



Connecting Illegal Vendors on Darknet Markets: Responsible Authorship Attribution to Link and Connect Online Cybercrimes



Maastricht University

Maastricht Law and Tech Lab



Bashpole Software, Inc.

Attention to Your Cause



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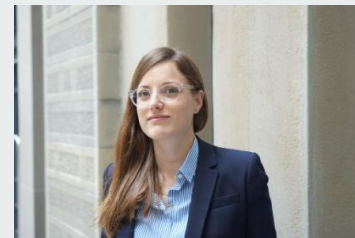
About the Presenters:



I completed my bachelor's degree at a European law school and pursued a master's degree in criminology, forensics, and law at Maastricht University. Currently, I am pursuing a Ph.D. at the University of Lausanne. My research focuses on artificial intelligence in the judiciary. Specifically, I am examining various aspects such as risk assessment tools in the justice system, the concept of legal relevance in information retrieval systems, factors influencing the adoption of technology in the judiciary, and methods for testing frameworks within the use of technology in the justice system.



I'm a machine learning enthusiast, in the final year of my Ph.D. at Maastricht University's Law & Tech lab, Netherlands, focusing on research in Natural Language Processing and Computer Vision. My work concentrates on exploring multimodal representational learning techniques for authorship identification tasks, to link and connect illegal vendors by analyzing patterns in writing and photometric styles on online market advertisements.



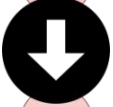
Dr. Aurelia Tamò-Larrieux is an Assistant Professor for Privacy, Security, and Computational Law at University of Lausanne. She has a background in law and economics and is specialized in research at the intersection of law and digital technologies with a particular focus on privacy, data protection, design approaches for privacy-friendly technologies, transparency of automated decision-making, automatically processable regulation, and trust in automation. Aurelia's scientific publications on those subjects are [open access](#) and she has presented her research at numerous international conferences.



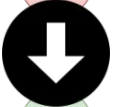
Introduction to Authorship Attribution and Darknet Markets



Responsible guidelines for Authorship Attribution



Hands-on Session 1: Getting started, data analysis and pre-processing, and stylometric analysis



Hands-on session 2: Authorship Identification through Statistical algorithms and traditional Neural Networks



