# <mark>ເບິງ</mark> CounteR

## NEWSLETTER

MAY 2023 | ISSUE #6

## **Editorial**

Dear Readers,

As the CounteR Project successfully entered into its third year of implementation, we are happy to welcome you to the spring edition of our Newsletter!

Issue #6 provides insights from CounteR's fourth technical meeting, conducted in Toulouse, as well as updates from our consortium partners on their participation in major industry events in Barcelona, Athens and Sofia to make targeted promotion of CounteR's goals and achievements. The newsletter continues its digest of the scientific publications, authored by researchers and experts from among our consortium members. The "Special Interview" rubric features ICON's CEO Ian Castillo who talks about CounteR's specific technologic advantages for making Europe a safer place.

Enjoy the newsletter's full text below and do send us your feedback! You can subscribe, and invite your friends to subscribe to the newsletter through filling in your email address in the box, located in the left bottom corner of the homepage.

To make sure that you stay up-to-date with exciting project updates, please follow CounteR on Twitter and LinkedIn.

Sincerely yours, The Editorial Team from El

#### IN FOCUS: "IMAGE RECOGNITION TECHNOLOGY IS COUNTER'S MAIN POWER IN ADDRESSING RADICALISATION"

In an Interview for CounteR's Newsleter, ICON's CEO Ian Castillo reflects on CounteR's main advantages in terms of technology for facilitating the work of LEAs.

Please present your company and the products and services it offers to its clients.

ICON is a highly experienced digital transformation company that works within the financial services and public sectors. We deal with business visionaries to understand what they need to take their offering to the next level and leverage a number of internal specialisations, including business analysis, project management, and technical delivery to bring ideas to market rapidly. Our approach ensures that even the most ambitious ideas can be realised within a short timeframe, market tested, and improved, allowing our customers to realise business benefits sooner than their competition.

(continues on p. 5)



• In March, MSD hosted CounteR's fourth technical meeting in Toulouse (p. 2)

• CounteR Attended the CREST Project's Final Conference (p. 2)

 Presentation of CounteR's scientific and research publications, continued from Issue #5 (p. 4)

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### CounteR's Fourth Technical Meeting in Toulouse

On March 9-10 2023, MSD gathered partners from the CounteR's consortium to the project's fourth technical meeting in Toulouse, France. The demo of the current CounteR Flow and the system's deployment specifications were in the focus of the meeting's first day. Partners from INRIA, CINI, UCSC reviewed the work performed on data acquisition, management, and analytics for detecting radical content; radicalisation taxonomy and ontology; as well as data understanding and NLP analysis.



The next session was dedicated to semantic reasoning and network algorithms with presentations by ELTE, INS, IMG, ICON, and AST. MITLA led a conversation on ethical requirements, IPR management and data privacy, related to the project's exploitation and commercialisation phase. The meeting's pinnacle was about the end-user trainings, the field demonstrations, and the pilots – i.e. WP8.



INS and NOVA led the module on learning and training materials, training sessions, system deployment, and field demonstrations with a focus on users' feedback. During the meeting, El conducted short spot-on video interviews with consortium

members, which will serve as conversation-starters of CounteR's upcoming LinkedIn Cluster Group discussions and online surveys.

More details about the Toulouse gathering are available here and here. 69

## CounteR Attended the CREST Project's Final Conference

IMG and EI represented CounteR in the CREST Project's final conference on 21-22 February 2023 in Athens, which gathered over 40 participants. The CREST conference was organised by the Centre for Security Studies (KEMEA) and included panels on cross-border fights against organized crime and counter-terrorism responses, as well as on presentations of sister projects.



EI and IMG provided an overview of CounteR's goals, objectives and recent achievements – Big Data, NLP, Deep Reinforcement Learning, and Image Analysis. In addition to CounteR, ODYSSEUS, STARLIGHT, CTC, and LAW-GAME were also presented during the conference. All these initiatives are supported through the European Commission's Horizon 2020 Programme for Research and Innovation.



### CounteR Participated in the Mobile World Congress

AST took the initiative to promote the CounteR Project at the world's largest mobile industry event – the Mobile World Congress (MWC), which took place from 27 February to 2 March 2023 in Barcelona. AST has maintained consistent presence at MWC over the past years.



