About ROXANNE

ROXANNE advanced data analysis solution, developed following a privacy by design approach, aims to enhance and assist police investigations, while reducing the cost and burden on the society owing to organized criminal activities. In the **ROXANNE** consortium, Law Enforcement Agencies, industry and academia, are joining forces in the fight against organized crime.

The main goal of this project is to develop an interactive platform with AI intelligence that will combine advanced text, speech, and language technologies, along with network analysis all into one platform. The **ROXANNE** project fully complies with the European legal framework and ensures that both privacy and individual rights are well respected. **ROXANNE** aims not only to improve and assist police investigations but also to speed up investigative processes and support LEA decision-making.

Hellenic Police & ROXANNE Project

Despite the COVID-19 pandemic spreading over the globe, ROXANNE project is progressing steadily, imposing all the possible mitigation measures to overcome any drawbacks from the coronavirus outbreak. Since our last newsletter in September 2020, ROXANNE project has successfully virtually conducted the first of the three series Field Test events, demonstrating the first version of the ROXANNE platform's capabilities to more than 90 representatives from the law enforcement, technology experts, policymakers and research community from all over Europe. The ROXANNE platform will help unmask criminal networks and

their members as well as to reveal the identity of perpetrators by combining the capabilities of speech/language technologies and visual analysis with network analysis.

Hellenic Police, as a law enforcement agency as well as a partner of the Roxanne project, is eager to contribute to the application and improvement of technologies that will strengthen both the forensic domain and the fight against terrorism. It is designed for law enforcement agencies (LEAs), therefore it is important that their concerns and requirements, are well represented in the end product - the purpose of the field test is to identify the needs of the end-users. Last September, year after the start of the project, despite the COVID-19 restrictions, all the project partners managed successfully to prepare the first field test. During this test, LEAs had the opportunity to trial the first version of the ROXANNE Platform and provide feedback.

The field test prove that ROXANNE project can benefit the law enforcement agencies by increasing accuracy and saving time in the investigations by providing the crucial information about the perpetrators' identity. The inputs, suggestions for improvements, feedback on the practical applications of the tools in the enforcement environment gathered during the field test were elaborated in close cooperation with the technical partners to provide valuable support in the finalization of the platform development.

Progress in the last 6 months

The first field test of ROXANNE was conducted on 30th of September 2020.

Due to COVID-19 pandemic the first field test could not be conducted physically. Project partner KEMEA provided necessary infrastructure for virtual execution of the first field test. More than 90 individuals representing law enforcement, technology experts and researches from different countries attended this event. The aim of the first field test was to test and question the technologies and solutions proposed during first twelve months of the project, thus assisting the developing team to identify and fix any potential issues. The developed platform was dedicated to demonstrating and evaluate voice and text processing technologies combined with network analysis, and how their employment in the investigation of three cases provided by Prague's anti-drug unit of the Czech police. The demonstration of the first version of the ROXANNE platform's capabilities included an overall presentation of all the technologies based on the scenario proposed by Czech police, covering precisely voice processing, text processing and network analysis. End-user participants evaluated the presented ROXANNE platform's components and proposed their feedback and recommendations for the platform's future development.

The online ROXANNE training platform was also presented at the first field test event. The education tool is based on the MOODLE framework created for theoretical and practical training. The educational process will be formed in training modules, and each module will operate as a micro website.
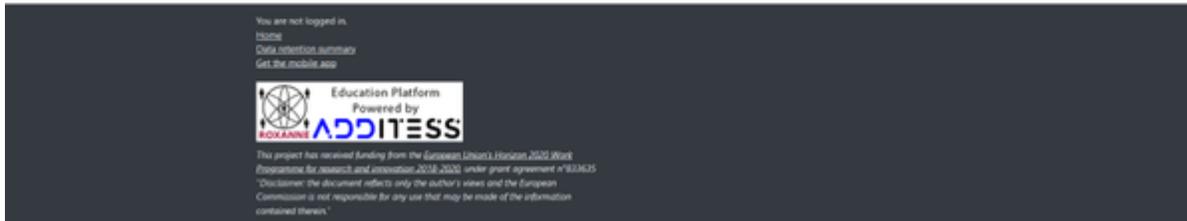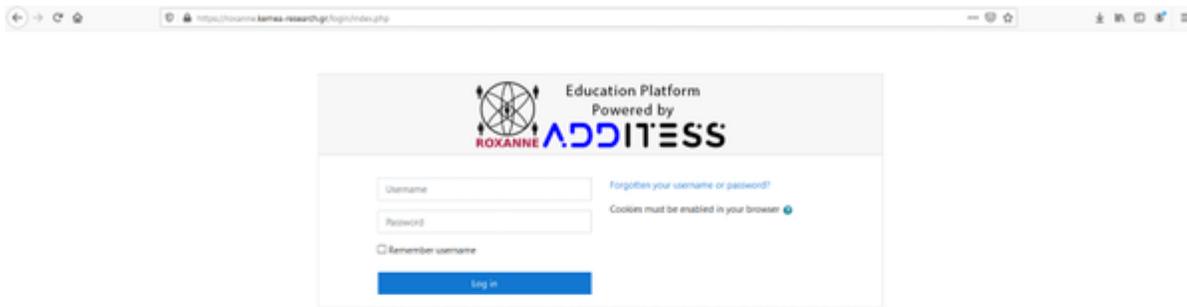
The first version of ROXANNE platform has been already installed by technical partners and LEAs on their premises. All partners will have the opportunity to experience the ROXANNE Platform v.1.

