AI Standardisation: STAR project trusted AI in manufacturing

STAR STAR-AI.EU

Safe and trusted human-centric AI for manufacturing

Dr Christos Emmanouilidis

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STAR: AI in manufacturing use cases

Human-Robot Collaboration

(PHILIPS)

Safety Zone Detection

(DFKI)

AI for Agile Manufacturing

(IBER)

Each one of the three pilots above has multiple sub-cases for AI in manufacturing

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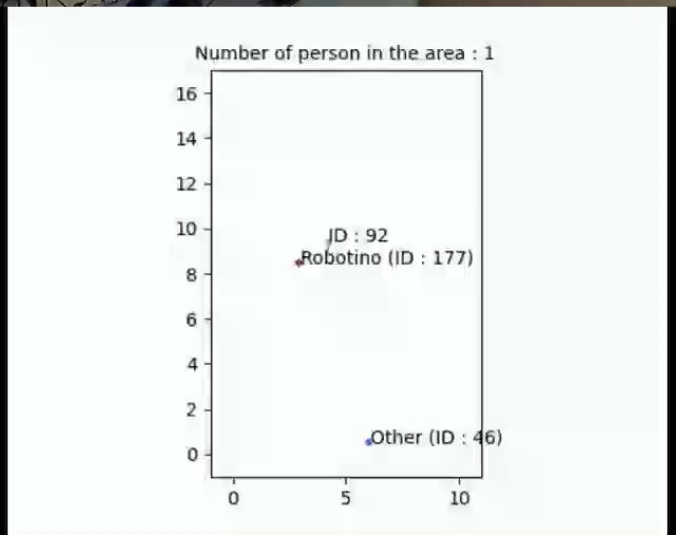
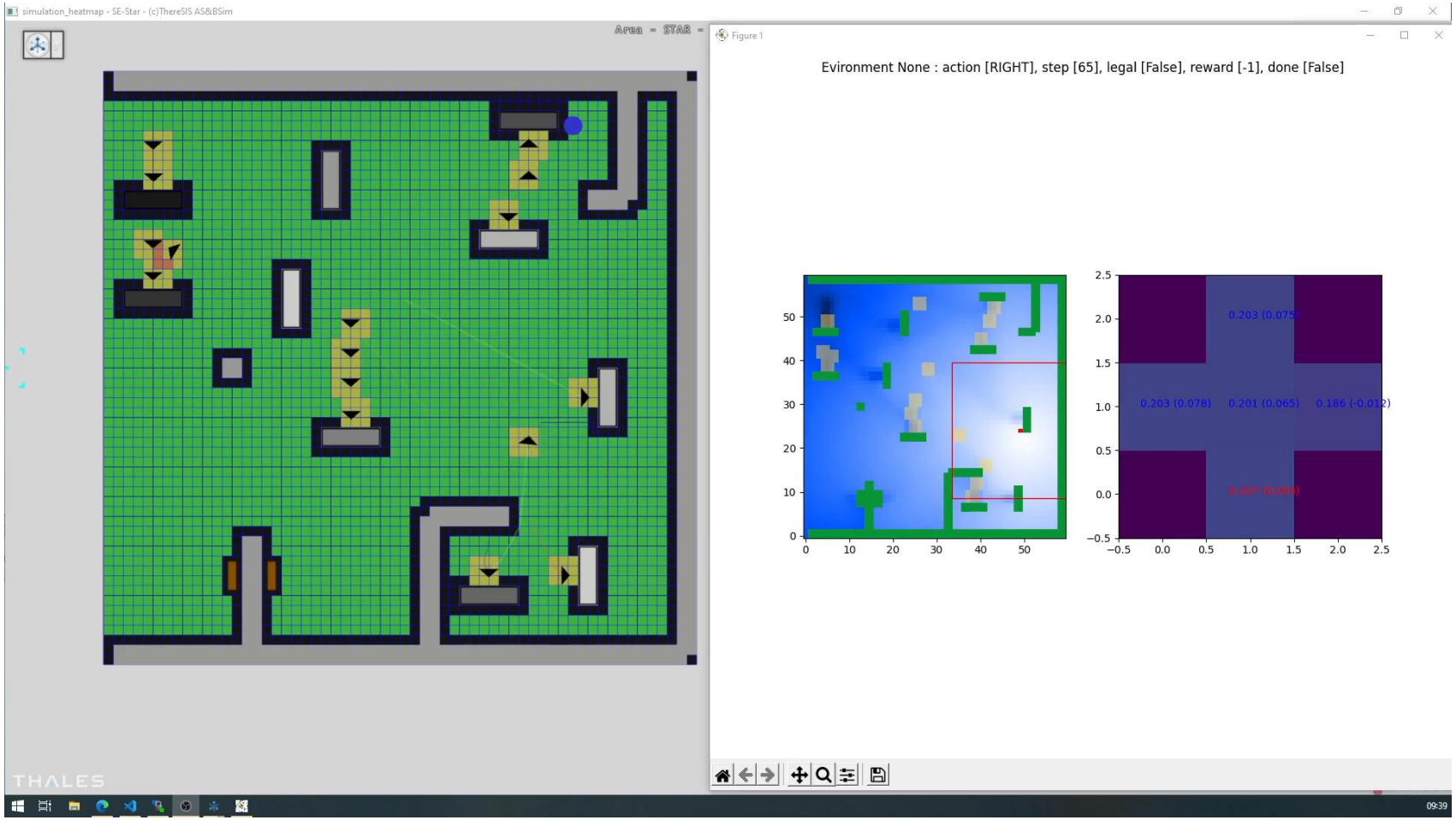
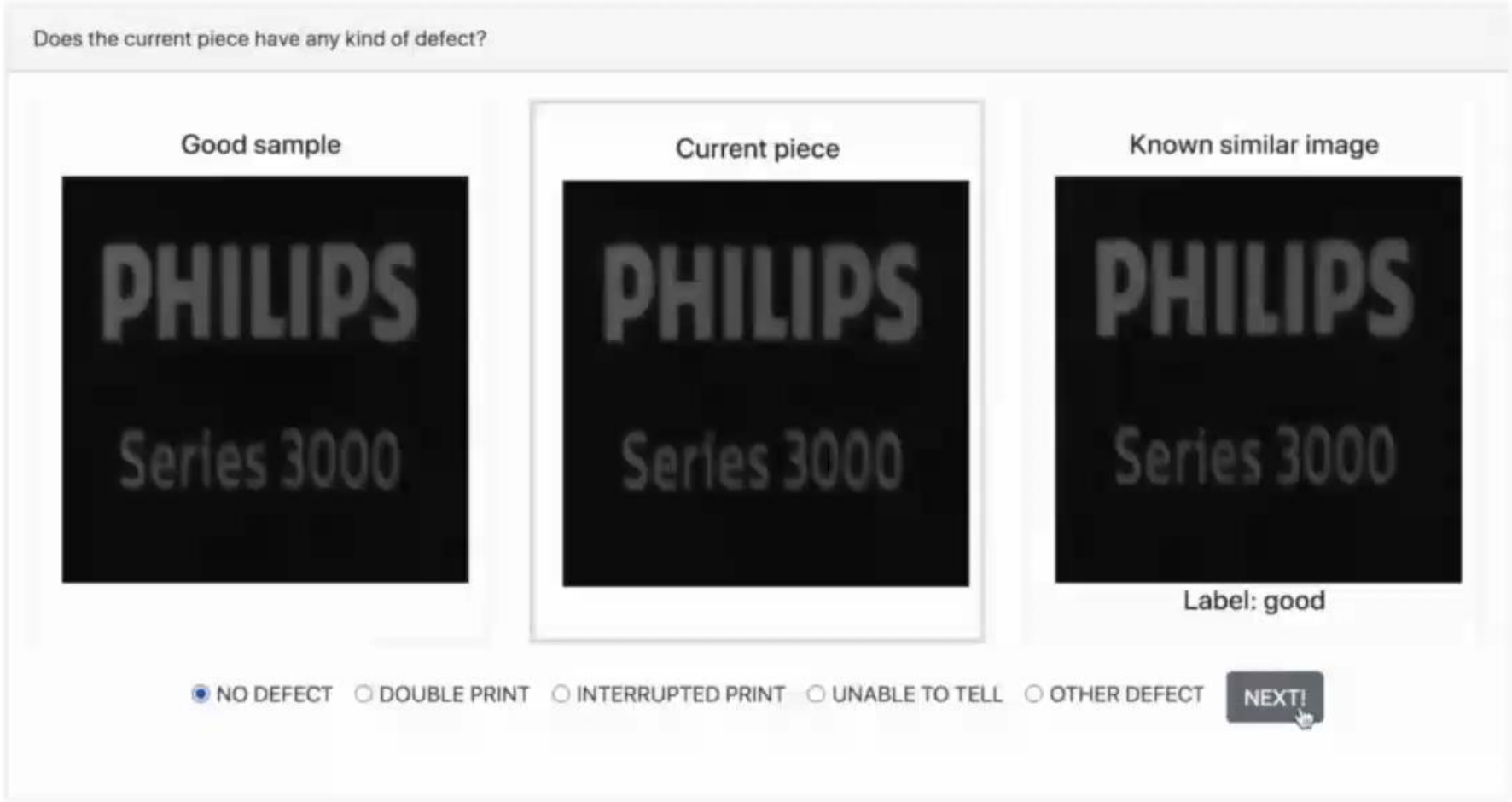

