

# Critical Understanding of Predictive Policing

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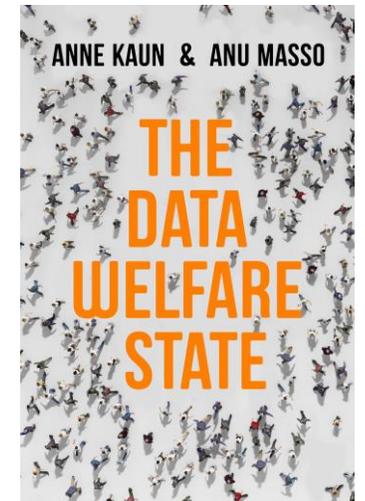
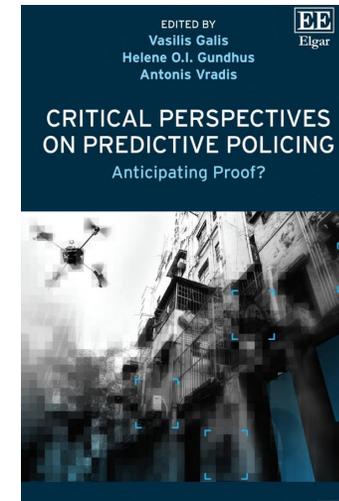
Tallinn University of Technology

# TalTech DataLab

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  - Combining computational and critical studies.
  - Algorithmic governance, data and society, spatial mobilities, digital social transformations.
- **Impact on social and political life:**
  - Research in big data: data, algorithms, AI, governance, methodologies.
  - Data School: crucial data infrastructure, novel courses, and high-impact study materials.



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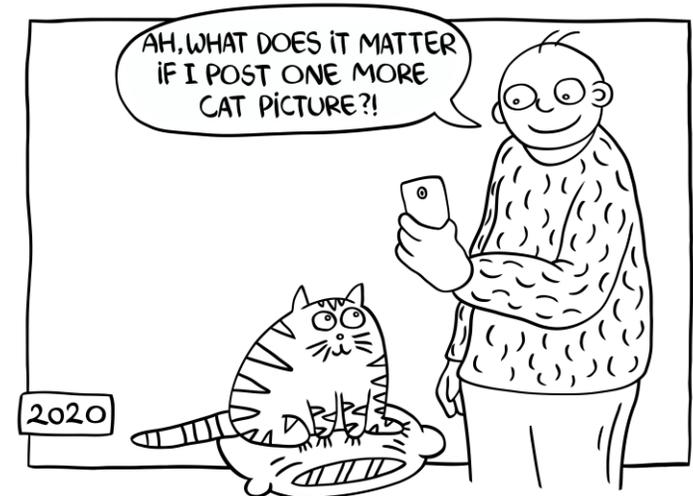
# Critical Understanding of Predictive Policing (CUPP, 2021-2024)

- **Call:** Digitalisation of the Public Sector – Research and Innovation Projects.
- **Aim:** How institutional and social values, digital affordances, and organisational politics are conceived and embedded in data-driven police innovations.
- **Partners:** Denmark, Estonia, Latvia, Norway, Sweden and the UK.
- <https://cuppresearch.info/>



# Introduction

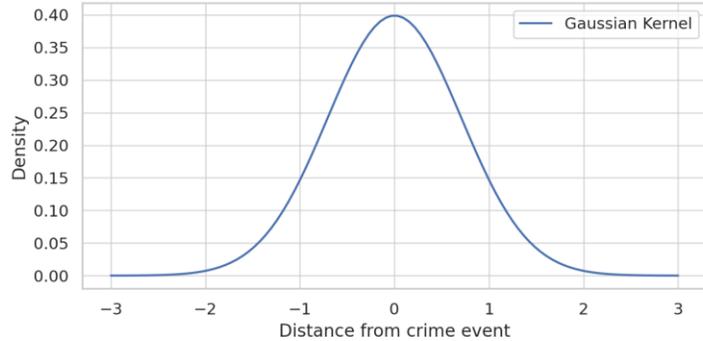
- **Automated data processing** enables more efficient decision-making in areas such as security and policing, part of national brand.
- The predictive policing can also **limit individual rights or choices**, and automated decisions may be less transparent.
- What is the **awareness, trust, concerns, and expectations** among people regarding digital law enforcement and predictive policing?



