



Trondheim, Norway, 30 June - 3 July 2025

Invited Session: AI Driven Warehousing and Distribution 5.0

Session Chairs:

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AI driven warehousing and distribution 5.0, a human-centric approach to intralogistic distribution, is a rapidly emerging area of opportunity for fundamental and application oriented research. Rapid advances in machine learning, computer vision, robotics, generative AI, digitalization and data-analytics, advanced simulation and digital twinning, etc. are changing the landscape of such systems. In fact, AI assisted systems consider the role of the human-in-the-loop even as rapid developments in AI technologies are increasing the levels of automation and autonomy in warehousing and distribution. Large warehouses and distribution centres are moving beyond hard-wired device automation and planning systems through the integration of smart and autonomous devices such as automated mobile robots (AMRs) with intelligent agent based planning and fulfillment systems. At the human level, AI is known to offer both cognitive and physical support to the worker.

This invited session aims to bring together papers and presentations that can collectively showcase AI driven warehousing and distribution in the Industry 5.0 context. They can be of a methodological or application oriented, or a combination of the two. AI methodologies include machine learning (supervised, unsupervised, reinforcement), generative AI and large language models (LLMs), context based simulation, digital twinning, data-driven or data-centric decision making, learning and adaptation, etc. Some applications find themselves in one of three AI assisted domains: device layer, intelligent agent layer, and human interface and control layer. Others could span a multitude of these domains.

Operations Research was the dominant methodology in optimization of warehousing and distribution systems and applied traditionally in optimizing the design, planning, and/or operations of such systems. While some researchers argue that traditional optimization using exact or heuristic methods such as evolutionary algorithms or variable neighbourhood search are part of the AI toolkit, we expect that papers submitted to this invited session will address issues relating to machine learning including pre- and post-processing: data capture, data processing, learning and/or adaptation.

Topics may include, but are not limited to:

- Machine learning techniques for design of warehousing and distribution systems
- AI driven smart warehousing infrastructure for optimal space utilization
- Supervised and unsupervised learning for enhanced planning in warehousing and distribution
- AI driven inventory planning and order fulfillment systems
- Reinforcement learning and/or deep reinforcement learning for enhanced operations support for warehousing and distribution
- AI driven material handling device control systems in warehousing and distribution including robotics, image processing, and computer vision
- Multiagent applications and decentralized control for planning or operations in warehousing and distribution
- AI driven monitoring and predictive maintenance in warehousing and distribution
- AI assisted human factors engineering in warehousing and distribution
- Generative AI applications in warehousing and distribution

INVITATION CODE: 47ewi

Draft papers reporting original research (limited to 6 pages in IFAC format) and extended abstracts are welcome.

When you submit your paper to the IFAC system, you will be required to enter the **invitation code xxxx** in order to associate your paper to the invited session: <https://ifac.papercept.net>

IMPORTANT DATES:

Draft papers/ extended abstract
submission deadline: **30.11.2024**
Final papers submission deadline: **28.02.2025**
Early registration opens: **28.02.2025**

Conference website:

<https://conferences.ifac-control.org/mim2025/>

Accepted papers will be published open access in Elsevier's IFAC-PapersOnLine. Post-conference special issues for extended versions of accepted papers are planned in IFAC and other high-ranked journals.