The AST representatives highlighted CouneR's ground-breaking research initiatives, aimed at targeting both LEAs and ISPs and end-users. They also promoted the early-warning tool for detecting radical content, through which end-users will be enabled to act pre-emptively against radicalisation and ensure a safer online environment.

More details about MWC are available here. 😁

## CounteR Interacts with Stakeholders Supporting Victims of Crimes

Together with more than 30 representatives of Bulgarian public bodies working on victimisation, a CounteR Project member from El attended a roundtable discussion, entitled "Victimisation and Victims of Crime: Challenges to Legislators, the Practice, and Society" that took place on 20 February 2023, in Sofia.



The event's agenda included victimisation in cybercrime, as well as protecting groups vulnerable to radicalisation and extremism. El provided a detailed overview of the CounteR Project's goals, objectives, and consortium composition. The participants were briefed about CounteR's scientific publications and its Cluster group on LinkedIn.

The discussion focused on measures for protecting victims of radicalisation and cybercrime, and the innovative methods, used by CounteR to foster cooperation between researchers, tech partners, LEAs, and CSOs.

More details are available here. 😁

#### Highlights from previous editions of CounteR's newsletter:

Issue #5 – an interview with Chief Inspector Minko Pondev from BGP;
Issue #4 – an interview with MITLA's Dr. Michael Zammit Maempel;
Issue #3 – an overview from CounteR's first public webinar;
Issue #2 – a presentation of Imagga Technologies as a consortium member;
Issue #1 – a presentation HfD as a consortium partner.



## SPECIAL PORTFOLIO OF COUNTER PROJECT'S SCIENTIFIC PUBLICATIONS, PART 2

In issue # 6, we continue showcasing the scientific publications and specialised articles, authored by experts and scientists from organisations that belong to the CounteR consortium. The full collection of scientific articles can be found on our website's Publications Section.

## Model-independent methods for embedding directed networks into Euclidean and hyperbolic spaces

#### Authors: Bianka Kovács, Gergely Palla / ELTE

The arrangement of network nodes in hyperbolic spaces has become a widely studied problem, motivated by numerous results suggesting the existence of hidden metric spaces behind the structure of complex networks. Although several methods have already been developed for the hyperbolic embedding of undirected networks, approaches able to deal with directed networks are still in their infancy. Here, the authors propose a framework based on the dimension reduction of proximity matrices reflecting the network topology, coupled



Figure 1: Mapping accuracy on the additional directed real networks of larger sizes.

with a general conversion method transforming Euclidean node coordinates into hyperbolic ones even for directed networks. While proposing a new measure of proximity, the researchers also incorporate an earlier Euclidean embedding method in their pipeline, demonstrating the widespread applicability of our Euclidean-hyperbolic conversion. Besides, the authors introduce a dimension reduction technique that maps the nodes directly into the hyperbolic space with the aim of reproducing a distance matrix measured on the given (un) directed network. According to mapping accuracy, graph reconstruction performance and greedy routing score, the experts' methods are capable of producing high-quality embeddings for several real networks.

Tâches Auxiliaires Multilingues pour le Transfert de Modèles de Détection de Discours Haineux (Multilingual Auxiliary Tasks for Zero-Shot Cross-Lingual Transfer of Hate Speech Detection)

#### Authors: Arij Riabi, Syrielle Montariol, Djamé Seddah / INRIA

The task of detecting hateful content is difficult, as it requires deep cultural and contextual knowledge; the necessary knowledge varies, among other things, according to the language of the locator or the target of the content. However, annotated data for specific domains and languages is often missing or limited.

Langue	immigrants	femmes
Anglais	39.36%	43.75%
Italien	40.66%	40.97%
Espagnol	33.00%	46.04%

## Figure 2: Percentage of hateful examples by language in the training set

This is where data in other languages can be used; but because of these variations, cross-lingual transfer is often difficult. In this article, available in French language, the authors highlight this limitation for several domains and languages and show

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the positive impact of learning multilingual auxiliary tasks - sentiment analysis, named entity recognition and tasks relying on morpho-syntactic information - on the zero-shot cross-lingual transfer of hate speech detection models, in order to bridge this cultural divide. 👸