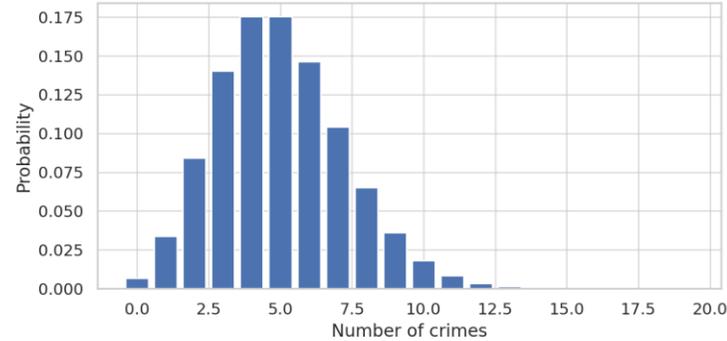
Source: Ave Taavet

# What is predictive policing?

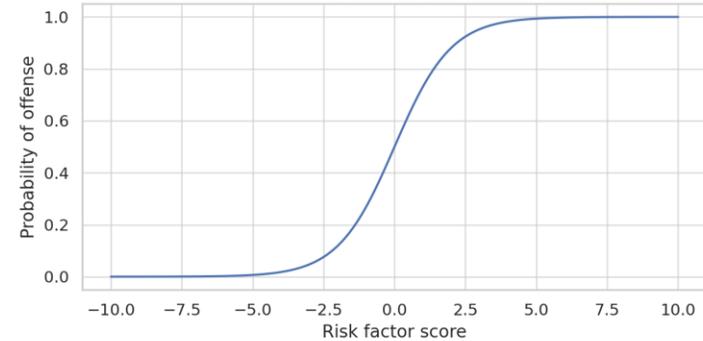
1. Kernel Density Estimation



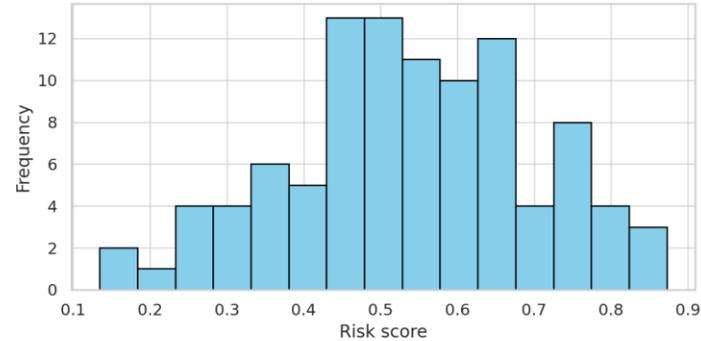
2. Poisson Distribution (Crime Counts)



