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Security and Privacy Accountable Technology Innovations, Algorithms, and Machine Learning

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THE CHALLENGE.

Artificial Intelligence is dominated by the United States and China

- The 2 biggest economic poles
- USA: Audio & Natural Language Processing; Autonomous Robotics; Connected & Automated Vehicles
- China: New patents

How to position Europe as a frontrunner in AI.

A strategy centred around two pillars

EXCELLENCE

TRUST

Address specific features of AI technologies that make the application and enforcement of legislation challenging and generate high risks

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RESEARCH GAPS.

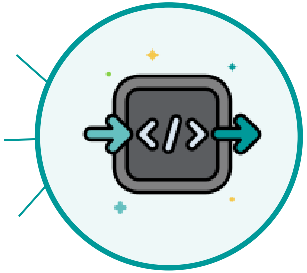
DATA MODEL TRAINING

How data is influencing the behaviour of the AI systems

- BIAS
- PRIVACY
- DATA POISONING

BLACK-BOX AI

Understanding how the systems are making safe decisions

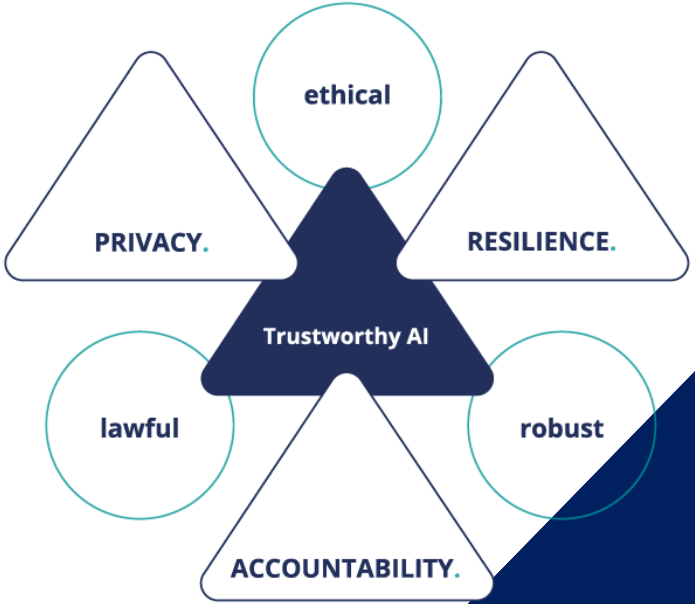


- EXPLAINABILITY
- RISK LEVELS
- TRANSPARENCY

OUR MISSION.

Achieve
Trustworthy AI
in cybersecurity
solutions.

Delivering building blocks to enforce **data privacy**, **resilience engineering**, and **legal-ethical accountability**



OUR GOALS.

Transparency and Explainability

Verification and validation SW + HW mechanisms for security solution development

Explainability Metrics |

Accountability Algorithms |

Distillation for pre-trained Models |

Resilience and Privacy

Enhance resilience in the training and deployment of AI in decentralized, uncontrolled environments

Homomorphic Encryption |

Privacy-preserving Computing |

Risk Assessment |

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OUR GOALS.

Societal Impact for Uptake

Provide adoption and adaptation specifications to reduce complexity of integration

Requirements and KPIs |

Guidelines |

Validation in use cases |

Education and Skills Building

An educational module to raise awareness and provide technical, ethical and legal skills

MOOC |

Knowledge fast-track |

Based on ‘Elements of AI’ |

USE CASE 1 - Privacy-preserving AI on the Edge

- **CHALLENGE:** Assess the performance of privacy-preserving ML deployed on edge computing nodes (telco environment)

- **IMPACT:** Protect user’s sensitive data from devices. Enable 3rd party AI solutions to run securely and accountable in Network Virtualized infrastructure

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USE CASE 2 - Cybersecurity Analysis of 5G/4G/IoT Networks

- **CHALLENGE:** Improve current network security techniques in data infrastructure to become more resilient to attacks

- **IMPACT:** Validate the explainability and resiliency of SPATIAL security analysis in real-world 4G/5G/IoT framework

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USE CASE 3 – Emergency eCall System

- **CHALLENGE:** Accountable and transparent algorithms for smart data (eHealth) analysis and actuation in critical services

- **IMPACT:** Validation in a eCall communications demonstrator, automatically triggering Next Generation emergency calls

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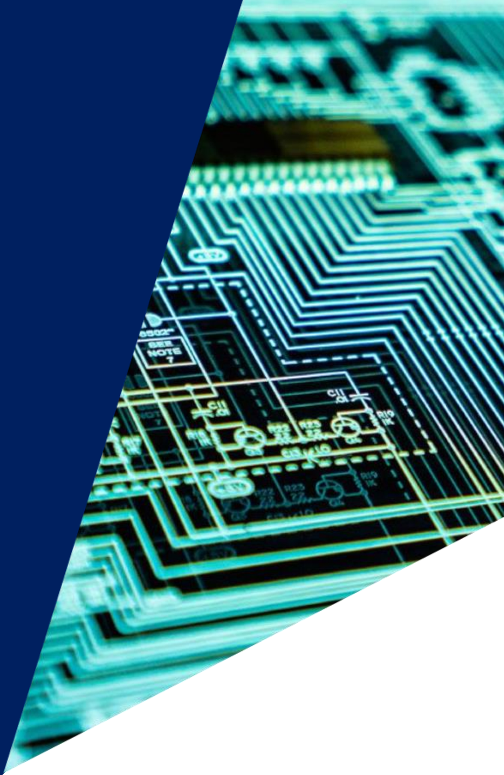
USE CASE 4 – Resilient Cybersecurity Analytics

- **CHALLENGE:** Evasion and poisoning attacks against and defences for ML models used in cybersecurity

- **IMPACT:** Implementing prototypes of dynamic attack detection systems and experiment with attack tactics to study their extent and key risks



WITH secure

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OUR TEAM.

TU Delft

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Thank You

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