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Guest Editorial

Computational Intelligence in Finance and Economics

Complexities of the financial world and economic systems have grown dramatically with new financial products and risk control systems. Institutions and investors deal with an enormous degree of volatility and uncertainties which in turn require complex systems and computing technology to model real phenomena. Technologies and knowledge in computer science have also broken new ground in terms of representation of complex systems, system identification and computing capacity with developments in both hard and soft components of computational engineering. In this context, computational finance and computational economics have established themselves as distinct and sophisticated lines of research.

In a similar vein, large corporations, banks and hedge fund firms have invested massively on financial engineering and machine learning systems particularly in algorithmic trading and dynamic risk assessment platforms. Currently, more than 2,000 active listings search for financial engineers in only greater New York City area. Fresh graduates from various fields including mathematics, computer science or physics step into this huge market. Considering the size and impact of computational finance and economics, the scholarly publications and research in this area have great spillovers and very practical implications in the real world.

In this environment, IEEE CIS Technical Committee on Computational Intelligence on Finance and Economics leads a variety of efforts such as its flagship event on Computational Intelligence for Financial Engineering and Economics (IEEE CIFEr). This special issue was a joint initiative of the Editor-in-Chief of the magazine and former chair of the technical committee (CIFEr). As guest editors, we received many interesting contributions addressing a wide range of research questions related to risk valuation, predictive analytics, agent-based modelling, stock pricing, market sentiment harvesting, among others. We would like to thank both authors and reviewers for their efforts in sharing their work, evaluating papers in-depth and eventually bringing this special issue to the final stage. We gratefully acknowledge the Editor-in-Chief, Prof. Hisao Ishibuchi, for giving us the opportunity, and also other supporting staff.

The first article proposes an extended benchmark suite for the performance evaluation of machine learning techniques in the agent-based computational economics. Martin Prause and Jürgen Weigand present an open benchmark suite of a holistic economic model machine learning and other Computational Intelligence techniques (*Market model benchmark suite for machine learning techniques*). The benchmark suite is able to reflect a dynamic multi-market and multi-product environment with few producers and many consumers, so it provides a realistic business simulation environment for strategic management.

In the second paper, the authors deal with text mining for harvesting market sentiment from social media comments by utilizing the long short-term memory (LSTM) neural network architecture. Frank Z. Xing, Erik Cambria and Roy E. Welsch propose a novel approach to the asset allocation problem based on collecting and executing text and reflecting sentiments embedded in texts to predictive information (*Intelligent asset allocation via market sentiment views*). The proposed sentic computing approach employs a different approach to natural language analysis which even outperforms Google Cloud Natural Language API in some aspects. Comparing to some benchmark portfolios, sentic computing platform offers significant improvements in terms of annualized return or Sharpe ratio.

In the third piece, Chuan-Ju Wang and Tian-Shyr Dai investigate a pricing model for the catastrophe equity put in insurance companies (*An accurate lattice model for pricing Catastrophe Equity Put under the jump-diffusion process*). Catastrophe equity put (CatEPut) is a financial engineering solution to generate cash inflow in an emergent case such as a disaster which triggers a huge number of claims and requires sufficient liquidity. For dealing such catastrophic cases, CatEPut gives the opportunity to generate rapid liquidity (cash injection) to handle claims and maintain financial sustainability. In this paper, the authors deal with the combinatorial exposition problem due to the nonlinearity error led by the accumulated-loss trigger of CatEPut.

We consider that these three articles pose significant contributions and illustrate some of the possibilities for the applications of Computational Intelligence in the domain of Finance and Economics.

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