Guest editorial: Artificial intelligence and machine learning in business and management

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Artificial intelligence (AI) is the enhancement of computers so that they can perform complex activities and tasks in ways that can be labeled as intelligent. Machine learning (ML) is a branch of AI where algorithms are used to learn from data to make decisions or predictions. Timely research subjects in AI and ML are: reinforcement learning, ethics in AI, quantum computing, convergence of AI and other emerging technologies, facial recognition, biased data, neural networks, socioeconomic models, deep learning and privacy protection (Alpaydin, 2014; Jiang, 2021; Shalev-Shwartz and Ben-David, 2014).

AI and ML are drawing considerable attention these days. An already large and fast-growing literature covers a wide range of real or soon-to-materialize applications, from dealing with autism and detecting breast cancer to selecting job candidates, setting legal sanctions and deciding upon conditional liberations. Managers, among many others, are now in need of a compass that would allow them to navigate lucidly through the hype (Bryson *et al.*, 2021; La Torre *et al.*, 2021; Jammeli *et al.*, 2021 and the references therein).

This special issue aims to start developing such a compass. It includes novel contributions and innovative ways of applying AI and ML techniques to business. It also covers most generic managerial tasks, assessing for each one the extent of the support AI and ML can bring and the consequences on managerial practices.

In Al Janabi (2021), the author examines, from a commodity portfolio manager's perspective, the performance of liquidity adjusted risk modeling in assessing the market risk parameters of a large commodity portfolio and in obtaining efficient and coherent portfolios under different market circumstances. Using reinforcement machine learning techniques, the implemented market risk modeling algorithm and investment portfolio analytics can simultaneously handle risk-return characteristics of commodity investments under regular and crisis market settings, besides considering the particular effects of the time-varying liquidity constraints on the multiple-asset commodity portfolios.

In Fadaei PellehShahi *et al.* (2021), the authors propose a method which combines deep learning methods (the recurrent neural network and Markov chain ones, in particular) to predict the final status of an ongoing process or a subsequent activity in a process. While semistructured business processes cannot be predicted by formal analytical methods, AI can be successful at it. The proposed method applies the BestFirst algorithm for the search section and the CFSSUBSETEVAL algorithm for the feature comparison section. The study focuses on the prediction systems of social insurance and presents a method which is cost efficient in providing real-world results based on past history of an event.

In Khashei and Chahkotahi (2021), the authors propose a linear optimal weighting estimator (LOWE) algorithm to find the desired weight of components in a global noniterative universal manner. Although it can be generally demonstrated that the performance of the proposed weighting technique will not be worse than the metaheuristic algorithm, its performance is also practically evaluated for real-world data sets. Empirical results indicate that the accuracy of the LOWE-based parallel hybrid model is significantly better than metaheuristic as well as simple average (SA) based

models. For electricity load forecasting, the proposed weighting approach can improve 13/96%, 11/64%, 9/35% and 25/05% the performance of the DE, GA, PSO and SA-based parallel hybrid models, respectively. Yet, its computational costs are considerably lower than GA, PSO and DE-based parallel hybrid models. Therefore, it can be considered as an appropriate and effective alternative weighting technique in efficient parallel hybridization for time-series forecasting.

In Ledhem (2021), the author analyzes various data mining techniques for predicting the financial performance of Islamic banking in Indonesia. The author determines the best data mining technique based on the criteria of the highest accuracy score of training and testing by comparing LASSO regression, random forest, artificial neural networks (ANN) and K-nearest neighbor on monthly data sets of all the full-fledged Islamic banks working in Indonesia from January 2011 until March 2020. The experimental results show that the K-nearest neighbor technique performs better than the others when dealing with predicting accuracy.

In Mousa and Kamel (2021), the authors seek to develop and test a framework for the integration of data envelopment analysis (DEA) and ANN, to predict the best financial performance concerning return on assets and return on equity for banks listed on the Egyptian Exchange.

In Tariq et al. (2021), the authors propose a model to assist e-business in predicting churned users. The proposed model uses a 2D convolutional neural network (CNN). It presents a layered architecture comprising two different phases – a data load and preprocessing layer and 2D CNN layer. In addition, the Apache Spark parallel and distributed framework is used to process the data in a parallel environment. Training data is captured from Kaggle by using Telco Customer Churn.

In Sundarakani et al. (2021), the authors investigate how AI and ML techniques are being applied and implemented within supply chains. Using a systematic literature review methodology, they analyze the publications available on Web of Science and Google Scholar that linked both AI and supply chain from one side and ML and supply chain from another side. A total of 30 articles are carefully reviewed. Future research directions are thereby articulated.

In Sadri et al. (2021), the authors propose a new approach to evaluate port performance evaluation based on greenness and intelligence criteria. This approach performs evaluations in two stages and a network. Using a two-stage network DEA approach over four years, the performance of 11 Iranian ports is appraised. Results indicate that only 5% of the ports meet the standards of intelligence and greenness.

In Shilbayeh and Vadera (2021), the authors report on the use of a meta-learning framework for recommending cost-sensitive classification methods with the aim of answering an important question that arises in machine learning, namely "Among all the available classification algorithms, and in considering a specific type of data and cost, which is the best algorithm for my problem?" The framework is based on the idea of applying ML to discover knowledge about the performance of different ML algorithms. It includes components that repeatedly apply different classification methods on data sets and measure their performance. The characteristics of the data sets, combined with the algorithms and the performance, provide the training examples. A decision tree algorithm is applied on the training examples to induce the knowledge which can then be used to recommend algorithms for new data sets. The proposed solution is implemented in WEKA, and evaluated by applying it on different data sets and comparing the results with the existing studies available in the literature. Results show that a developed meta-

learning solution produces better results than METAL, a well-known meta-learning system.

All in all, readers will find that this special issue's contributions relate to several themes of interest to managers, such as automation, data analytics and natural language processing, the integration of AI and ML into business processes, customer profiling, marketing segmentation, fraud analysis, marketing messaging, financial forecasting, fashion design, personalized advertising, sentiment analysis, organizational and team design, human resource management, motivation, job design, training, knowledge management, leadership and business ethics. We hope the ground will thereby be set for further insightful and useful inquiries.

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