Introduction to the Minitrack "Intelligent Decision Support for Logistics and Supply Chain Management"

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Abstract

Data-driven analytical tools used to provide valuable decision support are continuing their success stories within the digital transformation wave that is swashing into every niche awaiting to be discovered and lifted as the "gold nugget" of knowledge as once upon a time named by data mining experts. Accordingly, application areas are vastly ranging from air cargo management through manufacturing and demand forecasting to maritime maintenance as presented in our minitrack.

Advances in *information and communication technology* (ICT) have enabled a plethora of automation efforts to take place. Based on these, the digital transformation seems accelerating its pace towards the digital supply chain. Business-to-business transactions are made via the Internet and *enterprise resource planning* (ERP) systems support managing transactions within and external to companies. Automation based on software bots helps to speed up the pace of transactions and related data giving an even more clear picture of the actual situation providing a solid fundament for intelligent decision support and analytics.

Sensor networks, social network activities, retail transactions, website/online shop search histories, etc. are just a few examples of sources to provide data to support efficient decision analytics. Big data issues are well recognized to offer long-waited opportunities, but also challenging data handling and decision analytics. This year's contributions span various methodologies and aspects of logistics and *supply chain management* (SCM) and provide an insightful picture of where the trend is going. We present them in alphabetical order of the authors.

Enthoven, Blohm, Hofmann, and Gordetzki [1] propose a method for supplier selection based on internal ERP data and publicly available secondary data to assess and automatically *predict supplier resilience using a tree-based supervised learning method* that greatly outperforms the human evaluation by 139 percent.

Kiefer, Grimm, and van Dinther [2] investigate *artificial intelligence in SCM and transfer learning to improve demand forecasting of intermittent time series with deep learning*. Transfer learning originates from computer vision and can be used to improve forecasting quality of intermittent demand time series and reduce the mean square error by 65 percent.

Mazur, Lee, and Schoder [3] *propose a GPU-accelerated approach to static stability assessments for pallet loading in air cargo*. Their approach allows to include more complexity which is highly relevant in practice. It is based on the emerging technology of graphical processing unit acceleration and physics engines. The authors provide abstracted design principles.

Nahhas, Kharitonov, and Turowski [4] use *deep reinforcement learning techniques for solving hybrid flow shop scheduling problems applying proximate policy optimization (PPO) and asynchronous advantage actor-critic (A3C)*. The latter are applied to successfully solve problems with different complexity levels.

Finally, Pahl [5] investigates the *current state of maritime maintenance and spare parts logistics* and analyses the methods proposed in the literature for (bulk) shipping companies to move towards joint condition-based maintenance and spare parts logistics management. Some data-driven approaches exist, but the literature is very scarce. Moreover, shipping companies need to reorganize their processes and ICT to be able to adopt advanced decision support tools.s

References

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