Using neural networks to forecast stock prices with simulated data

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Machine Learning techniques are widely used in the financial market, many of which requires the same information as its input but different tasks. This project proposes the creation of a single corpus capable of solving multi-task problems, inspired on the success of language models, such as BERT and GPT-3, in solve generic problems, such as text generation, summarization and even basic arithmetic operations.

To create a robust multi-task model in any area, a robust **dataset** is also crucial. So, instead of retrieving information from diverse financial markets, this project proposes the creation of an artificial dataset, which can be expanded as much as we want. Our first efforts are on a model that could solve problems using stochastic volatility models, which are very important to the stock market.

Referências:

[1] HESTON, S. L. A closed-form solution for options with stochastic volatility with applications to bond and currency options. Review of Financial Studies, v. 6, n. 2, p. 327-343, 1993.

Objectives

Inspired in recent findings [1] that show the possibility of generating artificial samples which behaves with the same behavior as it's input, just as showed in the Figure on the left, this project objective is to develop a framework capable of generating random samples, with cost effective functions, while also retrieving important information about it's input.

Using defined parameters explained by this work [3] called Signatures, which encodes the information

[2] Hans Buhler et al.A Data-driven Market Simulator for Small Data Envi-ronments. 2020. arXiv:2006.14498 [q-fin.ST].

[3] Terry Lyons. Rough paths, Signatures and the modelling of functions onstreams. 2014. arXiv:1405.4537 [math.PR].

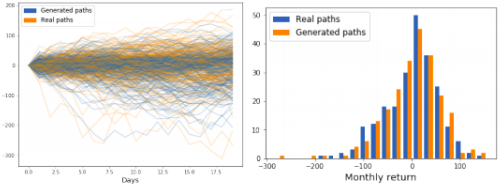

Figure: Sample Generation with Variational Autoencoders [1]

Métodos e técnicas

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Distribuição

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Resultados e conclusão

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Distribuição

$$p(x) = A.e^{-\beta V(x)}$$

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4	5	6
7	8	9

Table: A simple table

Agradecimentos:

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