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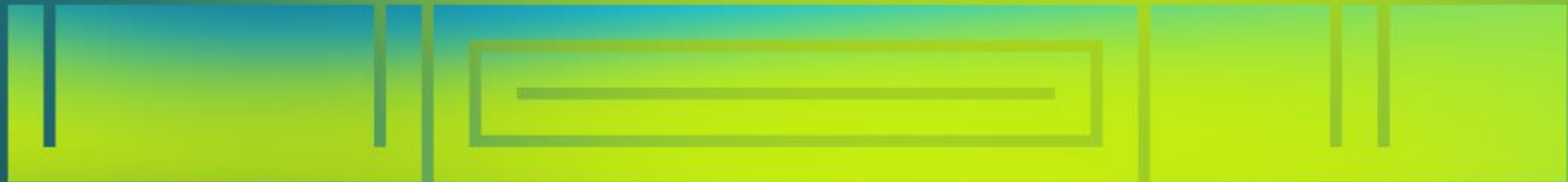
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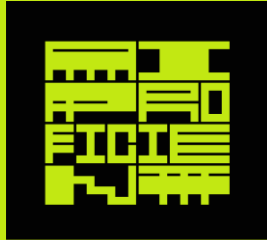
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BRINGING AI TECHNOLOGY TO THE PRODUCTION LINE



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Operationalizing AI Ethics in Industry 4.0

Mechelen, Belgium, June 8th 2023

Marc Anderson



This product is part of a project that has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 957391.

Presentation Outline

- Current Approaches to Ethics in AI
 - AI Ethics Context
 - HLEG guidelines
 - Problems with guidelines and frameworks in Industry 4.0
- A New Approach - The AI Proficient Approach
 - Methods
 - Technical Meetings and Plant Visits > base context
 - Recommendations and Reasoning, Deliverables
 - Implementation and Monitoring
 - Promoting an Ethical Culture
 - Example – AI Training Feedback
- Toward a Methodological Benchmark for AI Ethics in I 4.0

AI Ethics Context - Issues

Everyone Recognizes that AI Algorithms are creating problems that we will have to resolve

Deepfakes

Predictive Policing:

Bias

Taybot:

Racism

ChatGPT :

Authorship?

Factuality?

Self Driving Cars:

Life and Death Decisions



AI Ethics Context – Law vs Ethics



AI Ethics Context – Ethics

Turn to Ethics ...

Ethics Frameworks and Guidelines

➤ 80% of ethics documents
are less than 6 years old (Morley et al. 2021)

AI Ethics Guidelines Global Inventory:

<https://inventory.algorithmwatch.org>

167 AI Ethics Guidelines

(as of 2020)

**AI Ethics is
... Really
Really Huge!**



HLEG Guidelines for Trustworthy AI



52 Experts + public consultation = guidelines

Trustworthy AI = lawful, ethical, robust

But ... not legal guidance > only ethical

HLEG Guidelines for Trustworthy AI

Realising Trustworthy AI

- ✓ Human agency and oversight
- ✓ Technical robustness and safety
- ✓ Privacy and Data governance
- ✓ Transparency
- ✓ Diversity, non-discrimination and fairness
- ✓ Societal and Environmental well being
- ✓ Accountability

HLEG Guidelines for Trustworthy AI - Problems

AI-Proficient: draw upon HLEG Guidelines
+ ethics by design



Some HLEG Guideline Problems (Project and I4.0)

- HLEG concentrates on Social AI uses ...

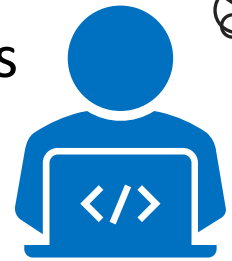
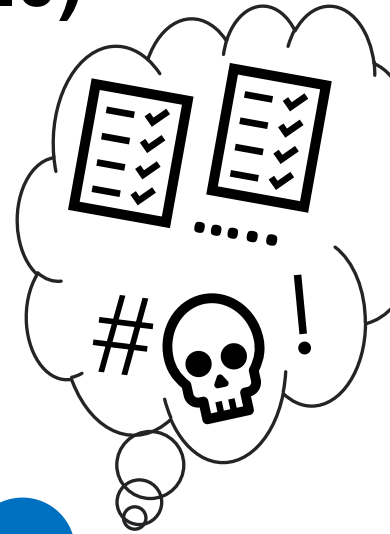
‘Guidelines less relevant for industrial settings’ (HLEG 15)

- HLEG assessment list: 152 questions +

many irrelevant; leans on developers; human centeredness lost in process

- End User Engagement Goal (project)

HLEG too general to capture implicit workplace customs, e.g. “could AI affect human autonomy?” who knows, until we get specifics: “who is responsible for operator team? Process manager role?, informal workplace customs?”



