



# THE APPLICATION OF MACHINE LEARNING TO FINANCIAL MARKETS

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*Artificial intelligence, and in particular machine learning, can play beneficial roles within investment management.*

## What is Machine Learning?

Although the terms Artificial Intelligence and Machine Learning are often used interchangeably, they mean quite different things. AI is a broad catch-all term that describes the ability of a machine – usually a computer system – to act in a way that imitates intelligent human behavior. In contrast, Machine Learning is the study of the algorithms and methods that enable computers to solve specific tasks without being explicitly instructed how and instead doing so by identifying persistent relevant patterns within observed data.

## How is Machine Learning used in investing?

Machine Learning can be used in investing in the following ways:

- Market movement prediction e.g. where is the price of oil heading?
- Prescribing the next possible actions for the next period e.g. which position should an investor take to optimize returns?
- Generating features from data which deliver some insight and

have predicting power e.g. how can data related to the oil market help to inform my approach?

- Validating existing trading strategies e.g. how can Machine Learning help to identify biases and/or validate my trading strategy?

While Machine Learning can be applied to investing in several ways, a combination of all of the above is typically the most effective. Insights gleaned from data, for example, can only produce positive results when used to predict where the market may go next, and what the optimal position should be.

## What are the fundamental components of a Machine Learning based strategy?

The two critical parts of any Machine Learning based strategy are data and algorithms. Both are equally important. When talking about data, we can subdivide this into three parts:

- Time series for all relevant instruments e.g. what are the historical prices for oil and the

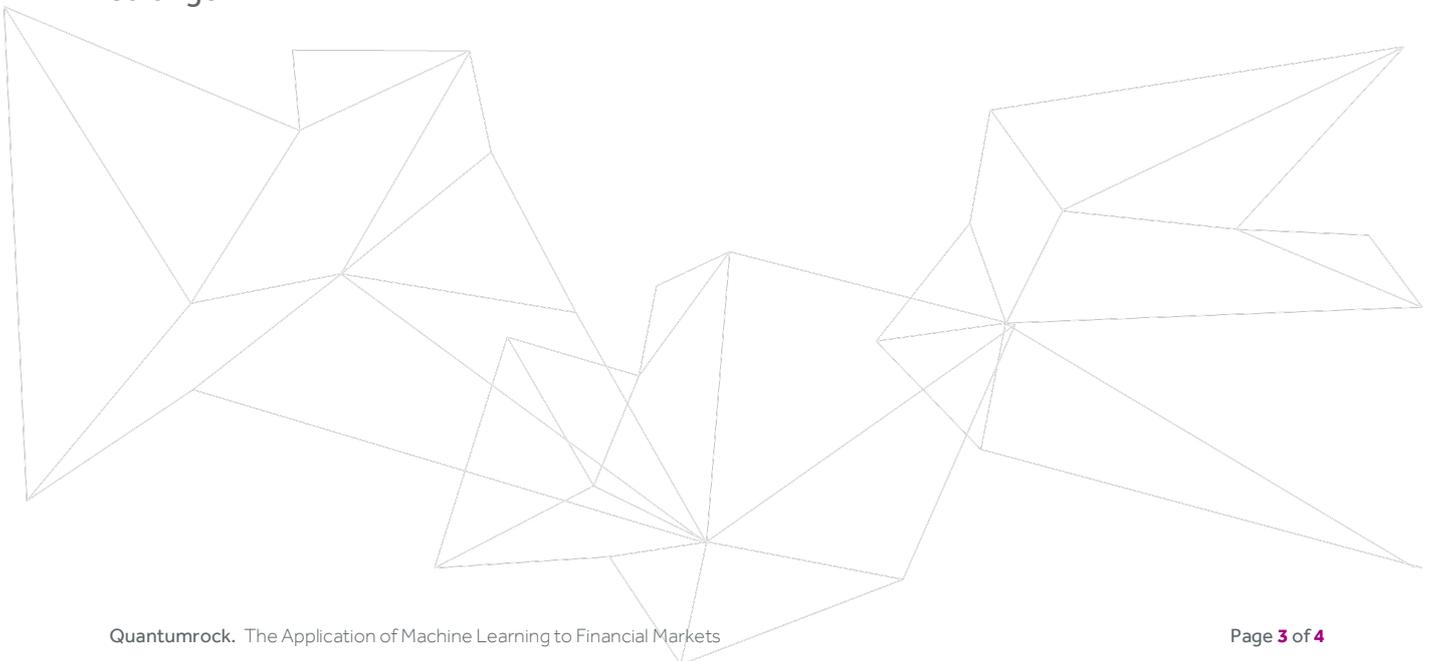
instruments that might be relevant for trading oil?

