May 21, 2024

Giuseppe Cascavilla

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Job Position

TU/e Eindhoven   **Eindhoven, Netherlands**
University Teaching Qualification process   *Jun 2023*
I received the Teaching Qualification (UTQ), the Dutch Abilitazione Scientifica Nazionale.

TU/e Eindhoven - Jheronimus Academy of Data Science 's-Hertogenbosch, Netherlands
Tenured - Assistant Prof.   *2022–NOW*
My research interests lie in cyber threat intelligence and cybercriminal activities monitoring in the surface-deep-dark web. IoT technologies for the protection of cyber-physical spaces. User profiling from social media activities.

TU/e Eindhoven - Jheronimus Academy of Data Science 's-Hertogenbosch, Netherlands
Tenure Track   *2020–2022*

TU/e Eindhoven - Jheronimus Academy of Data Science 's-Hertogenbosch, Netherlands
Postdoctoral Fellow   *2018–2020*

Education

Sapienza - Universitá di Roma   **Rome - Italy**
Doctor of Philosophy   *2014–2017*
Privacy issues in Online Social Networks

VU University of Amsterdam   **Amsterdam - Netherlands**
Master's Degree   *2010–2014*
SocialSpy: Browsing Supposedly Hidden Information in Online Social Network

Universitá di L'Aquila   **L'Aquila - Italy**
Master's Degree   *2010–2014*
SocialSpy: Browsing Supposedly Hidden Information in Online Social Network

Universitá di L'Aquila   **L'Aquila - Italy**
Bachelor's Degree   *2003–2009*
Study of Zenoss application and reporting tool JasperReport

G. Checchia Rispoli   **San Severo (FG) - Italy**
High school diploma   *1998–2003*
Emphasis on sciences

Ph.D thesis

title: *Privacy issues in Online Social Networks*

supervisor: Prof. Luigi Vincenzo Mancini

co.supervisor: Prof. Mauro Conti

description: Discover privacy and security issues in online social networks.

Master thesis

title: *SocialSpy: Browsing Supposedly Hidden Information in Online Social Network*[1]

supervisors: Prof.ssa Patricia Lago, Prof. Giuseppe Della Penna, and Prof. Mauro Conti

description: Discover leakages in social network having like a target Facebook. The target of this research is to discover the weakness of Facebook.

Research

My primary focus revolves around researching and monitoring cybercriminal activities across the surface, deep, and dark web. My aim is to enhance existing investigation techniques to apprehend criminals and combat illicit activities effectively. Furthermore, I am dedicated to developing innovative tools and methodologies for analyzing vast amounts of data, enabling the identification of criminal trends and behaviors.

In addition to my work in cybercrime, I am deeply committed to protecting cyber-physical spaces from potential attacks and illicit activities, with a particular focus on exploring the security of IoT devices. Through careful analysis of user profiles obtained from social media activities, my goal is to uncover valuable insights into potential criminal behaviors. This enables me to predict and proactively mitigate such behaviors, contributing to a safer digital environment.

Furthermore, I am actively engaged in the exploration of personal emotions, seeking to deepen our understanding of human experiences. By delving into this area, I aim to shed light on the intricate nuances of emotions and their impact on various aspects of our lives. This endeavor ultimately enhances our comprehension of human behavior and related activities.

- Cybersecurty;
- Cyber Threat Intelligence;
- Deep and Dark web;
- Big Data Analsysis;
- IoT;
- Protection of cyber-physical spaces;
- Social Network Analysis;
- Open Source Intelligence;
- (Re)identification of personal emotions;
- User profiling;

Teaching

TU/e - JADS	**NL**
Course Coordinator and Lecturer	*2020 - NOW*
Data Forensics course	
TU/e - JADS	**NL**
Course Coordinator and Lecturer	*2021 - NOW*
Cybersecurity course	

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[1] In https://link.springer.com/chapter/10.1007/978-3-319-17127-2_6

| **TU/e - JADS** | **NL** |
| *Master Thesis Supervision* | *2018 - NOW* |

TU/e - JADS	**NL**
Professionl Education Lecturer	*13/12/2019*
NoSQL	

TU/e - JADS	**NL**
Professionl Education Lecturer	*29/11/2019*
NoSQL	

TU/e University of Eindhoven	**NL**
PDEng Lecturer	*28/1-1/2/19*
Machine Learning course introduction	

Liceo Scientifico E. Fermi	**Padova**
Substitute Teacher, IT	*01/18–02/18*
Computer science for high schoool	

University of Padova	**Padova**
Teaching Assistant	*04/14–06/14*
Database course for bachelor degree.	