#### Maximally modular structure of growing hyperbolic networks

Authors: Sámuel G. Balogh, Bianka Kovács, Gergely Palla / ELTE

Hyperbolic models are remarkably good at reproducing the scale-free, highly clustered and smallworld properties of networks representing real complex systems in a very simple framework. Here, the authors show that for the popularity-similarity optimisation model from this family, the generated networks become also extremely modular in the thermodynamic limit, in spite of lacking any explicit community formation mechanism in the model definition. According to the authors' analytical results supported by numerical simulations, when the system size is increased, the modularity approaches one surprisingly fast. 😁



Figure 3: Communities in a PSO network. a) The modules found by the Louvain algorithm, indicated by colour; b) The communities according to the partitioning studied in this paper, consisting of equally sized angular regions

#### Fine-tuning and Sampling Strategies for Multimodal Role Labelling of Entities under Class Imbalance

#### Authors: Syrielle Montariol, Étienne Simon, Arij Riabi, Djamé Seddah / INRIA

In this article, the authors propose their solution to the multimodal semantic role labelling task from the CONSTRAINT'22 workshop. The task aims at classifying entities in memes into classes such as "hero" and "villain". The authors use several pre-trained multi-modal models to jointly encode the text and image of the memes, and implement

three systems to classify the role of the entities. They propose dynamic sampling strategies to tackle the issue of class imbalance. Finally, they perform qualitative analysis on the representations of the entities. 👸



Figure 4: In this meme, the OCR is: "WEARS A MASK THE SAME WAY\nEXIT\nHE HANDLES THE\nPANDEMIC \nmakeameme. org\n". There are two entities, "Donald trump" labelled as villain and "mask" labelled as other.

#### TRA-I and radicalisation processes: current considerations and future perspectives

Authors: Barbara Lucini / UCSC

In recent years, with the advance in Europe and the United States of more or less organised forms of extreme right-wing extremism and white supremacism, the Terrorism Risk Assessment Instruments (TRA-I) have been the subject of renewed reflection with respect to their adaptive capacity, resilience and effective assessment of the multiple and varied paths of radicalisation that are being witnessed. Find out more in Barbara Lucini's text, published in English in the ReaCT2022 Report/2022, page 66. 💏

#### **RA-I e i processi di radicalizzazione: considera** oni attuali e prospettive future

Barbara Luci

ITSTIME, Università Cattolica, Ricercatrice S

act utimi anni, con l'avanzare in Europa e negli Stati Uniti di forme di estremismo più o meno organizza rematismo bianco, i Terrorism Risk Assessment Instruments (TRA-I) sono oggetto di una nuova r apacità adattativa, di resilienza e di valutazione efficace dei molteplici e variegati percorsi di radicalizz zato di estrema d riflessione rispe izzazione recenti

agency Approach, TRA-I, Terrorism



calizzazione che è avvenuto e rivolgono fattori spesso legati al passato criminale già presente o radicalizzato.

Questo è un aspetto importante perché colloca que ■ chi oli martice religiosa isia-mica coccrsi li particolare in Eu-tropa, le agenzie di sicurezza dei potenziale recidiva, ma riferendosi ad un percorso ( vari Paesi hanno iniziato a svi-definito e noto. luppare strumenti per la valuta-lone del rischio e della nuoval i radicalizzazione sono meglio delineati e possono ( minaccia. TRA I. Tarentem Birk danses anter anter anter alla luce di eventi estremisti che già s

I TRA-I – Terrorism Risk Assess- no occorsi e sono stati stabiliti dall'autorità giudiziaria It Instruments – sono ii prodotto operativo di quell'e-ti Instruments – sono ii prodotto operativo di quell'e-nza e delle sottostanti riflessioni, sviluppati con lo so di poter megio valutare la minaccia rappresentata i come propaganda, reclutamento e finanziamento.

