

Human and Machine

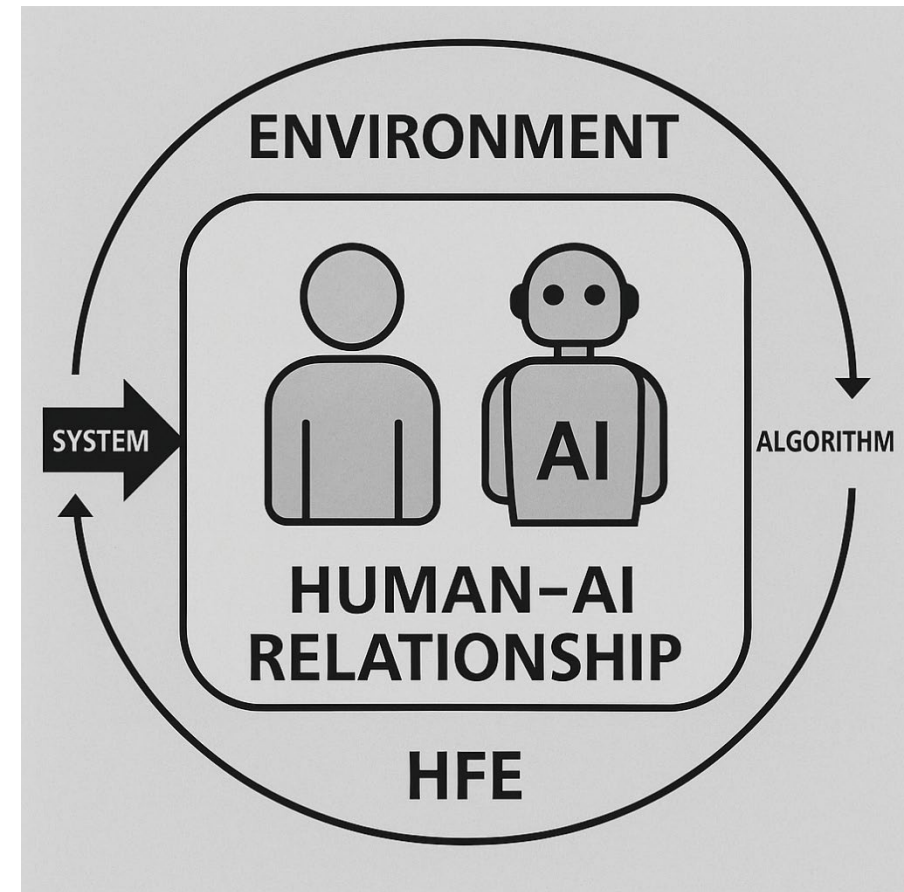
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AI is a new application domain for Ergonomics and Human Factors

- The goal of ergonomics has always been to optimise the interaction between humans and systems.
- AI adds a new layer: autonomous decision-making and learning systems.
- Yet the human factor and cognitive safety remain essential.





- The EU AI Act protects human safety and supervision.
- Key principles:
 - Human Oversight,
 - Transparency,
 - Explainability,
 - Predictability,
 - Safety
- These are also classical ergonomic principles.





AI Act Requirements vs. ISO 9241

AI Act principle	Practical UX/ergonomic requirement (ISO 9241-110/210)	Potential psychosocial negative impact in the workplace
Human oversight	Controllability, reversibility, “stop” option	Helplessness, feeling of loss of control; stress, increased responsibility anxiety; decision paralysis; fear of making mistakes
Transparency	Self-descriptive design, status feedback, logging	Uncertainty, worry due to lack of information; feeling of a “hidden system”; distrust toward the technology and the organisation
Explainability	Understandable reasoning, short description of the decision path	Lack of clarity → incomprehensible expectations, cognitive overload; constant stress due to questioning AI decisions; fear of being blamed
Predictability	Consistent patterns, surprise-free user interface	Unpredictable work environment, continuous state of tension; attentional overload; anxiety about errors
Safety	Fault tolerance, user protection, fail-safe behaviour	Fear of accidents, feeling of danger; increased stress reactions; long-term workplace tension; reduced trust in safety



AI Introduces New Psychosocial Risks

- AI is not only a technical challenge, but also a psychological one.
 - Feeling of continuous monitoring → mental tension
 - Automated feedback → emotional exhaustion
 - Blurred human–machine boundaries → identity and competence conflict.