The AI-Proficient Approach

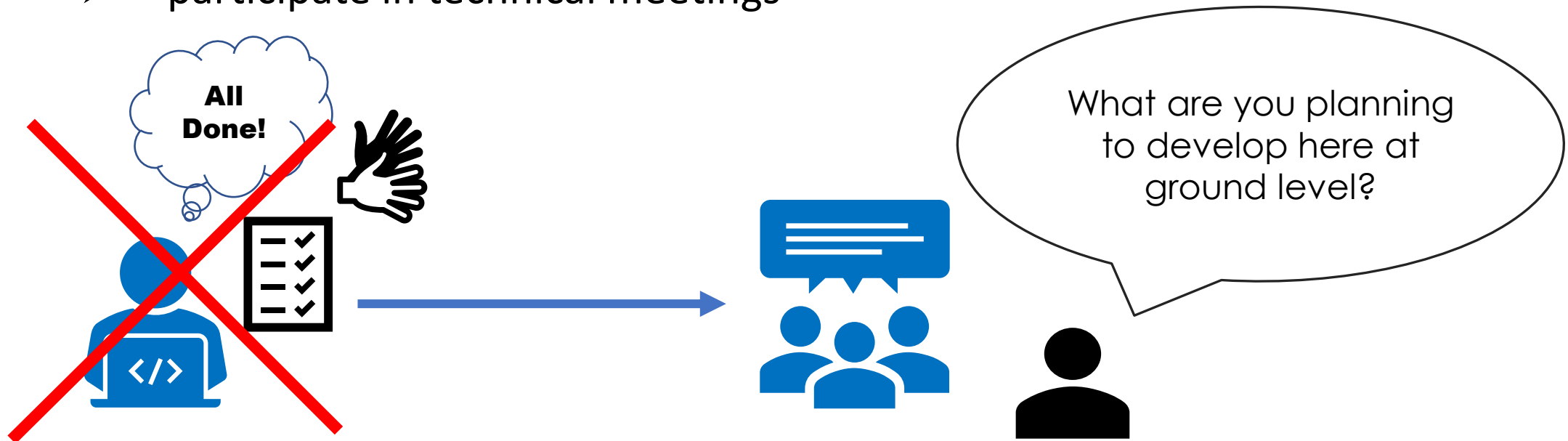
- Industry is: Time and Space
 - uncover the work context
 - and what is planned for the AI service
 - Continuous ethical process (vs. checked and done)



The AI-Proficient Approach

➤ Don't just leave it to Partners

- The ethical issues appear through questioning
- Go beyond strictly AI ethical issues > other ethical issues are integrated
- participate in technical meetings



The AI-Proficient Approach

- Be practical
 - Make recommendations specific
 - Use recommendations to uncover context
 - Incorporate spirit of law and regulations in recommendations