- Contract and exchange specifications
- Fundamental data e.g. what data sets can I use to help with my strategy such as periodic reports on the U.S. economy?

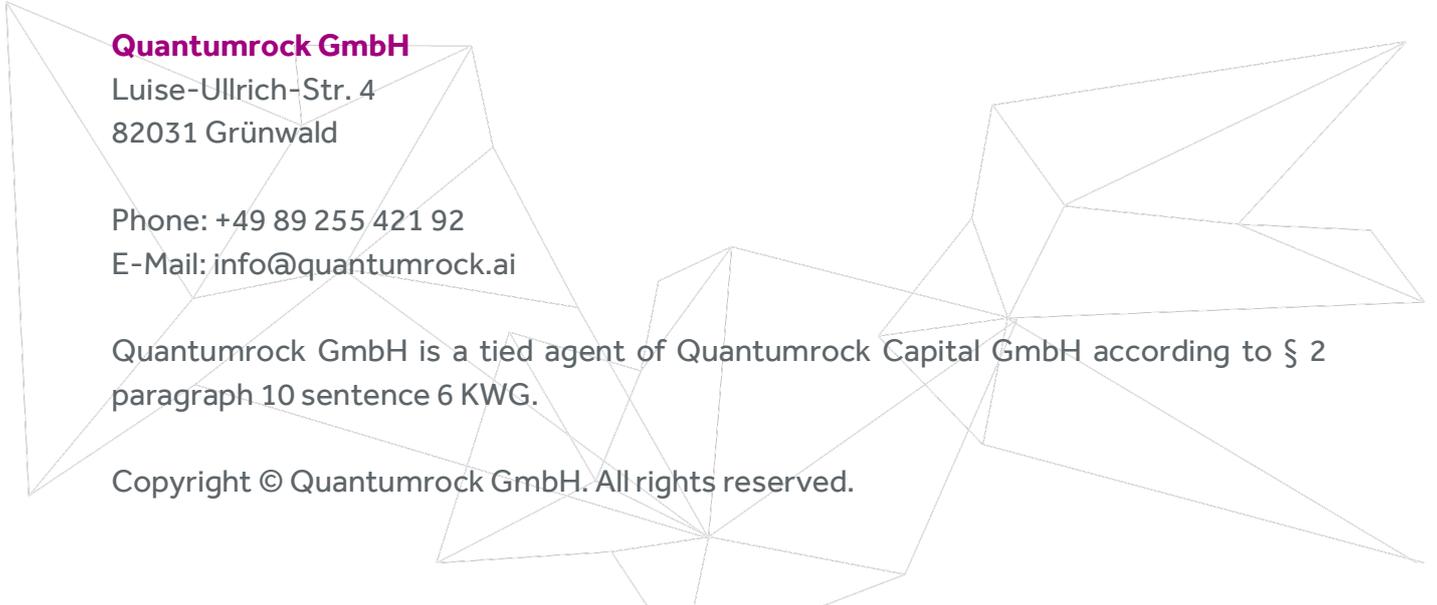
Meanwhile, the use of algorithms, the way in which the model is built and evaluating its overall effectiveness must also be given careful consideration.

### **What kind of opportunities can Machine Learning provide investors?**

Ultimately, Machine Learning strategies can benefit investors in two ways: diversification of their portfolio and the reduction of risk. Keeping in mind the investment management industry's struggle to adapt to chaotic markets disrupted by the coronavirus, the case for investors looking to add non-correlating strategies has never been stronger.



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