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UNVEILING TRUTH IN MULTIMEDIA DATA:

Exploring AI from Legal and Technical Perspectives

Wednesday, June 26th 2024

Parador de Baiona, Spain

About the UNCOVER session

Unveiling Truth in Multimedia Data: Exploring AI from Legal and Technical Perspectives

An Endorsed Event by UNCOVER

Baiona, Spain. June 26th, 2024

14:20-15:30	Plenary Talk: "Image-Based Evidence in International Criminal Prosecutions: Charting a Path Forward," by Jonathan W. Hak (Leiden University)
15:30-16:00	Coffee break
16:00-17:30	**Round Table** "Navigating the AI Frontier: Challenges in Multimedia Forensics and Steganalysis" **Panelists:** • **Industry Representative:** Matthias Kirchner (Kitware Inc.) • **Government Agency Representative:** Ralf Zimmermann (ZITiS) • **Legal Representative:** Jonathan W. Hak (Leiden University) • **Academia Representatives:** Mauro Barni (University of Siena) & Patrick Bas (CNRS) **Moderator:** • Luis Pérez Freire (Gradiant)

About the Plenary Talk:

Image-Based Evidence in International Criminal Prosecutions: Charting a Path Forward

ABSTRACT

We are confronted daily with images of war, conflict, and crime. These images frequently exist in the largely unregulated open source environment where legitimate images compete with the triple threat of AI generated synthetic content, deepfakes, and shallowfakes. How can viewers know what images to trust? Pictures do not speak for themselves and frequently require technical and interpretive assistance. Questioning the authenticity and reliability of image-based evidence is an essential step in gaining an informed understanding of what propositions images may support. Image-based evidence can be extraordinarily valuable in the search for the truth, but the current approach to this evidence is fundamentally inadequate for truth seeking purposes. The use of image-based evidence in international criminal prosecutions is at a tipping point. This presentation will look at the challenges posed by images and steps that must be undertaken to use them more effectively. The focus will be on legal and practical considerations for the use of this evidence in criminal investigations and the courtroom.

PHOTO CREDITS: JONATHAN W. HAK

SPEAKER

Jonathan W. Hak, Leiden University

Dr. Jonathan W. Hak KC is a barrister and solicitor who served as a Crown Prosecutor in Canada for over thirty years. He has extensive experience prosecuting serious and violent crime and utilizing image-based evidence in complex cases. He is an international imagery law lecturer who teaches extensively in the UK, US, Canada, Singapore, and Europe on the legal and practical considerations involved in the effective use of image-based evidence in criminal prosecutions. Jonathan holds a Diploma in Criminal Justice (Mount Royal University), a BSc (with distinction) (California State University), an LLB (University of British Columbia), an LLM (University of Cambridge), and a PhD in Law (Leiden University). The focus of his recent PhD work is on the use of non-textual evidence in international criminal prosecutions. He is the author of Image-Based Evidence in International Criminal Prosecutions: Charting a Path Forward (Oxford University Press, 2024). Jonathan was appointed Queen's Counsel in 2006.

About the Roundtable:

Navigating the AI Frontier: Challenges in Multimedia Forensics and Steganalysis

INDUSTRY REPRESENTATIVE:

SPEAKER

Dr. Matthias Kirchner, Kitware Inc.

Dr. Matthias Kirchner is a principal engineer on Kitware's Computer Vision Team located in Clifton Park, New York. He is an expert in the field of media forensics and brings more than 15 years of experience and domain knowledge into research collaborations at the intersection of computer vision and forensics. Some of his key projects at Kitware include DARPA MediFor, where he worked on various aspects of image sensor attribution and verification. Currently, his main focus is on the DARPA SemaFor program, which seeks to develop innovative semantic technologies for forensic media analysis. Prior to joining Kitware, Dr. Kirchner was an assistant professor in the Electrical and Computer Engineering Department at Binghamton University. He has also worked with the IT Security Research Group at the University of Münster, Germany, and the International Computer Science Institute (ICSI) in Berkeley, California. Dr. Kirchner received his degree in computer science from Technische Universität Dresden in Germany for his pioneering work on counter-forensics.

About the Roundtable:

Navigating the AI Frontier: Challenges in Multimedia Forensics and Steganalysis

GOVERNMENT AGENCY REPRESENTATIVE:

SPEAKER

Ralf Zimmermann, Dr. Engineer, ZITiS

Dr. Ralf Zimmermann is the head of research in cryptanalysis at the Central Authority for Information Technology in the Security Sector (ZITiS) - a governmental agency founded by the German Ministry of the Interior and Community (BMI) in 2017, which serves Germany's security authorities with research and development in digital forensics, lawful interception, cryptanalysis and big data analysis. Before taking up his current position, he worked at the Forensics Science Institute of the German Federal Criminal Police Office (BKA) and joined the ZITiS establishment team in 2017 to provide technical and scientific expertise. Ralf has a strong scientific background, holding a Diploma in computer science and a PhD in electrical engineering with the focus on applied cryptanalysis, and gives university lectures as well as trainings for the LEA community.