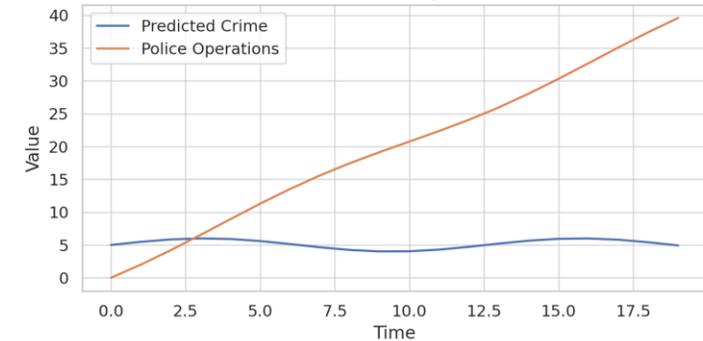
3. Logistic Regression



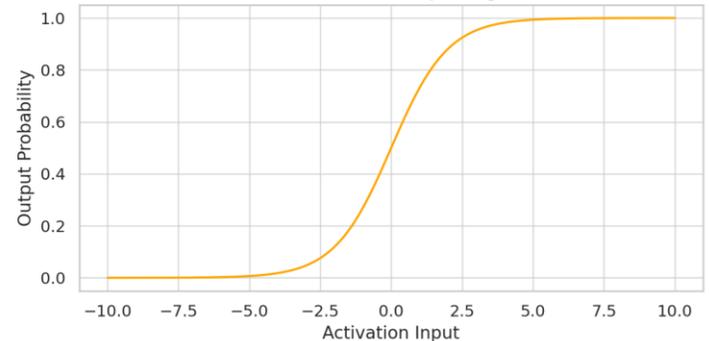
4. Linear Risk Score Distribution



5. Feedback Loop Effect



6. Neural Network Output (Sigmoid)



1. Spatial prediction (Kernel Density Estimation)

$$\hat{f}(x, y) = \frac{1}{nh^2} \sum_{i=1}^n K\left(\frac{x - x_i}{h}, \frac{y - y_i}{h}\right)$$

2. Temporal prediction (Poisson regression)

$$\log(\lambda_i) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki}$$

3. ML for individual risk (logistic regression)

$$P(Y = 1|X) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \dots + \beta_k X_k)}}$$

4. Risk score calculation (linear)

$$\text{RiskScore}_i = w_1 x_1 + w_2 x_2 + \dots + w_n x_n$$

5. Feedback-loop modelling (self-reinforcing)

$$O_{t+1} = O_t + \alpha P_t$$

6. Neural networks (abstract structure)

$$\hat{y} = f(W_2 \cdot \sigma(W_1 X + b_1) + b_2)$$

# Predictive policing: state view

Jüri opened the door to his apartment. Standing in front of him were two police officers. Jüri was very surprised to see them. The officers explained that, as part of a new pilot project, they were using new tools that analyze people's data to identify individuals with a high likelihood of committing a crime. Jüri was one of 134 people flagged by the analysis as likely to be involved in criminal activity. Therefore, the officers wanted to visit him to see if there was anything they could do to help — and to possibly prevent a future crime.

**Masso, A., Kasapoglu, T., Kaun, A., & Galis, V. (2024).** Citizens' perspectives on platformisation of police work: A scenario and story-based exploration in Estonia and Sweden. *Information, Communication & Society*, 0(0), 1–19.  
<https://doi.org/10.1080/1369118X.2024.2333842>

# Predictive policing: citizen view

Jüri felt constant stress over the possibility that he might commit a crime. Eventually, he could no longer cope with the pressure. He decided that it had to happen — just to put an end to the ongoing anxiety. And so, later that evening, long after the police had left, he broke into a shop near his home. He smashed the window and filled his pockets with candy. After committing the crime, he simply stood there, waiting for the police to arrive so he could turn himself in. When he was finally handcuffed, he felt a sense of relief — a release from the persistent stress and anxiety.

**Masso**, A., Kasapoglu, T., Kaun, A., & Galis, V. (2024). Citizens' perspectives on platformisation of police work: A scenario and story-based exploration in Estonia and Sweden. *Information, Communication & Society*, 0(0), 1–19.  
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# How to study citizens' perspectives?

- **Scenario and story-telling:** realistic and fictional stories, alternative future scenarios; study of social imaginaries (qual+quant).
- **Cognitive perceptions:** semi-experimental eye-tracking study combined with in-depth interviews; cognitive perceptions.
- **Secondary data:** in-depth interviews and comparative survey data, three countries with different welfare models (Est, Swe, Sweden).