GDPR

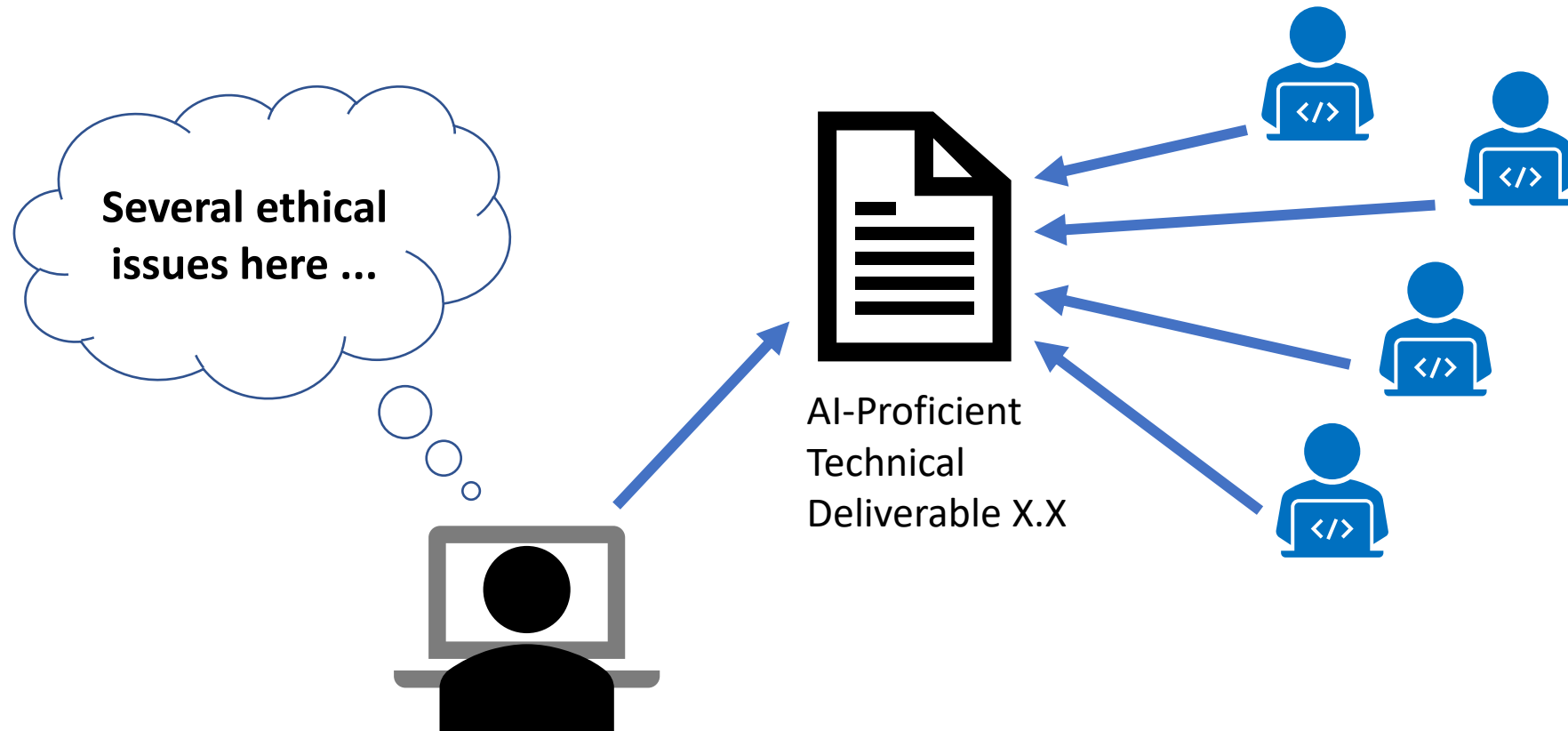
The AI-Proficient Approach - Methods

➤ Technical Meetings and Plant Visits



The AI-Proficient Approach - Methods

➤ Participate in Deliverables beyond Ethical



The AI-Proficient Approach - Methods

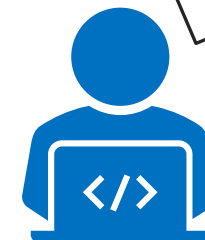
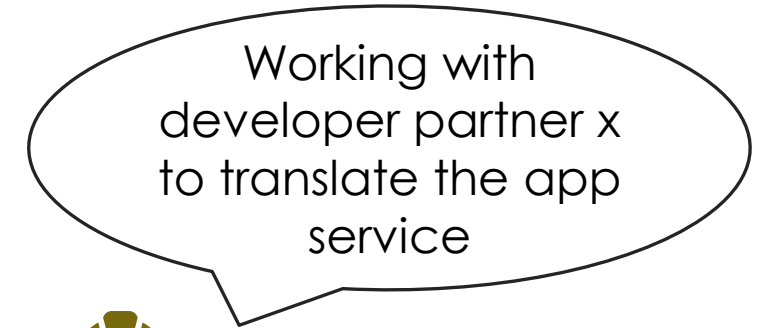
➤ Recommendations and Reasoning

x.x-x) (All) *Recommend that for Task X.X Use Cases where explicit and implicit feedback will be combined (xxxx_2; xxxx_5), you develop a best practice of tagging the data resulting from that feedback to indicate that active operator choices (explicit feedback) make up part of it*

«... (Ehsan et al 2021) have shown that the background of the person receiving the explanation changes how they see the explanation, and leads to problematic or mistaken ascriptions of intention to the AI. More specifically ...»