Number of person in the area : 1
16
14
12
10
8
6
4
2
0
ID : 92
Robotino (ID : 177)
Other (ID : 46)
0
5
10

Human – robot co-existence in shared industrial spaces




States
Results
START
Sequence
Camera
PicCounter
ProdCounter
Good parts
Bad parts
Mode
Trick
Cam
Files
LastProdNumber
LastPicCount
Error
Delete last files
Demo Mode

Human – AI teaming in quality control



AI Act and Applying the FRAIA Framework

Ethics & legal analysis questionnaire (Fundamental Rights & Algorithms Impact Assessment)

I. WHY? Intended effects of the system
II. WHAT? [Data (input)]; Algorithm (throughput)]
III. HOW? Implementation and use of algorithm (output)
IV. Fundamental Rights impact assessment

Source: STAR project deliverable, “Ethical and Legal Analysis”

Human – AI teaming: best of both

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Human Actor

Empower, inform, constrain, train, explain

Uses

Technical actor affordances and capabilities (computational, physical)

Exhibits

Amplification

Operational impact (on physical state; control/operational state)

Learning

Impact on Sociotechnical Systems

Sustainment

Information impact (on data, information, knowledge, decision, state)

Interaction

Exhibits

Human actor affordances and capabilities (cognitive, physical)

Uses

Enhance, inform, control, train

Technical Actor

Linked Data and Knowledge | Natural Interfaces Interaction | Active Trust Management | Human in the AI Loop | XR | Context Management | FAIR AI & Bias Management

Shared spaces – context – affordances - values – targets – understanding – actions

C. Emmanouilidis, S. Waschull, J. A. C. Bokhorst, and J. C. Wortmann, 'Human in the AI Loop in Production Environments', in IFIP Advances in Information and Communication Technology, 2021, vol. 633 IFIP, pp. 331–342, doi: 10.1007/978-3-030-85910-7_35.

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AI Solution Spaces in Industry Use Cases

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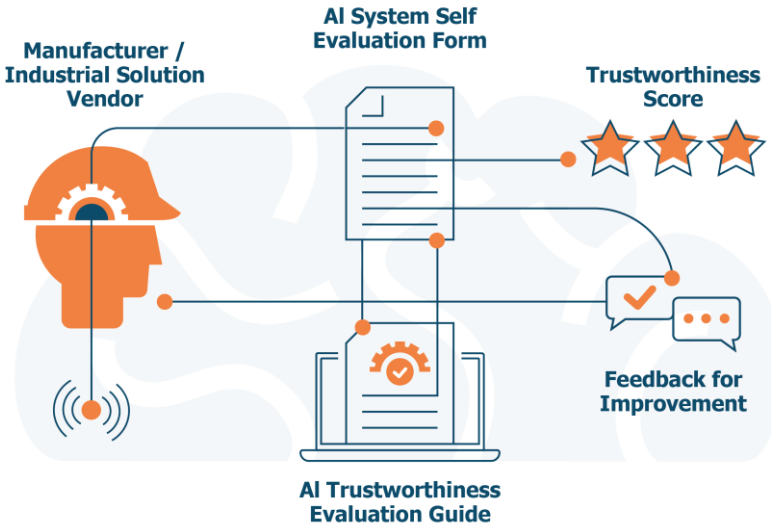
AI replaces humans	AI helps humans
Humans help AI	AI + Humans

