



# Machine Learning and Artificial Intelligence

London (HedgeNordic) - The earliest use of machine learning as a concept has been credited to UK wartime codebreaker, Alan Turing, who devised a machine called Bombe, which cracked the Nazis' Enigma code. The earliest use of the phrases "Machine learning, and "Artificial Intelligence", probably date back to the Dartmouth Conference of 1956, organized by computer scientist, John McCarthy. The earliest image classification system may have come a year later in the form of Perceptron, while the first natural language application might have been discovered in 1964, and applied to algebra.

A notable fictional manifestation of AI was the talking computer named "Hal" in Stanley Kubrick's 1968 movie, entitled "2001: A Space Odyssey", which was at the time classified as "science fiction". Techniques were applied to robots in the 1960s and the early 1970s, and then progress slowed down until the mid-1990s - a generation that has been dubbed the "AI Winter". Interest perked up when IBM's Deep Blue machine defeated Garry Kasparov at Chess in 1997 and growing computer power allowed internet companies such as Google, Amazon and Baidu to apply techniques to mine vast amounts of customer and search data.

The first hedge fund managers using AI around the same time are thought to have included Jim Simons' Renaissance Technologies (RenTec), and David Shaw's

D.E.Shaw. It is probable that funds were experimenting with AI/ML techniques some years before they began talking about them; it is typical for systematic and quantitative funds to “incubate” new techniques, often using proprietary capital, for a number of years before rolling them out to external investors.

## **Pure play or partial ML/AI**

Over 1,000 systematic and quantitative hedge funds now exist (1,360 according to Preqin), but one should not assume that they are exclusively using ML or AI techniques. Though an AI hedge fund index - the Eureka hedge AI hedge fund index - now exists, it has just 16 constituent funds, and “pure play” ML or AI funds are thought to be rare. They are often said to include Sweden’s award-winning Taaffeite Capital Management; Hong Kong-based Aidiya Holdings, or Cerebellum Capital and Numerai, which are both located in San Francisco, near the tech hub of Silicon Valley. Also US-headquartered, Millburn Ridgefield Corporation, which was one of the first trend-following CTAs back in the early 1970s, has been gradually adapting its systems to the point where 100% is now based on statistical or machine learning, as of 2019. If pure AI remains rare, Barclay hedge’s July 2018 Hedge Fund Sentiment survey found over half of respondents using ML/AI to inform investment decisions, with over a quarter using it for trade execution. A significant proportion have just started using it over the past year or two.

A 2018 Greenwich Associates survey also found 56% of managers were planning to integrate AI into their process. Managers including multi-billion shops, Man Group, Winton and Aspect Capital in Europe, and Two Sigma and Acadian Asset Management in the US, are applying it selectively. It is not only systematic funds who are using AI. Many managers that also run discretionary strategies, including Blue Mountain, are also hiring teams of data scientists to crunch data and inform both systematic and discretionary investment processes. And at groups such as Man Group, there can be valuable idea-sharing between the systematic units (Man AHL and Man Numeric) and the discretionary part (Man GLG).

Some erstwhile discretionary managers may have even morphed into quants: Paul Brewer’s Rubicon Capital Management reportedly shut down a discretionary macro strategy, but is still running an AI-based strategy.

## **AI, ML and data types**

A key use case of ML/AI is turning 'Big Data' including unstructured data - such as satellite images, news, or social media postings - into structured data that can be more easily used to generate trading signals. For news or corporate earnings releases, Natural Language Processing (NLP) techniques can be used. Indeed, some managers who espouse ML/AI, also enthuse about alternative data, but the two are quite different: the data is the fuel, and the technique is the engine. It is possible to apply ML/AI to traditional data, or to apply traditional, hypothesis-based analysis to alternative data. AI is also being used to select funds and managers, by firms including FQS, which was set up by Robert Frey, who worked at RenTec in the early days. Multi-manager platforms can also use AI to assess individual traders. None of these fashionable new techniques are guaranteed to make a profit however. Many hedge funds shut down after a few years, and ML/AI based strategies are no exception. Large teams of highly trained scientists, sometimes including eminent academics, have devised models that lost money. New asset management companies, and funds within larger platforms have been closed down. It is natural that any new field of research will experience some trial and error, but AI/ML might have a higher success rate when applied to non-investment functions.

## **Back and middle office**

EY's 2018 Global Alternative Fund Survey (previously named its Global Hedge Fund and Investor Survey) has identified that AI has seen the most spectacular growth in front office functions - 300% year on year. But the survey finds it is also relevant to the back and middle office processes, such as confirmations, reconciliations and regulatory reporting. Many other service providers, including most naturally technology firms, and also custodians; administrators; depositaries; shadow accounting firms; and providers of outsourced back and mid office solutions, are developing AI/ML solutions. The back office may be more amenable to AI/ML because financial markets are "noisy", in the sense that it is difficult to separate signals from random noise when hundreds of factors including "unknown unknowns" could affect asset prices.

But other problems in a back office environment, such as confirmations, reconciliations or currency hedging, are much closer to being what mathematicians call a "closed form solution". It is possible to pre-define most, if

not all, reasons for trade breaks, or errors in reconciliations or currency hedges. The glitches could come from power cuts; internet outages; inconsistent naming conventions; erroneous ISIN codes, or inverted exchange rate quotes, for instance. And a computer program could be written to identify these and other sources of errors, reduce human time spent, and speed up NAV calculations. The program could be trained to recognize recurring patterns in the data, and in some cases, automatically correct them. In other cases, some manual human intervention may still be needed to investigate the problems.

## **Office furniture**

Indeed, there are still limits to the applications of computing power and paradoxically it is some apparently simple tasks that may elude automation. What follows may sound flippant but it makes a serious point. Assembling office furniture from IKEA could take advanced robots half an hour, and involve errors and broken parts, according to 2018 experiments in Singapore. The reason is that manual dexterity cannot yet be programmed into a machine.

Humans and other animals learn manual dexterity through trial and error when they are young, making millions of movements and often falling over before finding their balance. Though computers have been programmed to learn the rules of Chess - and more recently in 2016, Deep Mind's Alpha Go beat champion Lee Sedol at a more difficult game, Go - an office table can be more reliably and efficiently assembled by a human being, or possibly another primate, such as a chimpanzee.

*This article featured in HedgeNordic's [special report on systematic strategies](#) in June 2019*