About the Roundtable:

Navigating the AI Frontier: Challenges in Multimedia Forensics and Steganalysis

ACADEMIA REPRESENTATIVES:

SPEAKER

Mauro Barni, Professor, University of Siena

Dr. Mauro Barni is a leading expert in electronic engineering and information security. He earned his doctorate in informatics and telecommunications in 1995 and has dedicated over two decades to research in this field. Professor Barni's career has spanned prestigious universities in Florence and Siena, Italy, where he currently holds a full professorship. His research interests lie in applying digital image processing techniques to copyright protection through digital watermarking and multimedia authentication (multimedia forensics). Beyond watermarking, Dr. Barni has explored innovative areas like processing encrypted signals without decryption and delving into adversarial signal processing and machine learning. His impactful research is evident in his extensive publication record, with over 350 papers and an impressive H-index of 63. He has also co-authored a book and edited another, demonstrating his commitment to knowledge sharing. Dr. Barni's achievements extend beyond publications. He holds patents in digital watermarking and anti-counterfeiting technology, and his expertise has been recognized through prestigious awards, including the IEEE Signal Processing Magazine Best Column Award.

SPEAKER

Patrick Bas, Dr.-Ing., Research Director at CNRS

Dr. Patrick Bas received his Electrical Engineering degree from the Institut National Polytechnique de Grenoble in 1997 and his Ph.D. in signal and image processing from the same institution in 2000. He co-organized the BOWS-2 watermarking contest in 2007, as well as the BOSS and Alaska steganalysis contests in 2010 and 2019, respectively.Dr. Bas served as an associate editor for IEEE Transactions on Information Forensics and Security from 2013 to 2016 and again since 2019. He has also been involved in organizing several conferences on data-hiding, including Information Hiding in 2010 as communication chair, IH-ACM Multimedia Security in 2016 as co-general chair, and the IEEE Workshop on Information Forensics and Security in 2017 as program chair.

About the Roundtable:

Navigating the AI Frontier: Challenges in Multimedia Forensics and Steganalysis

MODERATOR

SPEAKER

Luis Pérez Freire, Dr. Engineer, CEO of Gradiant

Luis is a telecommunications engineer with expertise in watermarking, security, and multimedia processing. After his PhD in Telecommunications Engineering from the University of Vigo in 2008, he gained experience in research and development through positions at universities and companies in the US and France. For instance, he conducted a research stay on Digital Watermarking at the University of Illinois and worked as a postdoctoral researcher at Thomson R&D developing multimedia protection technologies. He has a strong publication record and holds patents in his field which have led to the creation of technology startups. Since joining Gradiant in 2009, he has risen through the ranks to become Executive Director, the position he has been holding since 2015. He is also a member of the executive board in several industrial organizations related to innovation and technology at national and European level.

About UNCOVER

Criminals and terrorists use more and more data hiding methods (steganography) for concealing incriminating information in innocent-looking digital media files such as images, video, audio, and text files. The main objective of UNCOVER is to fill existing gaps in the ability of Law Enforcement Agencies (LEAs) for detecting the presence of such hidden information (i.e., steganalysis). The partners of UNCOVER are committed to substantially increase the technological autonomy of LEAs in the field of digital media steganalysis. With its consortium of 22 partners including LEAs, forensic institutes, leading researchers working at universities and research institutions, as well as industrial companies, UNCOVER sets out to outperform available steganalysis solutions in terms of performance, usability, operational needs, privacy protection, and chain-of-custody considerations.

PROJECT **OBJECTIVES**

CONDUCT a detailed analysis about the various aspects of the needs and requirements of LEAs for detecting and investigating steganography.

CONSOLIDATE relevant information about existing steganographic tools and centralise this information in an intuitive database for LEAs.

IMPROVE existing methods for operational steganalysis in digital media workflows.

IMPLEMENT a flexible and interoperable platform for the integration of steganalysis detection tools.

DEMONSTRATE the steganographic detection capabilities with realistic test cases and scenarios.

ENSURE the obtained results are admisible in European court rules.

PROVIDE a comprehensive training program for LEAs and forensic institutes by providing in-house training.

DISSEMINATE outcomes, communicate the project and prepare an exploitation and sustainability plan.

PROJECT FACTS

Duration
39 Months

Horizon 2020
SU-FCT02-2020
Research and
Innovation Action

REFERENCE
101021687

Coordinator
ROYAL MILITARY ACADEMY
(Belgium)

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101021687.