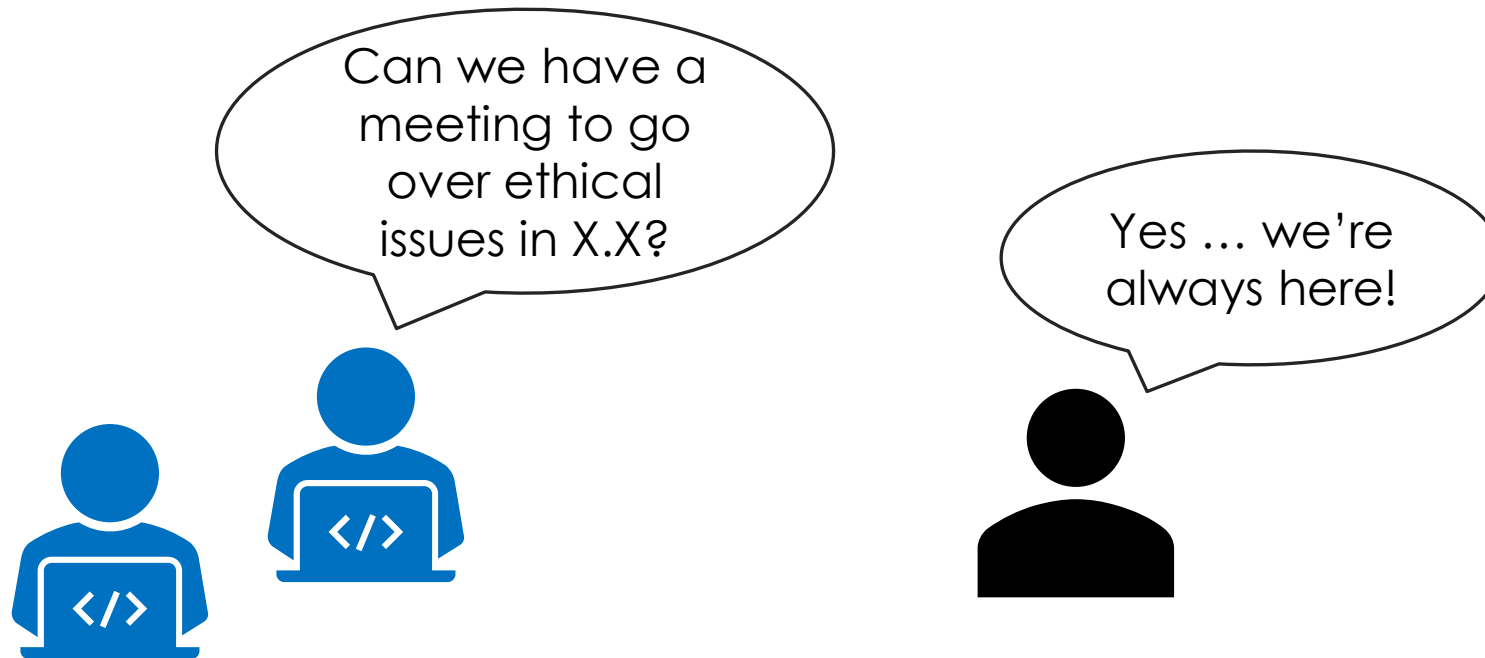
The AI-Proficient Approach - Methods

➤ Regular Implementation and Monitoring



The AI-Proficient Approach - Methods

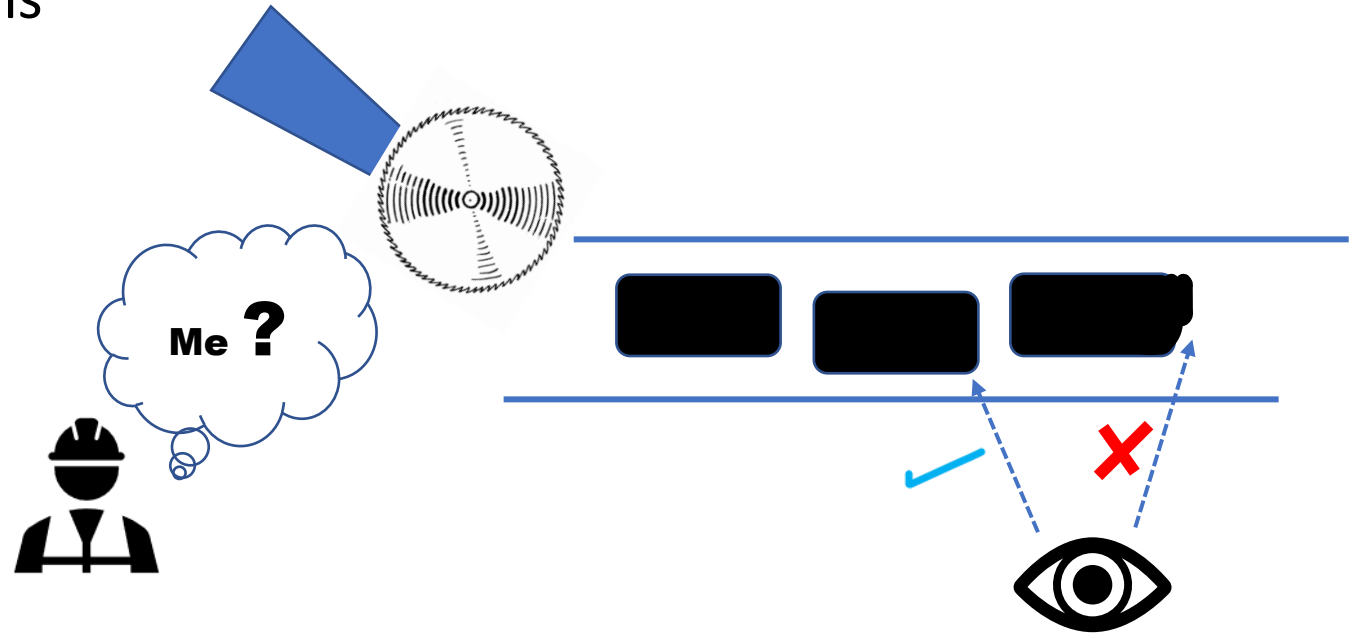
➤ Quantitative Results and Ethical Culture



Bringing it Together: An Example

Feedback from cut quality trains the AI to predict blade wear

