engine developed under the project is that key, unlocking complex correlations with precision and acumen. Utilizing state-of-the-art algo-rithms, this component distils clarity from complex data, allowing for the intricate visualization of networks and trends associated with firearm incidents. This is not just data analysis; it's foresight in the fight against firearms trafficking.
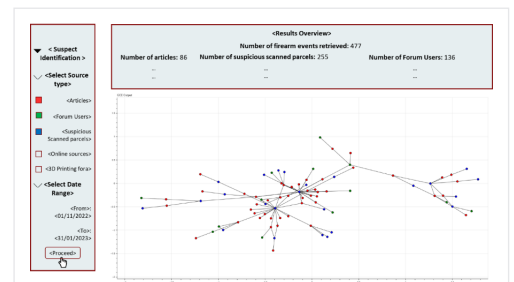
Toward a Safer Society

As these components move from the realm of conception to the frontlines of criminal justice, we stand on the precipice of a new era. An era where the power of AI and the ingenuity of European collaboration converge to create a shield against the shadow of organized crime.

A strengthened European community of stakeholders

Ceasefire is targeting to build a community of stakeholders that are relevant to the project goals and can benefit from each other's results. To this end, an expanded **CEASEFIRE Community** has been built, to facilitate interactions between the project and relevant stakeholders, such as various LEAs, relevant LEA user communities, initiatives or established bodies and other EC-funded projects.

Sister projects are an integral part of the CEASEFIRE Community, since they hold the potential of significant emergent synergies. During the past few months, the following 4 projects have joined the Ceasefire Community:

ARIZONA

ARIZONA is a project sponsored by the VDI (Verein Deutscher Ingenieure. V.) and funded as part of the "Anwender Innovativ II" (User Innovative II) announcement by the "Federal Ministry of Education and Research" (Bundesministerum für Bildung und Forschung – BMBF) of Germany as part of the Federal Government's "Forschung für die zivile Sicherheit" (Research for Civil Security) program. The project kicked off in July 2022 and is estimated to be finished in February 2025. It is a research project of the Innovation Lab (InnoLab) of the Police of Saxony and the University of Applied Sciences Zwickau (WHZ). ARIZONA trains an Artificial Intelligence (AI) system, not with pictures, but with 3D models of weapons and their parts, which are generated by a photogrammetric scan process of real weapons and weapon parts. Then the AI is used in a mobile phone application to identify weapons or which type of weapon the weapon part belongs to. The project goal is to find out if the AI training process with digital 3D models of real scanned weapons gives an advantage compared to using pictures only.

VIGILANT (*Vital Intelligence to Investigate Illegal Disinformation*) is a 36-month, 17-partner Horizon Europe project (including 4 Police Authorities), kicked-off in November 2022 and coordinated by Trinity College Dublin. It aims to equip European Police Authorities with advanced technologies from academia to detect and analyses disinformation that leads to criminal activities. It also has applications in other areas such as detecting and monitoring hate-speech, radicalization, incel content, extremism, and violent separatist, nationalist, or paramilitary movements and terrorism. The VIGILANT consortium includes leading research and commercial partners from across Europe.

VIGILANT Website:
https://www.vigilantproject.eu/

VIGILANT LinkedIn:
https://www.linkedin.com/company/the-vigilant-project/

VIGILANT X/Twitter:
https://twitter.com/EUvigilant

VIGILANT Facebook:
https://www.facebook.com/profile.php?id=100087492975842

A strengthened European community of stakeholders

BAG-INTEL

BAG-INTEL (*Intelligent system for improved efficiency and effectiveness of the customs control of passenger baggage from international flight arrivals*) is a 3-year Horizon Europe Rasearch& Innovation Action that kicked-off on October 2023. The project, which is being coordinated by Legind Technologies A/S (Denmark), is powered by a multidisciplinary consortium of 24 partners from 8 European countries, including industrial players, consultancy and advisory firms, universities and research organizations, ministries, customs and tax and civil authorities. BAG-INTEL is developing a highly effective and efficient AI-based solution that will support customs authorities in the detection and re-identification of suspicious baggage, in order to increase the effectiveness and efficiency of baggage customs control at inland border airports, without increasing the number of human resources.

BAG-INTEL Website:
https://www.bag-intel.eu/

BAG-INTEL LinkedIn:
https://www.linkedin.com/company/bag-intel/

BAG-INTEL X/Twitter:
https://twitter.com/BAGINTEL

Cosmo Port is a three-year Horizon Europe project aiming to revolutionize the detection of illicit goods in logistics using Atmospheric Ray Tomography (ART), combined with advanced machine learning for risk assessment. This novel approach addresses the increasing challenge of efficiently scanning the growing volume of goods and parcels shipped through various logistics channels. The project's ambition is to deploy the first mobile ART solution enhanced with AI/ML for improved material and object classification. Having kicked-off in October 2023, CosmoPort brings together a consortium led by GScan, including prominent partners such as Fondazione Bruno Kessler, various national customs and tax authorities across Estonia, Latvia, Greece, Finland and UK, as well as law enforcement agencies like the Hellenic Police. The project emphasizes collaboration across borders to tackle the challenges of modern logistics and security, setting a precedent in the application of cutting-edge technologies for public safety and customs efficiency.

Cosmo Port Website:
https://cosmoport.ai

Cosmo Port LinkedIn:
https://www.linkedin.com/showcase/cosmoport/

The future

Ceasefire work has accelerated and the integration of the first version of the various AI/ICT system components has already progressed. Since the development of the front-end applications for the five project use-cases is underway, LEA end-users are soon to undergohands-on training sessions on the actual, innovative Ceasefire system tools. Simultaneously, technical improvements are also planned and proceeding along with complementary project activities, such as policy recommendations drafting, legal/ethical monitoring, societal impact analysis, innovation management and results exploitation planning, coordination with external stakeholders (such as EMPACT-Firearms),etc. Thus, the groundwork is being laid for the first round of the project's pilot studies to take place, within the second half of 2024.

Ceasefire links

The CEASEFIRE dissemination channels will host regular updates on these critical aspects:

CEASEFIRE Web site:
https://ceasefire-project.eu/

CEASEFIRE LinkedIn:
https://www.linkedin.com/company/ceasefireproject/

CEASEFIRE Facebook:
https://www.facebook.com/people/Ceasefire-Project/100089862614779/

CEASEFIRE X/Twitter:
https://twitter.com/CeasefireHE

Any relevant stakeholder (LEAs, security-related EU/national/international bodies and initiatives, related EC-funded research projects, SMEs active in security products/services, etc.) are welcome to join the CEASEFIRE community, in order to receive regular updates, news and invitations from the wider security ecosystem!

You can subscribe easily at https://ceasefire-project.eu/community/. All personal information are kept internally within Ceasefire, adhering to the highest privacy standards.