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

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Information technology (IT) is a prerequisite for successful supply chain management today and will become even more so in near future. While IT systems are vital components in supply chains, their successful management rests on coordinated decision making throughout the logistics network. Data warehouses and data mining can be used to store and analyze product, inventory, and sales information. Simulation and optimization can be employed for, e.g., inventory, production, procurement, and distribution planning. Intelligent agents can, e.g., communicate with different partners in the supply chain, assist in collecting information, share product information, negotiate prices, and distribute alerts throughout logistics networks.

This minitrack consists of eight contributions which deal with intelligent decision support in the field of logistics and supply chain management. The papers provide a heterogeneous yet complementary ensemble as they consider different approaches in coping with the uncertainty and complexity found in real-world decision situations.

Jörg Homberger and Hermann Gehring describe a new parallelized genetic algorithm for the uncapacitated warehouse location problem. High-quality results are provided for a large set of benchmark problem instances.

Inventory management is generally faced with uncertain data. Kaj-Mikael Björk studies problems with fuzzy cycle times and provides an analytical solution for the case where cycle times are symmetrical triangular fuzzy numbers.

Geon Cho, JaeJon Kim, Choon-Sup Noh, Soon-Hoo So, Yi Sook Park, and Kyung Ho Jung consider an original optimal decision making model for a two echelon supply chain partnership. They derive a win-win strategy combination for both the supplier and the buyer.

Decision making often involves achieving a consensus among several people in a group. Mario Fedrizzi, Michele Fedrizzi, Ricardo Alberto Marques Pereira, and Matteo Brunelli study the modeling of consensus reaching when the individual testimonies are expressed as fuzzy preference relations. They propose a fuzzy consensual dynamics model which is analyzed by means of computer simulations.

As real-world decisions are often to be made in the presence of large amounts of dynamically collected and uncertain data, IT tools are needed for supporting the various tasks of the decision making process. Alexander Brodsky and X. Sean Wang consider the integration of different methods that are involved in effective decisions support systems, namely data acquisition, learning, prediction, and optimization. In particular, they propose a stochastic relational data model and a related SQL-based query language, which supports the construction of data sets for learning, probabilistic prediction, and optimization.

Vasileios Zeimpekis, George Giaglis, and Ioannis Minis present the development and evaluation of a real-time fleet management system in order to cope with the dynamics of a city logistics environment. Delivery vehicles are monitored in real time, which allows adjusting the distribution schedule by rerouting strategies. Results show that delivery performance is significantly enhanced and customer satisfaction is improved.

Henning Baars, Hans-Georg Kemper, Heiner Lasi, and Marc Siegel study data acquisition by means of RFID in order to improve decision making within supply chains. Their analysis, which is based on two retail supply chain scenarios, indicates the importance of effective means for the acquisition and integration of detailed data.

Alexander Brodsky, Malak Al-Nory, and Hadon Nash describe an extension of the programming language Java in order to support simulation and optimization with applications in supply chain management. The proposed approach offers the advantages of a simulation-like model development, testing and extensibility, while also integrating a mathematical programming solver.