Task automation and implication for OSH
E. Heinold, P.H. Rosen, S. Wischniowski
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- Task automation
- OSH effects
  - Literature on AI-based systems and advanced robots
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Task automation via AI-based systems & advanced robotics
Bridging the gap between literature and practice

- 16 case examples, European and American
- 1.5 hour interviews with workers, OSH officer, technical engineer, workers council, management
- 11 use cases (+ 5 use examples)
  - Challenges and risks
  - Barriers and drivers
  - OSH impact
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Task automation (AI-based systems)

- Automation will eliminate specific tasks, as opposed to entire occupations
- The content of jobs is likely to change considerably over time
- Some of the professions most likely impacted:

**Focus on more cognitive complex tasks**

**Pre- and post-processing**
- Quality control officers
- Manufacturing workers
- …

**Supervisory role**
- Manufacturing workers
- Construction workers
- Miners
- Safety inspectors
- …

**Handling of special cases**
- Artisans and artists
- Service workers
- …

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Task automation (advanced robotics)

- Automation will eliminate specific tasks, as opposed to entire occupations
- The content of jobs is likely to change considerably over time
- Some of the professions most likely impacted:

  **Focus on more physical complex tasks**

  **Pre- and post-processing**
  - Researchers and knowledge based workers
  - Software developers
  - Journalist / authors
  - ... 

  **Supervisory role**
  - Medical health professionals
  - Administrative positions
  - Financial advisors and bankers
  - ...

  **Handling of special cases**
  - Teachers and other educators
  - Customer support workers
  - ...

Automation will eliminate specific tasks, as opposed to entire occupations.
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OSH effects

- When it comes to the automation of physical tasks through advanced robotics, the scientific literature discusses a number of OSH related topics.

- According to the taxonomy OSH implications primarily impact, psychosocial, physical or organisational aspects.

Physical effects
- Physical benefits
- Physical risks
- Long term physical health

Psychosocial effects
- Function allocation
- Task design
- Interaction design
- Operation and supervision

Organizational effects
- Introduction process and change management
- Cybersecurity
- Need for training
OSH risks and opportunities of AI-based systems

- FEAR
- STRESS
- POOR MENTAL HEALTH

- LOSS OF AUTONOMY
- LOSS OF MEANINGFULNESS
- DEPERSONALIZATION

- LOSS OF PRIVACY
- SELF-SCENSORSHIP

- FEAR
- STRESS
- POOR MENTAL HEALTH

- ACCIDENT PREVENTION

- QUALITY OF COOPERATION
- STRESS
- COMMUNICATION PROBLEMS
- CONFLICTS

- REDUCED WORKLOAD
- PERFORMANCE
- OVERRELIANCE
- AUTOMATION BIAS
- MISUSE

- UPSKILLING
- RESKILLING
- DESKILLING
OSH risks and opportunities of advanced robotics

- SOCIAL SUPPORT
- POSITIVE ATTITUDE

- DISTRUST
- AUTOMATION BIAS
- COMPLACENCY

- MOTIVATION
- SATISFACTION

- EMOTIONAL EXHAUSTION
- NERVOUSNESS
- IRRITABILITY

- ACCEPTANCE
- POSITIVE WORKFLOW

- STRESS
- PERCEIVED MONITORING
- UNCERTAINTY

- SOCIAL SUPPORT
- POSITIVE ATTITUDE

- FEAR OF JOB LOSS
- UNDERUTILISATION OF THE SYSTEM

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OSH risks and opportunities found in use cases (AI + robots)
OSH take aways

- The combination in which the challenges and risks appear can **differ greatly** from application to application.

- A base assumption that advanced robotic applications as well as AI-based systems face common challenges but may **differ in detail**.

- Education is vital, but **first-hand experience** seemed to have the strongest positive effect in reducing aversion.

- Use cases initially reported most significant changes on physical OSH, but interviews repeatedly showed that **psychosocial impacts were significant**.

- When asked for motivators and goals OSH improvement was named 100% of the time by use case.
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GOVERNMENT RESEARCH FACILITY

OSH IMPACT

<table>
<thead>
<tr>
<th>CHALLENGES</th>
<th>OPPORTUNITIES</th>
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<tbody>
<tr>
<td>Loss of expertise!</td>
<td>More time for actual research!</td>
</tr>
<tr>
<td>High job satisfaction!</td>
<td></td>
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Use cases
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Summary

- Most prevalent OSH opportunities for advanced robotics are the reduction of physical factors and the removal of workers from dangerous work environments.

- For AI-based systems there is a risk of loss of autonomy and depersonalisation.

- Psychosocial risks are becoming increasingly relevant for OSH in relation to advanced robotics and AI, as risks can arise from misuse due to misfitted trust or low acceptance, or automation bias.

- Proper training and upskilling should not be neglected, however, first-hand experience is vital to address many psychosocial risks.

- During the implementation, worker involvement is a significant contributor to a successful introduction of technology.

- All Use Cases intend to expand their use of these technologies in the future.
Thank you