Source: Ave Taavet, 2020

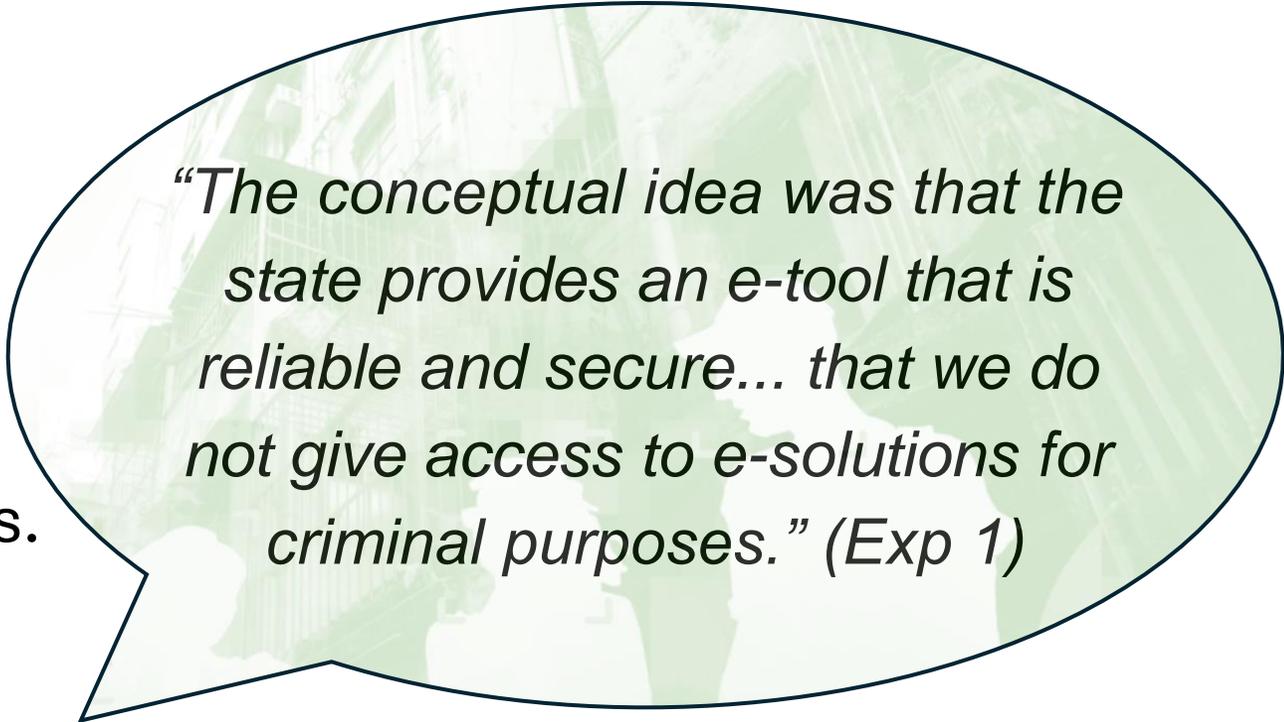
# Findings I: Digitalised border-control

- **Passports as evolving data infrastructures:** biometric data  $\Leftrightarrow$  perceived historic normalisation.
- **Social norms shape perceptions:** exposure to data  $\Leftrightarrow$  acceptance, reduced critical scrutiny.
- **Predictive policing requires attention to data awareness:** security culturally and historically embedded.



# Findings II: Digital mobility and control

- **Location-independent** work => challenge traditional notions of citizenship, forms of belonging.
- Security control through **cross-border data sharing**, while not addressing potential inequalities.
- **‘Citizenship by connection’** – transactional participation, networked sense of belonging.



*“The conceptual idea was that the state provides an e-tool that is reliable and secure... that we do not give access to e-solutions for criminal purposes.” (Exp 1)*