AI, Work and Well-Being

- AI increases efficiency only if it does not reduce the quality of life.
- Flexible work ↔ constant availability
- Digital support ↔ information overload
- Automated evaluation ↔ lack of human feedback
- “I do it” ↔ “I correct it”



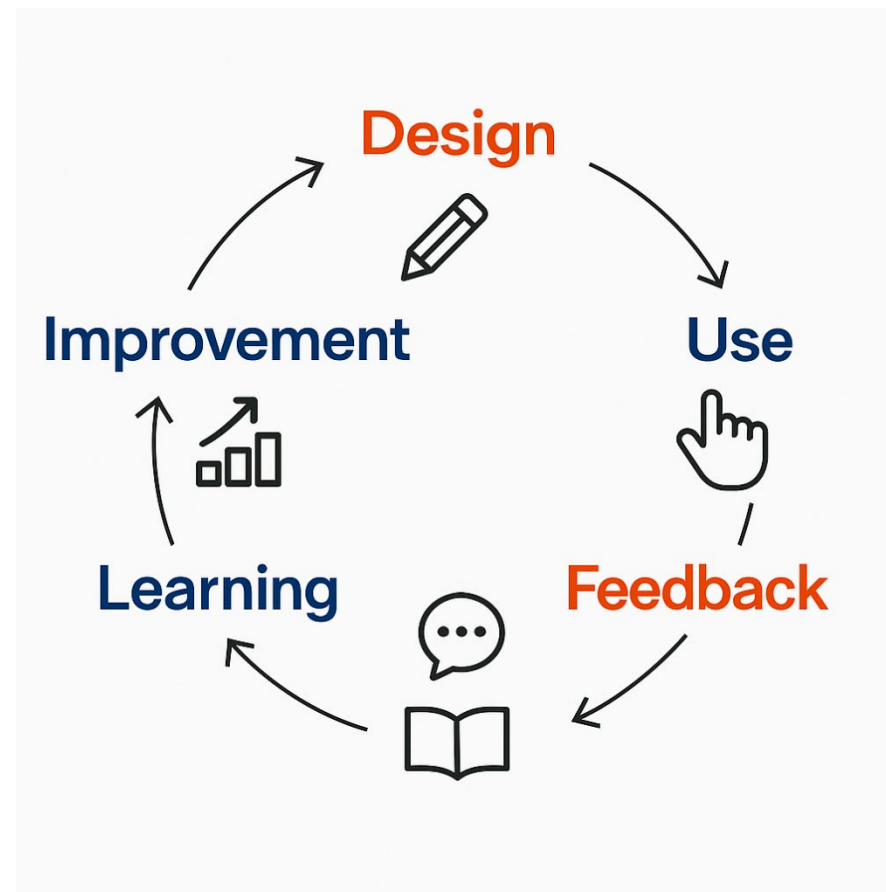
AI Benefits and Risks

Benefit (source: Thomson Reuters, 2024)	Description / Positive impact	Potential occupational safety and psychosocial risk	Example / Comment
Efficient processing of large data volumes (16%)	Automated data processing, faster decision-making	Mental overload, technostress, errors caused by information overflow	Continuous dashboard monitoring increases cognitive stress
Reduction of human errors (8%)	Higher accuracy, fewer manual mistakes	Loss of control, overreliance on algorithms, shifting of responsibility	“The AI decides, not me” – responsibility uncertainty
Advanced analytics, improved decision support (7%)	Better strategic insight, more objective decisions	Data dependency, reduced autonomy, decision-making stress	Leaders follow machine recommendations without human judgement
Creation of innovative solutions (3%)	New products, more efficient processes	Rapid changes, adaptation stress, pressure to acquire new competencies	Workers forced into continuous learning
Faster response time (3%)	Efficient customer service, less waiting	Time pressure, accelerated work pace, shorter breaks	Increased stress in real-time customer service systems
Better customer experience (1%)	Personalized service, fewer complaints	Emotional labour burden, constant performance pressure	“You always have to be positive” – psychological exhaustion
Development of new services (<1%)	Innovation, opening of new markets	Uncertainty, role loss, anxiety due to change	Job roles may disappear due to automation
Better communication with stakeholders (<1%)	Faster information exchange, transparency	Data protection concerns, constant availability, blurred boundaries	Demand for continuous online presence



Ergonomics: The Answer is Human-Centred AI Design

- The user is not passive—they are a partner.
- Users must be involved in the development cycle.
- Key aspects: clarity, acceptability, safety, learnability.





Thank you for your attention!
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