Theses Advising/Co-Advising

- **The applicability of a hybrid framework for automated phishing detection** - R.J.van Geest - Jheronimus Academy of Data Science [in Computers & Security 2023]

- **Trajectory Prediction And LocationMeasurement In A Multi Sensor System** - Tom van der Wielen - Jheronimus Academy of Data Science [in IEEE BigData 2023]

- **Unsupervised Labour Intelligence Systems: an Exploitation Detection Approach and Its Evaluation** - Davide Carnevale - Jheronimus Academy of Data Science [in SummerSOC 2022];

- **Prototyping dark web cyber threat intelligence systems; a design science approach** - Michiel Jan-Willem Hessels - Jheronimus Academy of Data Science;

- **Protecting large-scale Enterprise Resource Planning Systems from second-stage Impersonation Attacks An automated approach and its evaluation** - De Kok, B.L.P. - Jheronimus Academy of Data Science;

- **IoT attack analysis using semi-supervised clustering** - Reinier Bastiaan Willem Zwart - Jheronimus Academy of Data Science [in IEEE BigData 2022];

- **Violence Detection: A Serious-Gaming Approach** - Stan Ruessink - Jheronimus Academy of Data Science [submitted in ACM TIST];

- **Illicit Darkweb Classification via Natural-Language Processing** - Theodora Tzagkaraki - Jheronimus Academy of Data Science [in Secrypt 2022];

- **A computer vision approach to simulating terrorist scenarios** - Johann Slabber - Jheronimus Academy of Data Science [in AVI 2020];

- **Illicit Content Recognition with Few Images** - Dimosthenis Mellios - Jheronimus Academy of Data Science [in Secrypt 2023];

- **Anomalous Scene Recognition Through the Internet-of-Things: a Data-Fusion Approach** - Simone Ladisa - Jheronimus Academy of Data Science;

- **Classifying Online Illegal Activities in the Dark Web** - Martijn Keizer - Jheronimus Academy of Data Science [in ICSME 2022]

- **Detection and Distance Estimation of Traffic Lights and Traffic Signs in Monocular Recordings for Road Asset Management** - Levi Portier - Jheronimus Academy of Data Science

PhD students Supervision

- **Alessia Libertucci** - November 2023 - NOW

- **Corrado Pellegrino** - November 2023 - NOW

Author Profile Metrics

- **Scopus:** Citations 140 | Documents 21 | H-Index 6

- **Google Scholar:** Citations 257 | H-Index 7

- **DBLP:** https://dblp.org/pid/147/5165.html

Organization Committee Participation

1st International Workshop on Big dAta aNalysis anD Illicit Trends - BANDIT   *2023*

First SWForum.eu Workshop on Trustworthy Software and Open Source   *2021*

Reviewer For International Journals and Conferences

[J1] Ad Hoc Networks - Elsevier (Q1);

[J2] Computers & Security - Elsevier (Q1);

[J3] Journal of Cybersecurity - Oxford Academic (Q1);

[J4] Journal of Engineering and Applied Science - Springer;

[C1] IEEE BigData - Special Session PSBD;

[C2] Program Committee EASE 2024 Short Papers, Vision and Emerging Results

Developed Tools

SENSEI: In the context of ANITA project I collaborated on the developing of the tool SENSEI[2].

Machine Learning: In the context of VISOR project I developed an object recognition tool.

Analysis tool: The tool includes multiple analyses from Topic Modelling to Word Clouds, Bigram, Trigram Models, t-SNE Clustering Chart, and Topological Analysis (GitHub Repo).

OSSINT: the tool extends SocialSpy and retrieves personal private information of a victim user like hometown, current city, school in Online Social Network.

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[2]Vimeo Tutorial

DUIL: detects those users responsible for information leakage that occurs through comments posted on news articles in a public environment.

SocialSpy: the tool can retrieve a private friends list of a victim user in Online Social Network.

Projects

Marit-D, WP leader. The project aims to develop an actionable toolkit to support en-field LEA officers in improving target-oriented searches of the maritime domain. Internal Security Fund - police programme, grant agreement nº 101114216.

DReSC - **Digital Resilience in Supply Chain,** WP leader. First, DResC aims to identify cyber-security risks within supply chains. Second, DReSC designs appropriate interventions based on real-world cases to strengthen weak links. Third, gain-sharing mechanisms to encourage supply chain partners to bolster themselves against cyberattacks.

PRoTECT[3], <u>WP Leader of WP3</u>. Is a H2020 project that aims to strengthen local authorities' capabilities in Public Protection by implementing an overarching concept where tools, technology, training and field demonstrations will lead to situational awareness and improve direct responses to secure public places pre, in, and after a terrorist threat. In the context of PROTECT I played a key role as main investigator on behalf of the JADE Lab. and as work package leader, I coordinated all the tasks and developed our research. Internal Security Fund – Police. Under Grant Agreement nº 815356.