Deliverable: “*Someone* will mark the cut quality on pics...”



Recommendations:

- Clarify *how many* pics? *Who* will do it? voluntary?
- *What* is the operator's job after X ...

Results: ≈2000 pics; developer will do it; operator no longer involved



Toward a Methodological Standard for AI Ethics in I 4.0

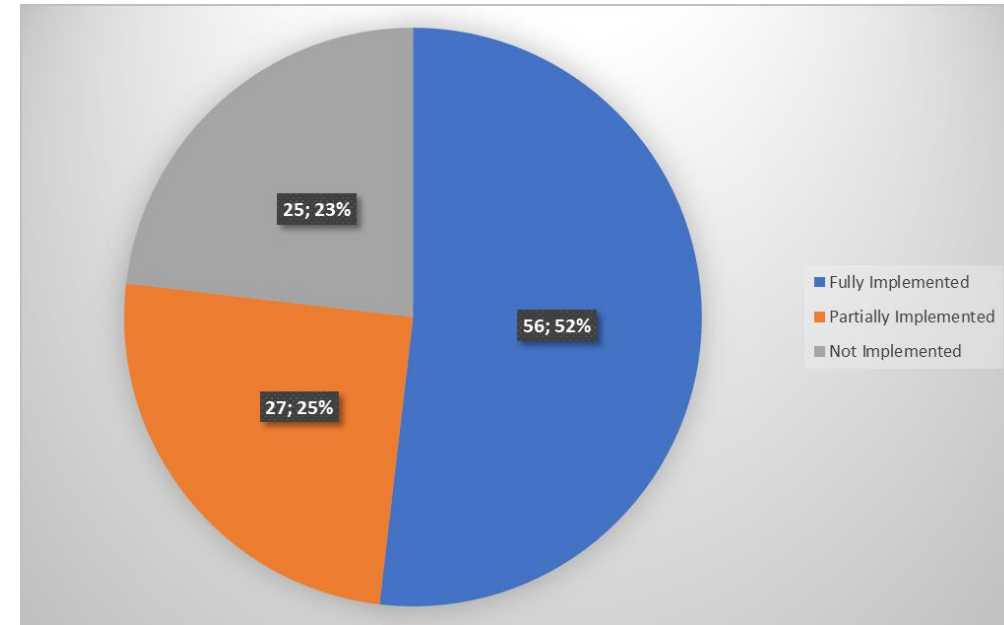
➤ What have we achieved?