Hands-on session 3: Authorship Identification through Transformers-based models

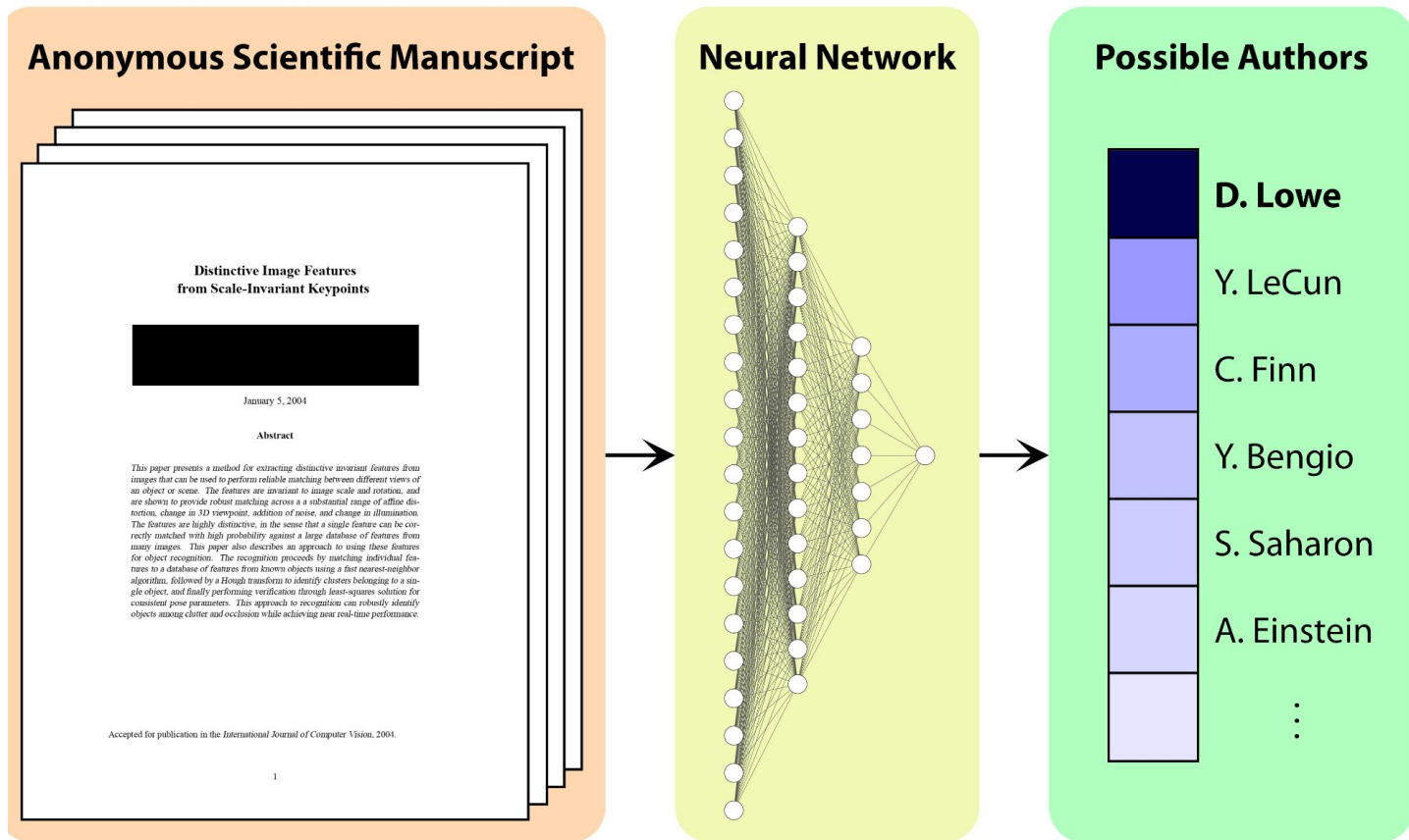


Hands-on session 4: Authorship Verification as retrieval task

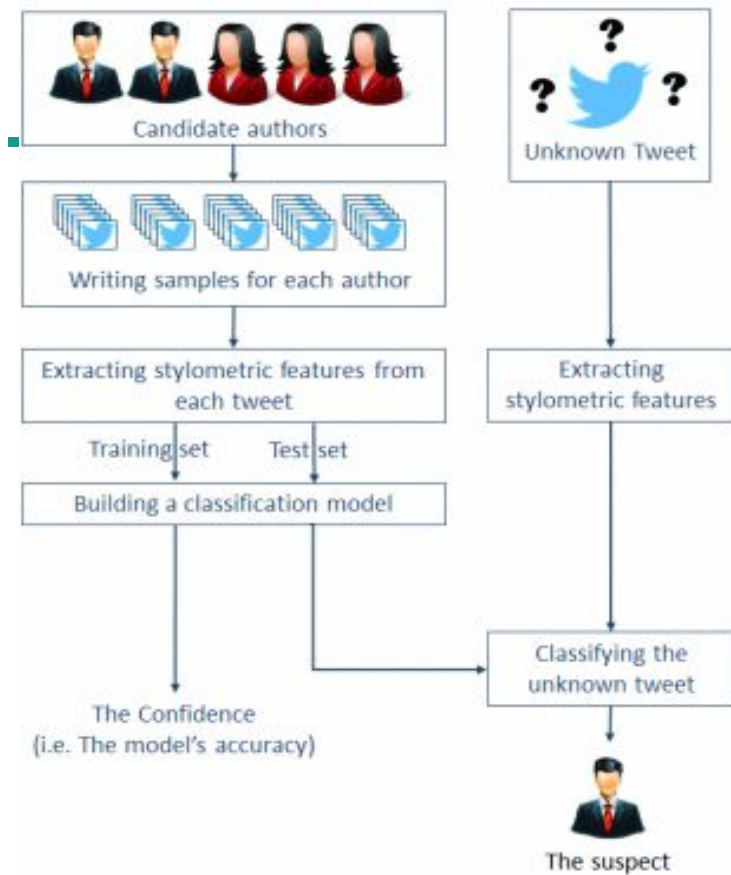


Limitations, Future Work, and Conclusion

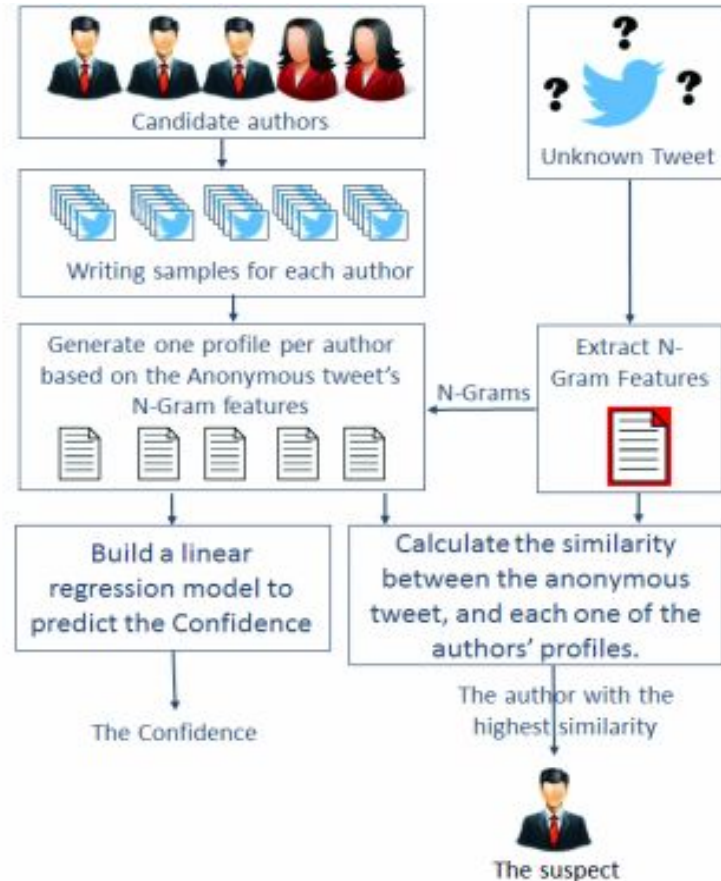
What is Authorship Attribution (AA)? How does it apply to NLP?



Authorship Identification vs Authorship Verification



(a) Instance-based authorship attribution.



(b) Profile-based authorship attribution.

Dark Web and Darknet Markets



Ag Agora Beta

gasumpel pehuang -- Wallet 0.00000000 BTC 376.68 USD

0 NEW MESSAGES LOGOUT

Listings Profile Wallet Orders Forums Info/Help

LISTINGS

Search

Counterfeits (600+)
Data (400+)
Drug paraphernalia (100+)
Drugs (12800+)
Electronics (100+)
Forgeries (200+)
Information (1400+)
Jewelry (100+)
Services (500+)
Tobacco (200+)
Weapons (100+)
Other (100+)