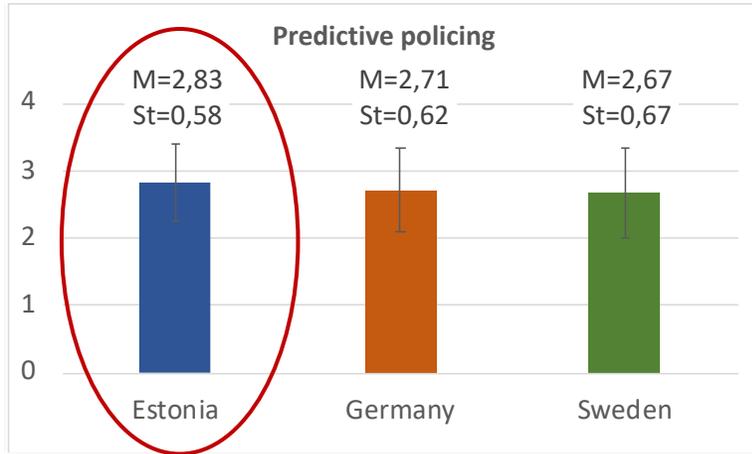
Masso, A., Kasapoglu, T., Tammpuu, P., Calzada, I. (2025). Estonia’s E-residency: Redefining Citizenship by Conneciton, in Handbook of Digital Citizenship, A.Hintz, (Ed), Edward Elgar Publishing.

# Findings III: Policing the body and the future

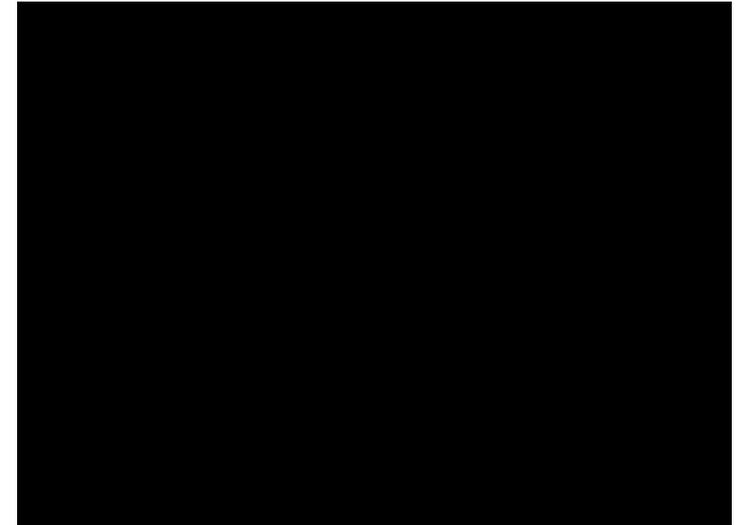
- **Controversial tech blurs policing boundaries:** raises questions about regulation and control.
- **Biohacking challenges identity norms:** Normalises self-modification, questions institutional power.
- **Ethics committee as gatekeeper:** access to knowledge, call for inclusive frameworks.



# Further studies: attitudes, GenZAI, mobility



**Figure 1. Attitudes towards predictive policing** (Kaun, Larsson, Masso, 2024)



**Figure 2. Security and autonomous vehicles** (Lobanova, Masso, Gerassimenko, 2024).



**Figure 3. Gen Z's social imaginaries of AI in policing** (Lobanova, Masso, Gerassimenko, 2024).

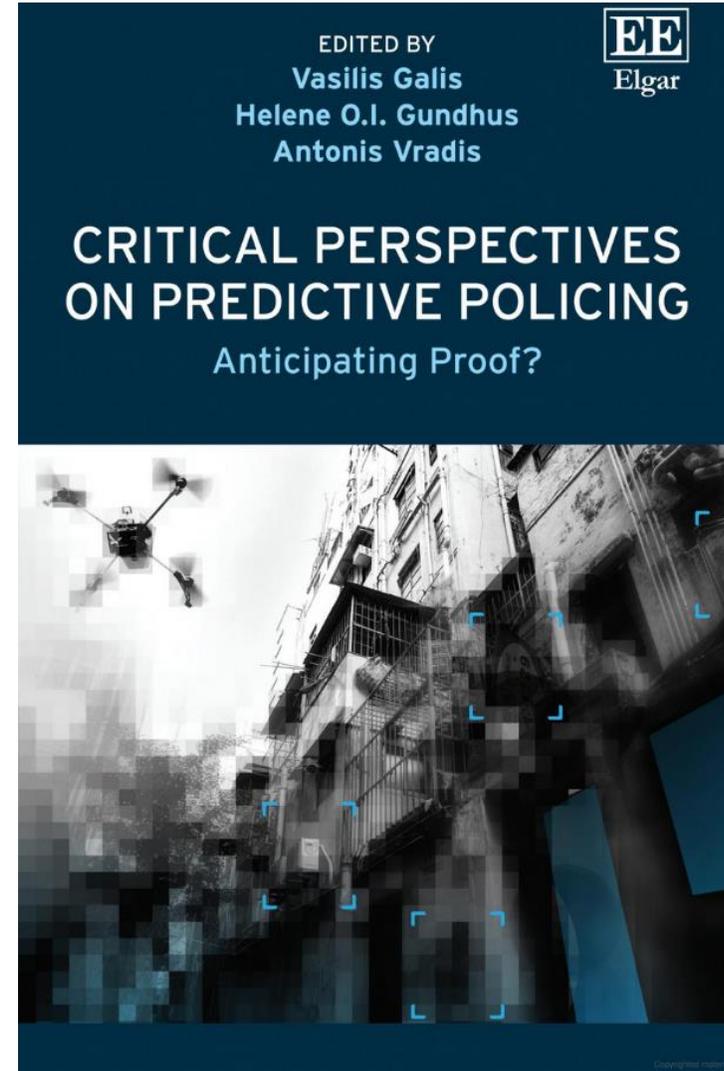
# A Critical Look at the Digital Law Enforcement

