Karlsruher Institut für Technologie

EnBW

Institut für Industriebetriebslehre und Industrielle Produktion
Lehrstuhl für Energiewirtschaft

ITS

Master Thesis at EnBW (external)
Improving Product Valuation in the Energy Market via Generative Adversarial Networks (GANs)

Background

Financial product valuation is essential to support trading and risk management decisions at EnBW. A standard method to perform the valuation of financial products under uncertainty is to estimate their return for alternating scenarios. These scenarios are usually simulated with Monte-Carlo methods, where stochastic variables are randomly sampled according to prescribed distributions (normal, log-normal, etc), for which the parameters depend on observed market-related figures (volatility, risk-free interest rate, etc). For sophisticated products, this leads to a considerable number of simulations and high computational expenses. With better simulation approaches, the valuation could be done more accurately with less resources. Recently, implicit generative machine learning models such GANs have shown promising results in creative tasks, including time-dependent, high dimensional problems. The goal of this study is to utilize the power of GANs to generate realistic market scenarios to depict the uncertainties in market conditions.

Content of the work

- Literature research on GAN applications for modelling time series, particularly in finance
- Design and application of state-of-the-art GANs architectures to generate scenarios for energy market time-series (e.g., power prices)
- The implementation has a significant potential and we support the publication of the outcomes in international scientific journals

Requirements

- Proven, strong background in energy market AND machine learning methods
- Python programming skills
- Good oral and written communication skills

The student will be employed by EnBW during the work with a competitive salary.

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