Human + AI



ELSA dimension

Operational dimension

Technical dimension

Source: https://doi.org/10.1016/j.ifacol.2023.10.1891

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https://star-ai.eu/star-auditing-framework-trustworthy-ai

Hsbooster.eu AI Standardisation: AI Use Cases in Key Sectors, 27 June 2024

STAR project: examples of AI and domain-specific standards

Manufacturing Operations Asset Management Maintenance	Human Factors	AI	Quality and Trust	CEN presented earlier
ISO 22400x EN 62261-1 ISO 550xx EN 13306, 16646, …	ISO 9241x (SQuaRE: Systems and software quality evaluation)	ISO/IEC TS4213 ISO/IEC 25059 ISO/IEC TS4202x ISO/IEC 38507	ISO/IEC 250xx	CEN-CENELEC JTC 21
	ISO 6385 (Ergonomics principles in the design of work systems)	IEEE P700x IEEEP339x	ISO/IEC TS 273	

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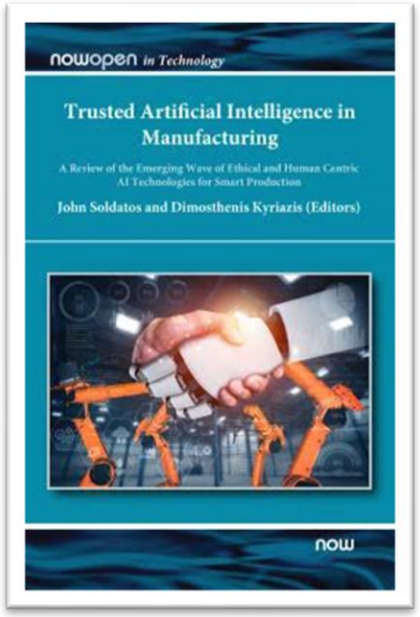
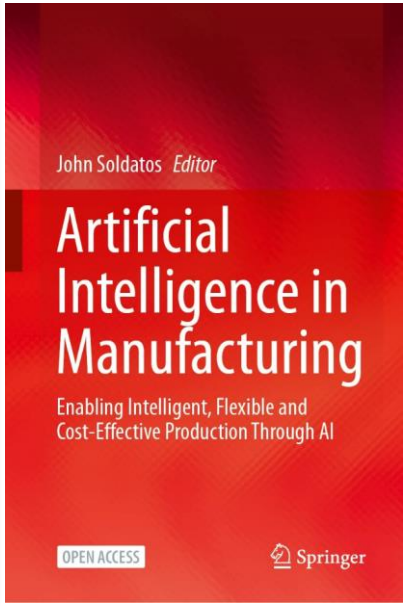
STAR: to probe further





- https://star-ai.eu/deliverables
- Review of applicable standards and regulations
- The STAR Auditing Framework for Trustworthy AI - https://star-ai.eu/star-auditing-framework-trustworthy-ai
- AI Norms and Standardisation: https://star-ai.eu/ai-norms-and-standardisation-road-ahead
- Human in the AI Loop: how organisations can assess human-centric AI systems in Manufacturing? https://star-ai.eu/human-ai-loop-and-how-organisations-can-assess-human-centric-ai-systems-manufacturing
- Bias Management for AI consistent with Human Values: https://star-ai.eu/bias-management-ai-consistent-human-values
- Humans and AI: Meeting the challenge of creating effective synergies in Manufacturing - https://star-ai.eu/humans-and-ai-meeting-challenge-creating-effective-synergies-manufacturing

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