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“From Small to Large Data – How Can We Leverage Synthetic Data for ML in Operations & Supply Chain Management”

Abstract: “Data-driven, End-to-End, automated” is the vision underlying many of the new approaches that have recently been developed in the ML-community (e.g. deep reinforcement learning, attention learning). These approaches are typically very “data-hungry”. In many real-life settings in OM and SCM, however, we oftentimes do not have large enough data to exploit these new approaches and to live up to this vision. For inventory and capacity management, for example, we may have a large number of explanatory variables (“features”), but often only have a very limited number of relevant historical observations, as we take decisions on a daily, weekly, or monthly basis. “Small data” causes a number of theoretical and practical problems that may – at least to some extent – be remedied by new generative ML-techniques. The idea of these techniques is to first implicitly learn the unknown data (demand) generating process, and then to generate large multi-variate artificial data. In this talk we present the first results of our work on synthetic data generation, outline problems and limitations, and discuss the future potential of such approaches.

Biosketch: Richard Pibernik is a Full Professor of Logistics & Quantitative Methods at the University of Würzburg in Germany. In Würzburg he heads a research group dedicated to data-driven Operations and Supply Chain Management. Richard is also an Adjunct Professor at the Zaragoza Logistics Center and a Visiting Professor at the Malaysia Institute for Supply Chain Innovation – both institutions are part of MIT’s Global Scale Network. Richard has published his research in numerous renowned international journals and has been responsible, as a principal investigator, for many projects that were funded by industry and public funding agencies. His team is currently working with numerous companies on projects focused on data-driven Supply Chain Management, Supply Chain analytics, and exploitation of big data in Supply Chain Management.