CUPP – an Ideas Catalogue provides an overview of key issues and concerns associated with the ongoing digitalisation of police work:

- 1) **Awareness** of contested and controversial technologies
- 2) **Accountability** means watching the watchers
- 3) **Transparent**, secure, and publicly governed infrastructures.

# Instead of conclusion

- NordForsk as a unique platform
  - Joint research  $\Leftrightarrow$  challenges
  - Networking + PROSA! + MobAI
  - Feedback and questions
- Availability of the book
  - Edward Elgar Publishing
  - Open access, Pdf
  - ...



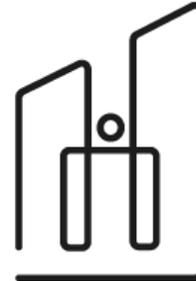
# Thank you!

NordForsk / Estonian Research Council  
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TALTECH DATALAB

<https://taltech.ee/datalab>



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for Smart Cities

<https://finestcentre.eu/>

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# Publications

- Masso, A., Kasapoglu, T., Tammpuu, P., Calzada, I. Estonia's E-Residency: Redefining Citizenship by Connection (chapter submitted to book '*Digital citizenships*' (ed.Arne Hintz)).
- Kasapoglu, T., Masso, A. Social Norms on Data Sharing across Borders: A Semi-experimental Study with Eye-Tracking and Interview Methods (submitted to *AI & Society*)
- Masso, A., Kasapoglu, T. Kaun, A., Galis, V. (2024). Citizens' perspectives on Predictive Policing: A Scenario and Story-Based Exploration. *Information, Communication & Society*.  
<https://doi.org/10.1080/1369118X.2024.2333842>
- Masso, A., Kasapoglu, T., Maccarini, A. (2025). (Un)predictable Futures of Policing: A Social Transformation Approach. In the CUPP edited volume; *Critical Perspectives on Predictive Policing: Anticipating Proof?*, Edward Elgar Publishing.
- Masso, A., Gerassimenko, J., Kasapoglu, T., & Beilmann, M. (2025). Research Ethics Committees as Knowledge Gatekeepers: The Impact of Emerging Technologies on Social Science Research. *Journal of Responsible Technology*, 100112. <https://doi.org/10.1016/j.jrt.2025.100112>
- Kaun, A., Larsson, A. O., & Masso, A. (n.d.). Automation scenarios: Citizen attitudes towards automated decision-making in the public sector. *Information, Communication & Society*, 0(0), 1–18.  
<https://doi.org/10.1080/1369118X.2024.2375261>
- Masso, A., Kaun, A., & van Noordt, C. (2023). Basic values in artificial intelligence: Comparative factor analysis in Estonia, Germany, and Sweden. *AI & SOCIETY*. <https://doi.org/10.1007/s00146-023-01750-w>