

Editor's Note

MACHINE learning (ML) is generating new opportunities for innovative research in areas apparently unrelated such as, economics, business or/and finance [1]. Specifically, it has also been widely used in applications related to the economic and financial analysis, such as economic recessions prediction, labor market trends, risk management, prices analysis among others [2].

However, it is important to note the differences between classical statistics/econometrics and machine learning. On the one hand, econometrics set out to build models designed to describe economic problems, while machine learning uses algorithms, generally for prediction, classification, and also, can manage a large amount of structured and unstructured data and make fast decisions or forecasts. As S. Athey [3] points out, perhaps “a key advantage of ML is that it frames empirical analysis in terms of algorithms that estimate and compare many alternative models. This approach contrasts with econometrics, where (in principle, though rarely in reality) the researcher picks a model based on principles and estimates it once”.

This Special Issue presents nine contributions that illustrate both approaches in the domain of economics, finance and business. We have classified them in three broad categories: economic modeling, language processing and business applications.

Among the first set, Cadahia et al., applied a decision-tree ensemble method to examine the variable importance of Treasury term spreads to predict US economic recessions with a balance of generating rules for US economic recession detection, demonstrating that machine learning methods are useful for interpretation comparing many alternative algorithms. This contribution is followed by the contribution of Rodríguez-Santiago, who manages a new dataset of 117 countries in the 2005-2019, using a Bayesian Model Averaging (BMA) allowing fixed effects and investigating the existence of heterogeneity, allowing interactions of the focus variable with other regressors it evaluates the robustness of determinants of the variation of self-employment rates across countries by variations in the unemployment, the stage of economic development and the variations in labor market frictions.

Sanchez Fuentes closes this initial set introducing a solution of the Parameterized Expectations Algorithm, a widely applied method for solving nonlinear stochastic dynamic models with rational expectations, based on asymptotic properties.

Natural language processing is among the most interesting areas of artificial intelligence. Recent developments in this field have enabled very significant advances in financial applications ranging from market sentiment analysis to fraud detection. This special issue features two studies. One focused on news extraction and the other on stock trend prediction.

The former, authored by Dogra et al., discusses multiclass financial text news classification. The article describes the difficulties posed by imbalanced datasets and elaborates on the solutions that have been proposed in the literature, such as over-sampling, down-sampling, and ensemble approach. It then reports the results of a benchmarking exercise of different classifiers on banking news extraction. The latter, by Chen et al., proposes an approach to build an ensemble classifier using sentiment in Chinese news at sentence level and technical indicators to predict stock trends. The system combines three different classifiers, a positive and a negative stock trend prediction model based on sentiment values, and another one that relies on Bollinger bands.

The third set of articles illustrates the potential of machine learning to tackle real-world business problems. The body literature on this

matter is extremely abundant, as the range of possibilities is almost endless. We present four contributions in this regard.

Alejandro Baldominos et al. focus their attention on the spot instance price prediction in AWS cloud. These authors benchmark nine classic machine learning algorithms and observe that performance varies very significantly among instance types. They subsequently describe how they use these models to develop a prediction-as-a-service system in the cloud.

Ejiyi et al. present a similar exercise in the domain of building insurance prediction. They test the potential of six algorithms to predict whether a customer will submit claims on his/her property or not based on the attributes of the building and some characteristics of the policy. The authors also dive deep in the analysis of feature relevance using Shapley Additive Explanations.

The third piece of research on business applications of machine learning discusses a very interesting case study on food and beverage sourcing for the hospitality industry. Sánchez Torres et al. explore the potential of hierarchical agglomerative clustering to identify similar products in the catalogs made available by suppliers to hotels. The decision support system described in the paper has the potential to have a positive impact both in customer satisfaction and cost effectiveness.

Finally, the extraction of information derived from a large amount of structured data, is the main topic in the work by Asensio et al. They collect data from customers who enquire about university programs, showing that data-driven business management offers itself as a solution to improve the design of promotional strategies.

The issue ends with a tenth article, not specific to the core topic of this special issue, but on a general topic of interest for the community of scientific authors. Razzaq et al. propose the use of dynamic co-authorship and citation networks to study the influence of research collaboration on different aspects such as area, quality or performance of the research.

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