300 mg Methoxetamine 0.27344164 BTC

Crystal Meth 28 grams 2.62291000 BTC

MDPPP (Simulation of 0.74333651 BTC

Rosier - Daytona 50th 0.95306360 BTC

10gr. Etizolam FREE 1.72560263 BTC

Paragon Backup Aamp; 0.04845853 BTC

Diesel Jeans 8M1 0.20972708 BTC

1 OZ High potency Magic 0.00262822 BTC

The Art of Making Money: 2.72114261 BTC

20g 84%+ MDA 1.72560263 BTC

Armani watch - AR1447 - 0.86280131 BTC

\$5000 Worth of Internet 0.0054773 BTC

Occult Chemistry: 0.00386315 BTC

Mega carding guide 0.07964319 BTC

QP (122g) Of Critical 1.99107699 BTC

0.02654773 BTC

5x DespicableMe&3s 0.34512052 BTC

Albert Heijn 0.34512052 BTC

Hygetropin 100u human 0.7998425 BTC

28g 11oz (Unpack&3s) 2.49548699 BTC

Super Haze, FREE 0.66369332 BTC

5 Gr. HIGH Quality MDMA 0.31857279 BTC

500 x LUCKY CLOVERS 2.92025091 BTC

How I have made 0.02654773 BTC

14g PROPER QUALITY 0.28937028 BTC

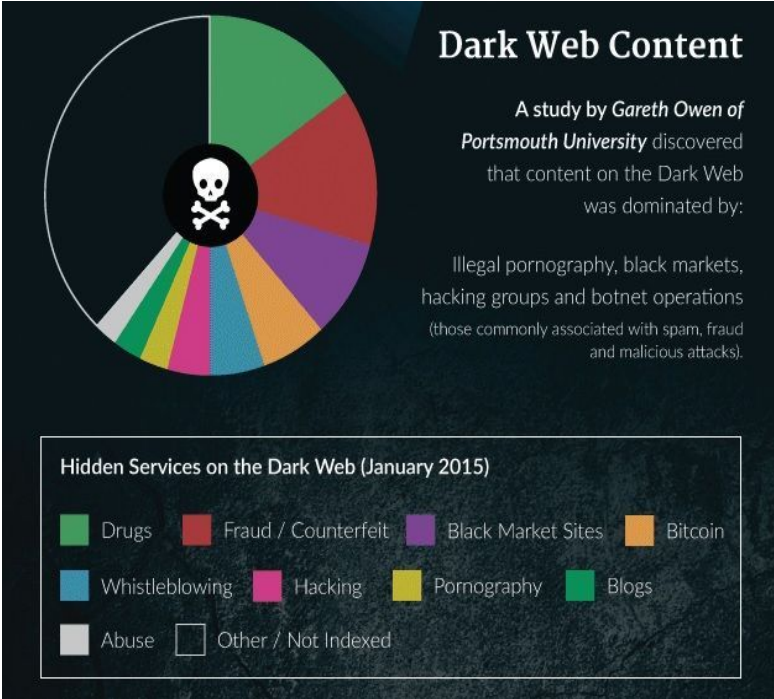
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200 tabs. Dianabol 10mg 0.13046821 BTC