Technical partners continue their research work on video data processing, entity extraction, and interaction of speech/text/video and network analysis. ROXANNE also took the next step towards integrating information across various data sources such as heterogeneous criminal networks. Data integration is technically carried out through the Data Fusion Bus in the ROXANNE framework. We studied state-of-the-art automatic methods for multi-modal data fusion and record linkage and accumulated an overview of criminology approaches to achieve this goal. In this context, we started research on adapting modern graph convolutional networks (GCNs) that will be integrated into the ROXANNE framework.

Other than that, the ROXANNE project is subject to strict ethical and legal requirements imposed by the European Commission. Compliance with these standards is assessed during regular Ethics Checks where external experts evaluate the project work on behalf of the Commission. Following a successful Ethics Check last year, the project has recently submitted documents to update the Commission on its progress. The project partners are dedicating substantial efforts to designing and executing their research activities in line with these requirements and are looking forward to receiving additional feedback from the Commission soon.

Diverse aspects of ROXANNE

The Benefits of Using Automatic Speaker Recognition in LEAs' Investigative Processes

The main benefit of speaker recognition systems is the automation of data processing, which saves a significant amount of time that would be otherwise spent on individual analysis. Traditional manually performed forensic analyses are language-dependent and time-consuming, while automatic speaker recognition systems are fast and language-independent (nevertheless, the role of a forensic expert is still irreplaceable for the presentation of the results). There is also other voice biometric information that can be automatically extracted from a person's voice, such as the gender of a speaker. The bottom line is that current automatic speaker recognition systems, such as the one currently built by the ROXANNE consortium, can greatly improve the analytical work efficiency, enabling law enforcement agencies of any size to investigate faster.

Read more here.

Making Natural Language Processing Work with Limited Training Data

In the ROXANNE project we are solving real-world problems which often do not have a large labelled training set. To overcome such data scarcity problems, we use the combination of distant supervision and noise-robust learning algorithms. Distant supervision serves as a way of obtaining a large amount of labelled data in an automatic manner. Such data is however often noisy so that feeding them directly to DNN models will hinder the learning process. Nonetheless, noise-robust learning algorithms will help the models to focus on the correct instances in the training set so that the models will not be affected much by the noise.

Read more here.

ROXANNE Project and Ethics

Ethics oversight in ROXANNE exists across four levels: the European Commission Ethics Checks; the External Ethics Board; the Internal Ethics Board; and ethics-focused work within the project. The strict oversight that the ROXANNE project is subject to ensures that no standards are violated in the work of the project. The ROXANNE consortium is committed to ensuring that the project is carried out in a responsible way, and that the technologies developed are used in an ethical and lawful manner.

Read more here.

Blogs, articles and publications

Blogs

- Forensic Automatic Speaker Recognition (FASR): Problems and prospects
- Overview of LTEC Voice Databases & ASR System Training
- Ethically developed technologies for safer societies – The ROXANNE project case study
- Link prediction algorithms to enhance criminal network analysis
- Ethics Oversight in ROXANNE

View more ROXANNE news, blogs and media on our website.

Articles

- Organised crime groups fuel a rise in violent crime in the EU
- Secretary General warns of parallel crime pandemic in CNN interview
- EU border agency says biometrics interoperability framework includes robust safeguards
- ROXANNE Project at Nicosia Risk Forum 2020

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Publications

- Experimental Evaluation of Scale, and Patterns of Systematic Inconsistencies in Google Trends Data (Behnen, Philipp & Kessler, René & Kruse, Felix & Schoenmakers, Jan & Zerr, Sergej & Gómez, Jorge. (2020)) [Research Gate]
- Transfer Learning and Distant Supervision for Multilingual Transformer Models: A Study on African Languages (Behnen P., Kessler R., Kruse F., Gómez J.M., Schoenmakers J., Zerr S. (2020)) [Springer]
- Detection of Similar Languages and Dialects Using Deep Supervised Autoencode (Parida, S., Villatoro-Tello, E., Kumar, S., Fabien, M., & Motlicek, P) [ICON 2020]
- Establishing phone-pair co-usage by comparing mobility patterns (Wauter Bosma, Sander Dalm, Erwin van Eijk, Rachid el Harchaoui, Edwin Rijgersberg, Hannah Tereza Tops, Alle Veenstra, Rolf Ypma) [Science Direct]

Collaboration

LEA Cluster coordinated by CC-Driver

ROXANNE has joined a cluster of security projects along with CC-Driver, COPKIT, DARLENE, INSPECTr, PREVISION, PROTAX and RAYUELA.

Read more

Establishing collaboration with LOCARD project

Child sexual abuse and grooming are a real threat for children and young people of all ages and backgrounds. It is a difficult task for any single agency, authority, ministry, or NGO, or company to tackle this problem and require strong cooperation to fight against the same.

ROXANNE is in touch with LOCARD H2020 EU project, a lot of similar requirements and challenges are targeted by both the consortia. Specifically, ROXANNE aims to learn more about recent work published by the LOCARD project on "Large-scale analysis of grooming in modern social networks". The paper is available on Arxiv, and will be soon published on https://www.journals.elsevier.com/expert-systems-with-applications.

Read more here.

Visit ROXANNE's website

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