Artificial Intelligence in Finance

Opportunities and risks you need to know

Key Ideas

- Asset managers seek to exploit the surge in newly captured data with the expectation of getting an investment edge that will differentiate them from the crowd.
- Artificial Intelligence is ultimately a tool that's more of an art than a science, and is still in its infancy.
- Not all data is created equal. The quality of the data used for the algorithms is more important than the amount aggregated – especially in finance.
- Employing secure data practices in the investment industry remains a strong competitive advantage.
- AI serves as an additional tool to asset managers, but cannot replace trust and confidence in a management team.

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Vassilios Papathanakos, PhD
Distinguished Researcher

Intech®

The rush for AI

The great rush to mine mountains of new information through artificial intelligence is on. Not to be left behind, investment managers are touting their ability to capitalize on the AI craze.

Indeed, references to Artificial Intelligence seem ubiquitous across the investment industry. Asset managers often claim to use AI and, specifically, Machine Learning to process and recognize patterns in data, trumpeting enhanced returns or a predictive ability to tackle the next investment cycle with increased advantage.

Industry pundits say the asset management industry is being disrupted by this technology. The argument is that AI will replace the manager with a robot that can be programmed to follow management constraints. More likely, AI will serve as an additional tool to portfolio managers. It will ease their day-to-day job by allowing managers to focus on what has the most added value, making decisions on information that has been filtered and qualified.

However, details of AI's specific use-cases often remain vague and conceptual. This leaves plan sponsors with little to no visibility into how or when such processes are being used, and to what end.

HOW CAN INVESTORS TRULY EVALUATE A MANAGER WHO CLAIMS TO USE AI?

Investors can't access a manager's proprietary models, can't check whether they work or if they are reasonable. It comes down to confidence and trust in the investment team and the firm that supports them. Investors can evaluate whether a manager is credible, trustworthy, has good judgement, and is mature in their risk management.

Sound familiar? There's nothing new here. The rigorous, time-tested process that plan sponsors and consultants conduct to evaluate an asset manager continues to be of paramount importance.

Proclamations regarding the use of sophisticated AI techniques as part of an investment process don't necessarily say anything useful or meaningful; they don't suggest whether a manager must be trusted more – or less.

Simply put, the use of AI in the investment process is just another tool. Like any tool, if used with expertise, it can serve its purpose. However, if treated lightly, it can also backfire.

Science or art?

The global financial crisis was the pivotal point during which investors realized they didn't have as clear an understanding of risks as they had thought. Subsequently they started building more elaborate systems to collect and analyze financial data from both internal and external sources.

Soon, the amount and complexity of the compiled financial information became overwhelming, allowing AI to emerge as a promising way to impose order on chaos.

At a high degree of simplification, building an AI capability requires three basic steps: 1) developing a 'black box' - an algorithm - that emulates pattern; 2) 'training' the algorithm to recognize patterns that are already understood; 3) setting it loose on real-world data and hoping for the best.

To plan sponsors, the use of high-powered computers and sophisticated statistical techniques suggest that this three-step process is a science. Instead, it's more of an arcane art form.

It's usually not possible to anticipate which algorithm will have the best chances of working, how to go about training it efficiently, or how to anticipate failure, especially of the blow-up-in-your-face variety. Even AI 'experts' have to find their way through a process of iterative trial-and-error, with only a few rules to guide them.

In its infancy

AI models are at an early learning stage. Unlike AI, a child has its own sensory input and absorbs data in an unfiltered fashion. A child receives constant input from the environment, and through intellect the child learns how to process all the data into information.

In AI's case, the researcher has to decide the channels that will feed the algorithm information. AI is a type of disembodied intelligence, installed in a box without sensory inputs like eyes or ears; it only has jacks to which cables can be connected, and has to be fed data that could be filtered, treated and selected.

Currently, AI systems don't have the computational sophistication required to choose which data to be exposed to, or to ask the practitioner for a particular set of data. These algorithms so far are devoid of sensory input and so they need to be fed enough and relevant information to find relationships, detect patterns, understand complex problems, and make decisions.

So far Artificial Intelligence approaches like neural networks provide preferred solutions without being able to explain their reasoning or to distinguish between complex patterns. We are yet to develop the AI that can itself select useful data for solving problems and explain why a solution is chosen. The 'why' is important in investing.

And yet the rush for a competitive edge has pushed managers to rely more on AI, increasing their odds of making mistakes. Some of these mistakes will likely snowball and become cautionary tales.

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Quality over quantity

Portfolio risk management is difficult and filled with pitfalls when faced with incomplete information or information overload. As such, the quality of the data used to train the algorithm matters much more than the quantity of it.

In fact, aggregating too much data often backfires. This is particularly an issue in finance, where data is often of poor quality, containing missing, duplicated, or erroneous items; it does not span a sufficiently long or recent time period; or it is not reported consistently.

It's natural to want to collect and aggregate as much information as possible with the belief that this will result in better decisions and outcomes. But more data doesn't guarantee better data.

Current AI models are not developed enough to independently select useful data to solve problems and explain why a solution is chosen.