Figure 4: A screenshot from Dr. Lucini's publication, in Italian

#### Generalised popularity-similarity optimisation model for growing hyperbolic networks beyond two dimensions

#### Authors: Bianka Kovács, Sámuel G. Balogh, Gergely Palla / ELTE

Hyperbolic network models have gained considerable attention in recent years, mainly due to their capability of explaining many peculiar features of real-world networks. One of the most widely known models of this type is the popularity-similarity optimisation (PSO) model, working in the native disk representation of the two-dimensional hyperbolic space and generating networks with small-world property, scale-free degree distribution, high clustering and strong community structure at the same time. With the motivation of better understanding hyperbolic random graphs, the authors hereby introduce the dPSO model, a generalisation of the PSO model to any arbitrary integer dimension d>2. The analysis of the obtained networks shows that their major structural properties can be affected by the dimension of the underlying hyperbolic space in a non-trivial way. The authors' extended framework is not only interesting from a theoretical point of view but can also serve as a starting point for the generalisation of already existing two-dimensional hyperbolic embedding techniques.



Figure 5: Layouts of networks generated by the dPSO model in 2- and 3-dimensional hyperbolic spaces of curvature K.

## **IN FOCUS** "Image Recognition Technology is CounteR's Main Power in Addressing Radicalisation"

#### (from p. 1)

#### Why is ICON participating in the CounteR project: what impacts does your involvement in a H2020-funded project bring to your company?

It's an honour to work on such an interesting and important project. We believe very much in purposeful work and seek to understand the wider societal benefits of our customers' missions – it drives us to deliver the best possible results. This project not only improves our portfolio from a skills perspective (working with AI, data analytics and visualisation) but it adds an important social factor which we thrive on – in this case, creating a safer society.

#### In your perspective, how will CounteR this contribute to a safer Europe?

Law enforcement's ability to adapt to the realities of social media is critical in a world where ideas spread faster than ever before. It's no longer a question of having enough people on the force to patrol problem areas or locations but about leveraging tools that can understand and identify threats as they happen online. Hopefully this will not only lead to law enforcement agencies preventing crime, but also giving wider society an understanding of how to address radicalisation in general.

## What are your organization's specific roles in CounteR?

ICON has worked on a number of technical aspects on CounteR, including business analysis and requirements gathering where we helped extract precisely what Law Enforcement Agencies were after from the functionality of the tool. We also provided user interface design for the tool itself, as well as powerful visualisations allowing end users to make sense the data gathered. Finally, we worked with other technical partners who devel-



oped the tool to deliver quality assurance, ensuring that the tool meets the high standards we're setting.

ICON and MITLA hosted CounteR's consortium meeting in Malta in September 2022. What are your key takeaways from the interaction with the project partners?

There were many, but one particular aspect that comes to mind was the power of our image recognition technology and how accurately we're able to review images for harmful content at scale. This is where the power of CounteR can be instrumental in addressing the threats of radicalisation online.



lan Castillo is co-founder and CEO of ICON, a leading digital transformation provider based in Malta. Ian brings over 25 years of tech leadership experience. He has led major rollouts in the health, transport, and financial services sectors, focusing on rapid, benefits-driven digital transformations. Ian has also been involved in the inception and growth of a number of tech start-ups, including fast-growing ebo.ai, a provider of Al-powered customer engagement solutions.



ICON Studios is a digital transformation specialist, based in Malta with a key focus on rapid go-to-market solutions. The ICON team helps their customers materialise their vision rapidly using experienced business and tech delivery teams combined with the best software solutions. ICON is a key technical partner in CounteR's Consortium.

## Stay Tuned to Newsletter's Issue #7!

Our next newsletter will focus on the industry webinars, thematic discussions and online surveys, planned for the next phase of project implementation. A series of insightful videos featuring prominent consortium members will be released soon to inform and guide the upcoming online interactions with radicalisation prevention stakeholders from across Europe...



## **CounteR Consortium**



ASSIST Software SRL, Romania



INSIKT Intelligence, Spain



Imagga Technologies LtD., Bulgaria



ICON Studios Ltd., Malta



Consorzio Interuniversitario Nazionale per l'Informatica, Italy







Eötvös Loránd University, Hungary







Malta Information Technology Law Association, Malta



European Institute Foundation, Bulgaria



Association les Militants du Savoir, France



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Elliniki Etairia Tilepoikinonion kai Tilematikon

## Forthnet





#### Hochschule für den öffentlichen Dienst in Bayern Fachbereich Polizei

Hochschule für den öffentlichen Dienst in Bayern, Germany





Valsts policija



Serviciul de Protectie si Paza, Romania



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Ministère de l'intérieur/ direction générale de la sécurité intérieure, France



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