\$100 AUD | Stealth 0.290202506 BTC

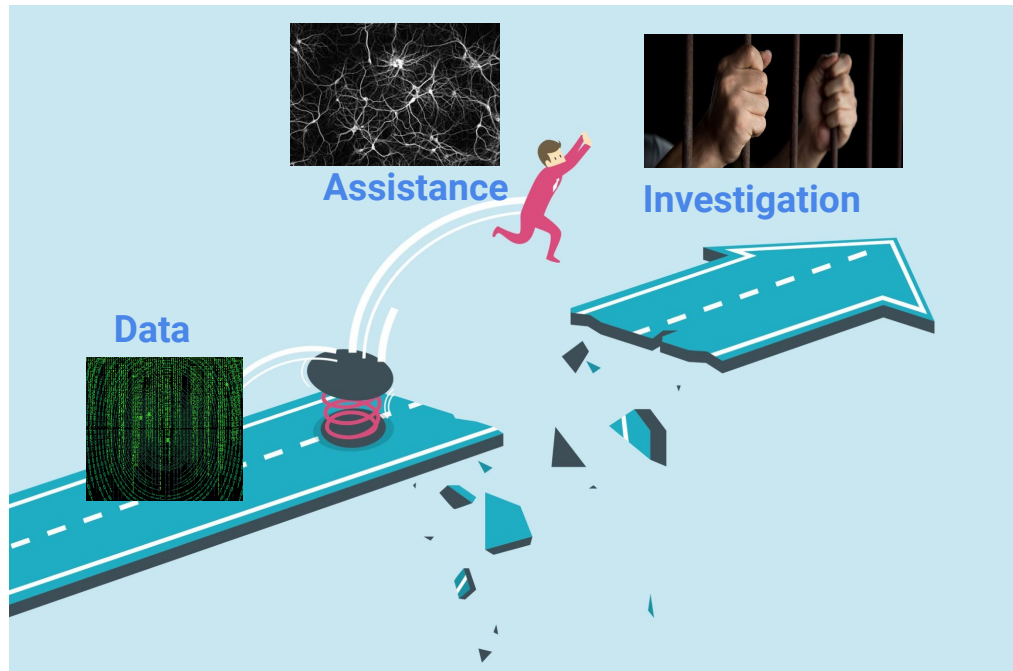
28 Grams Sour Diesel x 1.02738726 BTC

Karnaga Oral Jelly 0.011584647 BTC

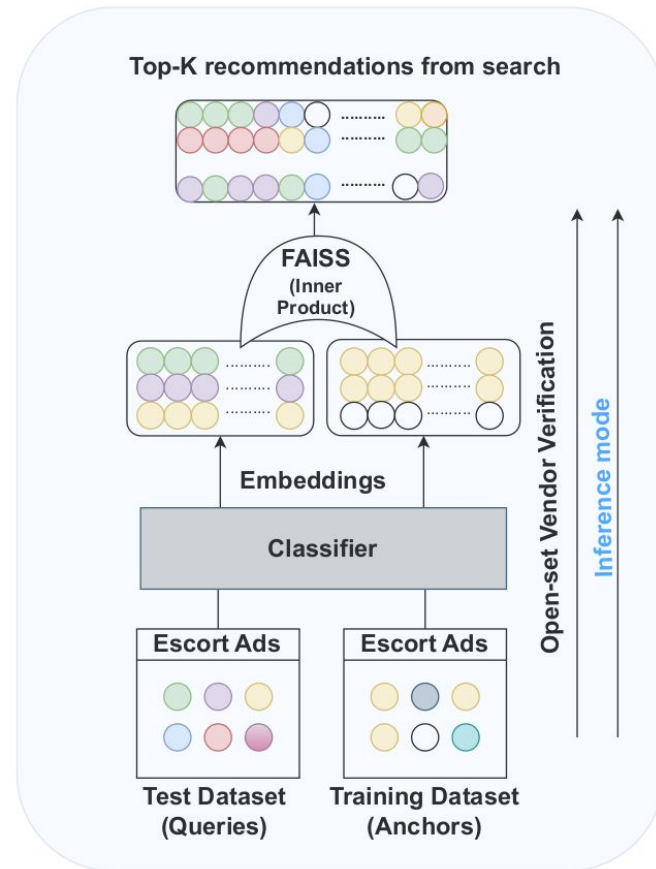
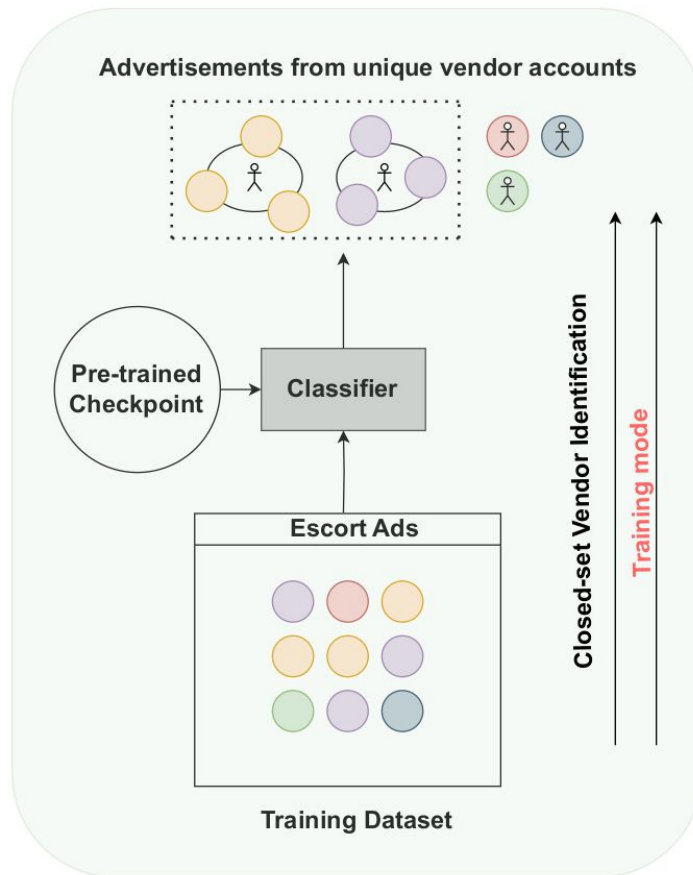


SETBACK

- Anonymity on the Dark Web
- Limited human resources
- Too much data to analyze
- Vendors creating aliases and appearing across different markets
 - Makes it difficult to estimate the scope and size of a market



Vendor Migrants vs Vendor Aliases



VendorLink: An NLP approach for Identifying & Linking Vendor Migrants & Potential Aliases on Darknet Markets



arXiv



GitHub



Maastricht University

Maastricht Law and Tech Lab



IDTraffickers: An Authorship Attribution Dataset to link and connect Potential Human-Trafficking Operations on Text Escort Advertisements



arXiv



GitHub



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