Investors may see a successful trading outcome from a manager but may not be able to infer the reason behind that decision. Attribution is challenging. AI systems might superficially appear to make a manager redundant, once the algorithm is trained to toil over a bundle of financial data that many others can use.

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Yet a good manager will be able to choose whether to follow the algorithmic rule or override it if it's unreasonable, since the manager has the context to make a holistic decision.

Even when an AI approach replicates the broad outlines of the manager's methodology, it doesn't have the rational abilities to anticipate when *not* to follow it.

Data security concerns

Data infrastructure and security is a 21st century challenge. As managers explore the rising power of AI, they face the dilemma of buying vs. building AI tools.

The finance industry has traditionally invested in security and privacy, but investors, managers, and regulators may have paid less attention to the value of their collected data.

The more popular AI becomes, the greater the urgency to have an IT infrastructure that can run these technologies. Not all managers can afford this and some will try to cut costs by outsourcing these services.

Managers buying from third-party vendors could easily compromise their company's security, but if AI tools are built in-house, managers will have to rely on the human capital they can deploy and in some cases, run the risk of neglecting other opportunities.

Consequently, companies must learn how to select AI vendors that will strengthen competitive advantage without sacrificing security. As AI learns through trial and error, best guesses, and feedback, vendors will need to train their AI tools using their client's sensitive proprietary information.

Asset managers can work with third-party AI vendors in several ways, ranging from outsourcing an entire process to buying selected services. They can also help to build in-house solutions or train staff.

Plan sponsors might have to look deeper into those fundamental managers claiming to use AI, ask whether their AI tools are developed in-house or through a third-party vendor, and look for potential risks. If the company buys these tools, what security measures are they deploying and why are they willing to risk it? If the firm builds it, what validation does it have?

Employing genuinely secure data practices remains a strong competitive advantage in the asset management industry.

Clear lines of responsibility for supervising the variety of AI models and risks are crucial, as the responsible party needs to have the mandate to cancel or modify those models if necessary.

AI requires considerable investment both to get off the ground and to maintain. Even standard computer systems, such as those involving settlement of financial transactions, or handling financial-data feeds, require significant IT security and management resources.

Another security concern is the legal and regulatory risks associated with aggregating data either in-house or through vendors. Managers should take protective steps via contracts, and conduct due diligence to ensure that data is collected legally. Some of the risks in this category include exclusivity, insider trading, privacy violations and copyright infringements.

Asset managers adopting AI, whether for operational, distribution, or investment functions, must make an open-ended commitment to building and maintaining the necessary infrastructure, in a field where algorithmic advances are still rapid and competition is fierce.

POPULAR NOMENCLATURE

Approaching Artificial Intelligence is hampered, partly deliberately, by the multitude of terms in regular use. Some of these describe a goal (AI, ML), some describe techniques (NN, FL, BN), while still others function mostly as labels for budget allocation (BD, DS). To name a few:

Artificial Intelligence (AI): The field of employing machines to perform tasks that are characteristic of natural intelligence. It includes aspects of planning, understanding language, recognizing objects and sounds, learning, and problem solving.

Machine Learning (ML): A way of achieving AI, or of 'training' an algorithm so that it can learn how. 'Training' involves feeding large amounts of data to the algorithm and allowing it to adjust and improve.

Neural Networks (NN): A biologically-inspired programming paradigm which enables a computer to learn from observational data.

Deep Learning (DL): A set of techniques for learning abstract representations of data, rather than solving specific tasks.

Fuzzy Logic (FL): An approach to computing based on the concept of partial truth or 'degrees of truth' rather than 'true or false.'

Bayesian Networks (BN): A type of probabilistic graphical models that represent probabilistic conditional relationships.

Genetic Algorithms (GA): It simulates natural selection, where short-term-successful random variations of an algorithm have a higher likelihood of long-term success.

Big Data (BD): Describes the sets of data which are too large to be stored and analyzed using traditional approaches.

Data Science (DS): A field that uses scientific methods to extract knowledge and insights from data.

Data Mining (DM): The process of discovering anomalies, patterns and correlations in large data sets, which are then used to predict future outcomes.

Conclusion

Artificial Intelligence is part of the technological revolution offering solutions that adapt to the environment beyond its original design.

Managers want to promote unique AI-driven investment techniques they believe will differentiate them in a crowded environment pressured by fees and innovation. They are using AI to interpret reams of data through different techniques. Some are using language-processing solutions to analyze corporate communications to help forecast company expectations. Others are applying learning algorithms to forecast future returns.

All new technologies and continuous innovation will support and propel our industry forward. While this will bring with it new and valuable investment opportunities, it is not likely to replace trust and confidence in a management team, their philosophy and process.

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Locations

HEADQUARTERS
250 South Australian Avenue
Suite 1800
West Palm Beach, FL, 33401
United States of America
+1-561-775-1100

INTERNATIONAL OFFICE
201 Bishopsgate
London
EC2M 3AE
United Kingdom
+44 (0)20 7818 5600

Contacts

NORTH AMERICA
John F. Brown
EVP, Head of Global Client Development
jbrown@intechinvestments.com
1-561-775-1163

INTERNATIONAL
David Schofield
President, International
dschofield@intechinvestments.com
+44 (0)20 7818 5600

Intech®