➤ A flexible methodology

- “From the Ground Up: Developing a Practical Ethical Methodology for Integrating AI into Industry” (Anderson and Fort, 2022)

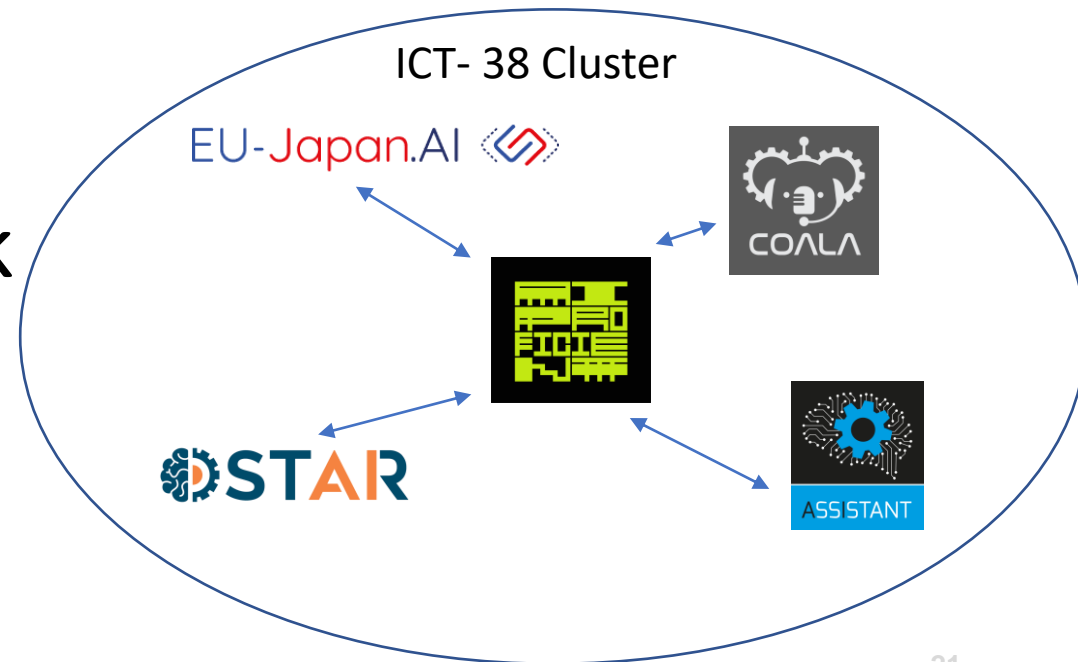
➤ Quantitative Results

- 130 Ethical Recommendations
- (Anderson and Fort 2023)
 - [in progress]



Toward a Methodological Standard for AI Ethics in I 4.0

- What are we aiming at?
 - Provide insights toward getting ethics applied on the ground
 - Get our approach out as a methodological benchmark





Thank You!

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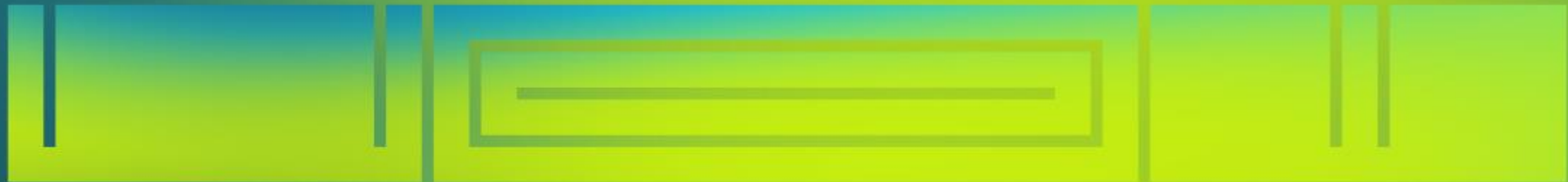
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