

Data-driven simulation modelling in logistics

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The field of discrete event simulation is widely used for logistics simulation. It can be found for analysing transportation networks structures, warehousing operations like storage and order picking, production plants in many industrial sectors and also complete supply chain activities. Many simulation software tools and libraries provide logistics functionality. They offer possibilities to easily model a simulation case most often with a graphical editor or directly by software code, to run experiments and to analyse the result data of these experiments. This is common practise and known as model-driven modelling; simulation models are created to prescind and visualise real world scenarios. These simulation models imply the intrinsic problem that they focus on only one special constellation and definition of the simulation case. If the external circumstances - or any assumptions about it - change, the simulation models themselves have to be changed each time. This means a lot of model-building work and demands simulation expertise. Therefore due to the costs the application of simulation most often is reserved to bigger companies and research institutes. Data-driven modelling techniques provide the possibility to reduce adaptation work and make simulation models more long-lasting and ruggedised in respect to a changing simulation case. This work comes up with a reflection of state-of-the-art data-driven modelling techniques and reports on implemented sample cases in the world of logistics. It demonstrates the basic concepts behind data-driven modelling, deals with its benefits to the underlying simulation case and shows challenging aspects in the implementation of data-driven modelling for more and less complex examples of use.