ANITA[4], <u>Principal investigator (PI) for the project</u>. ANITA is an H2020 project, and it aims at improving the investigation capabilities of LEAs by delivering a set of tools and techniques to efficiently address online illegal trafficking of counterfeit/falsified medicines, NPS, drugs, and weapons. As main investigator, we developed a trend analysis tool and a crawler. The trend analysis tool extracts useful insights and statistical information from the Deep and Dark web HTML pages. While the crawler is in charge of making an offline copy of Deep and Dark websites. ANITA Grant agreement nº 787061

SENTINEL, Protecting migrants against labour exploitations. The aim of the project is to develop a data-driven monitor that addresses victims of labor exploitation as one of the specific types of human trafficking.

CRIMSON, The CRIMSON project aims to enhance the security systems of the Rotterdam harbor. As investigator, I have to provide new methods, tools, and techniques to intercept, avoid, an mitigate the shipment of illegal goods i.e., drugs, armies, and NPS.

VISOR[5], Main investigator at VISOR project that focuses on the analysis, detection, and prediction of the behavior of large crowds. VISOR is set up from end-to-end to protect an individual's privacy according to the very strict General Data Protection Regulation (GDPR). I developed a machine learning tracker tested during the PaasPop event in collaboration with Dutch LEAs.

EU Marie Curie, PhD researcher

Computer skills

Kali linux: good knowledge of Kali and penetration testing tools.
Programming Languages: LaTeX, Python, R, SQL, Java, Assembly.
Web Page Design: PHP, HTML, CSS, JavaScript.
Content Management System: WordPress, Drupal, Joomla.

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[3] https://protect-cities.eu/ PRoTECT website
[4] https://cordis.europa.eu/project/id/787061 ANITA website
[5] VISOR website

Operating Systems: Windows, Linux, Mac OSX.

Modeling Tools: Magic Draw, Magic Draw with SoaML, AEmilia, IBM rational Team Concert, IBM Rational Software Architect.

Software: Gephi, Gnuplot, Microsoft Office Suite, Video and Audio editing Suite, Adobe Suite.

Languages

Italian: Listening: Native, Reading: Native, Speaking: Native, Writing: Native

English: Listening: advanced, Reading: advanced, Speaking: advanced, Writing: advanced

Science Communicator skills

○ Invited speaker at **SummerSoc - Service Oriented Computing** - *Cyber Threat Intelligence: Approaches and Methods.* Creete - Greece June 26th, 2024[6]

○ Speaker at **Data Week 2022** - *Workshop - AI for society* Tilburg - Netherlands June 30th 2022[7]

○ Speaker at **Data Week 2020** - *The Dark Side of W.W.W.* 's-Hertogenbosch - Netherlands October 28th 2020 - [YouTube video](#)[8]

○ Speaker at **Festival dello Sviluppo Sostenibile 2018** - *Nuovi spazi per i cittadini globali: una riflessione interdisciplinare sull'ambiente fisico e virtuale che ci circonda* Padova 31st May 2018

○ Speaker at **Gli spazi del diritto: verso le nuove frontiere del giuridico** presso University of Padova - Department of Law Padova 9th May 2018

○ Speaker at **DIGITALmeet** Padova 19-22 October 2017[9]

○ Speaker at **Galileo Festival** Padova 11-13 May 2017[10]

○ Project responsible *EDU4sec* - Educazione alla Cybersecurity nelle scuole superiori di Padova 2017

Grants

TU/e Starting Grant   *2023*
250k as starting grant to develop personal research and labs.

Awards and Honors

Sapienza - Universitá di Roma
PhD position   *2014*

Awards

Thesis award
2nd Place Best Master Thesis in Privacy and Security field, Centro Studi Privacy e Nuove Tecnologie - Premio su temi legati al rapporto tra protezione dei dati personali e innovazione, tecnologica 2019

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[6] https://www.summersoc.eu/program/
[7] https://www.tilburguniversity.edu/research/institutes-and-research-groups/taisig/ai-society
[8] https://dataweeknl.nl/
[9] 20Oct17 https://digitalmeet.it/programma-2017/
[10] https://tinyurl.com/data-security-network-risks

Premio Tesi «*Innovare la sicurezza delle informazioni*» - 10a edizione - 2014
*Best Master Thesis in Privacy and Security field, **CLUSIT** - Associazione Italiana per la Sicurezza Informatica 2014*

Publications

Conference Papers

[C1] D. Elzinga, S. Ruessink, G. Cascavilla, D. Tamburri, F. Leotta, M. Mecella, WJ. Van Den Heuvel. **Violence Detection: A Serious-Gaming Approach**. ACCEPTED in *21st International Conference on Security and Cryptography - SECRYPT*.

[C2] G. Cascavilla, A. Cuzzocrea, D. Pascale, M. Omidbakhsh and D. Tamburri. **BigData Fusion for Trajectory Prediction of Multi-Sensor Surveillance Information Systems**. In 2023 *IEEE International Conference on Big Data (BigData)*, Sorrento, Italy, 2023 pp. 5466-5475. doi: 10.1109/BigData59044.2023.10386779.

[C3] Cascavilla, G.; Catolino, G.; Conti, M.; Mellios, D. and Tamburri, D. (2023). **When the Few Outweigh the Many: Illicit Content Recognition with Few-Shot Learning**. In Proceedings of the *20th International Conference on Security and Cryptography - SECRYPT*; ISBN 978-989-758-666-8; ISSN 2184-7711, SciTePress, pages 324-334. DOI: 10.5220/0012049400003555

[C4] G. Cascavilla, R. Zwart, D. A. Tamburri and A. Cuzzocrea, **Explaining IoT Attacks: An Effective and Efficient Semi-Supervised Learning Framework**, *IEEE International Conference on Big Data (Big Data)*, Osaka, Japan, 2022, pp. 5662-5671, doi: 10.1109/BigData55660.2022.10020894.

[C5] De Pascale, D., Cascavilla, G., Tamburri, D.A., Van Den Heuvel, WJ. **SENSEI: Scraper for ENhanced AnalySis to Evaluate Illicit Trends**. In: Troya, J., et al. *Service-Oriented Computing - ICSOC 2022*. Lecture Notes in Computer Science, vol 13821. Springer, Cham. https://doi.org/10.1007/978-3-031-26507-5_36

[C6] De Pascale, D., Sangiovanni, M., Cascavilla, G., Tamburri, D.A., Van Den Heuvel, WJ. **Securing Cyber-Physical Spaces with Hybrid Analytics: Vision and Reference Architecture**. *ESORICS 2022 International Workshops*. ESORICS 2022. Lecture Notes in Computer Science, vol 13785. Springer, Cham. https://doi.org/10.1007/978-3-031-25460-4_23

[C7] G. Cascavilla, G. Catolino, F. Ebert, D. A. Tamburri and W. J. van den Heuvel, **"When the Code becomes a Crime Scene" Towards Dark Web Threat Intelligence with Software Quality Metrics**, *IEEE International Conference on Software Maintenance and Evolution (ICSME)*, Limassol, Cyprus, 2022, pp. 439-443, doi: 10.1109/ICSME55016.2022.00055.

[C8] Cascavilla, G.; Catolino, G. and Sangiovanni, M. **Illicit Darkweb Classification via Natural-language Processing: Classifying Illicit Content of Webpages based on Textual Information**. In Proceedings of the *19th International Conference on Security and Cryptography - SECRYPT*; ISBN 978-989-758-590-6; ISSN 2184-7711, SciTePress, pages 620-626. DOI: 10.5220/0011298600003283

[C9] Cascavilla, G., Catolino, G., Palomba, F., Andreou, A.S., Tamburri, D.A., Van Den Heuvel, WJ. **Unsupervised Labor Intelligence Systems: A Detection Approach and Its Evaluation**. In: Barzen, J., Leymann, F., Dustdar, S. (eds) *Service-Oriented Computing. SummerSOC 2022*. Communications in Computer and Information Science, vol 1603. Springer, Cham. https://doi.org/10.1007/978-3-031-18304-1_5

[C10] Giuseppe Cascavilla, Johann Slabber, Fabio Palomba, Dario Di Nucci, Damian A. Tamburri, and Willem-Jan van den Heuvel. **Counterterrorism for Cyber-Physical Spaces:**

A Computer Vision Approach. In Proceedings of the *International Conference on Advanced Visual Interfaces (AVI '20)*. Association for Computing Machinery, Article 52, 1–5. https://doi.org/10.1145/3399715.3399826

[C11] De Pascale, D., Cascavilla, G., Tamburri, D.A., van den Heuvel, WJ. **Services Computing for Cyber-Threat Intelligence: The ANITA Approach**. In: *Service-Oriented and Cloud Computing. ESOCC 2020*. Communications in Computer and Information Science, vol 1360. Springer, Cham. https://doi.org/10.1007/978-3-030-71906-7_15

[C12] E. Kusen, G. Cascavilla, K. Figl, M. Strembeck, M. Conti. **On the influence of emotional valence shifts on the spread of information in social networks**. *InProceedings of the 2017 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining 2017* (pp. 321-324).

[C13] E. Kušen, G. Cascavilla, K. Figl, M. Conti and M. Strembeck, **Identifying Emotions in Social Media: Comparison of Word-Emotion Lexicons**, 2017 *5th International Conference on Future Internet of Things and Cloud Workshops (FiCloudW)*, Prague, Czech Republic, 2017, pp. 132-137, doi: 10.1109/FiCloudW.2017.75.

[C14] G. Cascavilla, M. Conti, D. G. Schwartz and I. Yahav, **Revealing censored information through comments and commenters in online social networks**, 2015 IEEE/ACM *International Conference on Advances in Social Networks Analysis and Mining (ASONAM)*, Paris, France, 2015, pp. 675-680, doi: 10.1145/2808797.2809290.

[C15] Burattin, A., Cascavilla, G., Conti, M. **SocialSpy: Browsing (Supposedly) Hidden Information in Online Social Networks**. In: *Risks and Security of Internet and Systems. CRiSIS 2014*. Lecture Notes in Computer Science, vol 8924. Springer, Cham. https://doi.org/10.1007/978-3-319-17127-2_6.

Journal Papers

[J1] R.J. van Geest, G. Cascavilla, J. Hulstijn, N. Zannone. **The applicability of a hybrid framework for automated phishing detection**. Computers & Security, 2024, 103736, ISSN 0167-4048, https://doi.org/10.1016/j.cose.2024.103736. (SJR: Q1, Impact Factor 5.6)

[J2] Giuseppe Cascavilla, Damian A. Tamburri, Francesco Leotta, Massimo Mecella, WillemJan Van Den Heuvel, **Counter-terrorism in cyber–physical spaces: Best practices and technologies from the state of the art**, *Information and Software Technology*, Volume 161, 2023, 107260, ISSN 0950-5849, https://doi.org/10.1016/j.infsof.2023.107260. (SJR: Q1, Impact Factor 3.9)

[J3] Daniel De Pascale, Giuseppe Cascavilla, Damian A. Tamburri, Willem-Jan Van Den Heuvel, **Real-world K-Anonymity applications: The KGen approach and its evaluation in fraudulent transactions**, *Information Systems*, Volume 115, 2023, 102193, ISSN 0306-4379, https://doi.org/10.1016/j.is.2023.102193. (SJR: Q1, Impact Factor 3.7)

[J4] De Pascale D, Cascavilla G, Sangiovanni M, Tamburri DA, W-J van den Heuvel. **Internet-of-things architectures for secure cyber–physical spaces: The VISOR experience report**. *Journal of Software Evolution and Process*. 2023; 35(7):e2511. doi:10.1002/smr.2511. (SJR: Q1, Impact Factor 2)

[J5] Giuseppe Cascavilla, Damian A. Tamburri, Willem-Jan Van Den Heuvel, **Cybercrime threat intelligence: A systematic multi-vocal literature review**, *Computers & Security*, Volume 105, 2021, 102258, ISSN 0167-4048, https://doi.org/10.1016/j.cose.2021.102258. (SJR: Q1, Impact Factor 5.6)

[J6] Giuseppe Cascavilla, Filipe Beato, Andrea Burattin, Mauro Conti, Luigi Vincenzo Mancini, **OSSINT - Open Source Social Network Intelligence: An efficient and effective way to uncover "private" information in OSN profiles**, Online Social Networks and Media, Volume 6, 2018, Pages 58-68, ISSN 2468-6964, https://doi.org/10.1016/j.osnem.2018.04.003. (SJR: Q1, Impact Factor 8.6)

[J7] G. Cascavilla, M. Conti, D. Frison, A. Surian. **Data Security Awareness: metodi e strumenti per promuoverla nella scuola secondaria. Il caso del progetto Edu4Sec**. *MEDIA EDUCATION - Studi, ricerche, buone pratiche*, volume 8(2), pages 276-284, 2017.

[J8] Giuseppe Cascavilla, Mauro Conti, David G. Schwartz, Inbal Yahav. **The insider on the outside: a novel system for the detection of information leakers in social networks**, *European Journal of Information Systems*, 27:4, 470-485, DOI: 10.1080/0960085X.2017.1387712. (SJR: Q1, Impact Factor 9.5)

Book Chapters

[BC1] **Author of Chapter 5: Data Engineering in Action**. Chapter Title: Data Engineering in Action. Book Title: Data Science for Entrepreneurship. ChapterDOI: 10.1007/978-3-031-19554-9_5