

Artificial Intelligence in Stock Trading –Trends and Applications

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Abstract

Artificial intelligence is to trading what fire was to the cavemen. That's how one industry player described the impact of a disruptive technology on a staid industry. In other words, AI is a game changer for the stock market. While humans remain a big part of the trading equation, AI plays an increasingly significant role. According to a recent study by U.K. research firm Coalition, electronic trades account for almost 45 percent of revenues in cash equities trading. And while hedge funds are more reluctant when it comes to automation, many of them use AI-powered analysis to get investment ideas and build portfolios.

Keywords

AI : Artificial Intelligence, SDG : Sustainable Development Goals, Machine learning, Algorithms

AI

Artificial intelligence is technology and a branch of computer science that studies and develops intelligent machines and software. Major AI researchers and textbooks define the field as "the study and design of intelligent agents", where an intelligent agent is a system that perceives its environment and takes actions that maximize its chances of success.

In the simplest terms, artificial intelligence (AI) refers to systems or machines that mimic human intelligence to perform tasks and can iteratively improve themselves based on the information they collect. AI manifests in a number of forms. A few examples are: Chatbots use AI to understand customer problems faster and provide more efficient answers.

Intelligent assistants use AI to parse critical information from large free-text datasets to improve scheduling. Recommendation engines can provide automated recommendations for TV shows based on users' viewing habits

AI History

The history of Artificial Intelligence is quite interesting and dated back in 20th century when science fiction familiarized the world with the concept of artificially intelligent robots.

The 1950s period world saw a generation of scientists, mathematicians, and philosophers with the concept of AI culturally understood in their minds. One such person was Alan Turing, a young British polymath who discovered the mathematical possibility of artificial intelligence. He suggested that humans can utilize available information as well as reason in order to solve problems and make decisions.

But some great challenges stopped Turing from getting to work right then and there. The first reason was computers needed to fundamentally change. Because, before 1949 computers lacked a key prerequisite for intelligence – they couldn't store commands, only execute them. It means that computers could be told what to perform but couldn't remember what they performed. And the second reason was computing was extremely expensive.

During 1950-1974, when AI was in its infancy, a lot of pioneering research was being performed, also huge hype was being created that pushed AI into seclude state, and the research funding gone dry. The next few years would later be called an "AI winter",

The biggest problem had been the lack of computational power to perform anything substantial, meaning computers simply couldn't store enough information or process it fast enough. At the time, many researchers noted that computers were still too much weak to show intelligence. But in the 1980s, AI was reignited by two sources – an expansion of the algorithmic toolkit, and a boost of funds.

The success was essentially due to increasing computational power, greater emphasis on solving specific problems, new ties between AI and other fields (such as statistics, economics and mathematics), and a commitment by researchers to mathematical methods and scientific standards.

Notable milestones

Deep Blue became the first computer chess-playing system to beat a reigning world chess champion, Garry Kasparov, on 11 May 1997. In 2011, a Jeopardy! quiz show exhibition match, IBM's question answering system, Watson, defeated the two greatest Jeopardy! champions, Brad Rutter and Ken Jennings, by a significant margin. In March 2016, AlphaGo won 4 out of 5 games of Go in a match with Go champion Lee Sedol, becoming the first computer Go-playing system to beat a professional Go player without handicaps. This marked the completion of a significant milestone in the development of Artificial Intelligence as Go is a relatively complex game, more so than Chess.

2015 was a landmark year for artificial intelligence, many attribute this to an increase in affordable neural networks, due to a rise in cloud computing infrastructure and to an increase in research tools and datasets. Other cited examples include Microsoft's development of a Skype system that can automatically translate from one language to another and Facebook's system that can describe images to blind people.

AI Stock Trading

Computing already revolutionized financial trading once, it facilitated enormous numbers of calculations in a fraction of a second, and to track markets that shift in light speed. Now AI trading systems are poised to foster a second wave of innovation, one that will be the most significant transformation in finance history.

Ironically, AI and finance are made for one another, one could even go further and call them “soul mates.” Machine Learning and different techniques created new systems to spot patterns which the human brain is not capable of, and since finance is quantitative, to start with, it’s laborious not to notice traction. Financial corporations have conjointly endowed heavily in AI in the past, and many others are starting to investigate and implement the financial applications of machine learning (ML) and deep learning to their operations. The conjunction of Artificial Intelligence and Stock Trading, for instance, definitely is not a brand new development. Unfortunately, the access to its possibilities and benefits have traditionally been mostly restricted to giant corporations. Luckily, this reality is changing as AI becomes more mainstream.

History of AI in stock trading

The financial services industry was one of the first to adopt Artificial Intelligence (AI) in the early 80s. The complexity of the markets led to significantly larger data sets than found in other sectors and, along with the need for improved customer experience and efficiency, meant financial services as a sector was more willing than others to adopt the emerging technology.

Historically, decision-making in traditional trading was based on human intuition and extensive knowledge of finance and economics. However, with developments in computing and evolving technologies, many of the bigger traders started to formalise and automate their trading ideas in the form of trading rules. These rule-based systems were based on both market and fundamental data analysis, such as price and volume information, as well as public information about the traded assets.

The introduction of trading-bots, software programmes that automate trade executions based on an underlying set of rules, was the next natural step to these first rule-based systems. While such bots have transformed the markets, they are largely held back by their reliance on human intervention. Traders still have to come up with the parameters based on previous experience and judgements made by market experts. Such trading-bots are ubiquitous in today’s market, and open-source projects have made these basic tactics available to the masses.

While trading-bots themselves are not strictly Artificial Intelligence, efforts to refine these systems in recent years do harness AI to test the best parameters for a given strategy or alternatively enable the AI to choose from multiple strategies available.

Yet, even these approaches have struggled to scale. As such, we are now seeing true AI and machine learning being leveraged in the industry; continually learning, producing and refining algorithms and investment strategies. By harnessing industry and trading experts along with creating trading systems that allow AI to play a larger role in the creative process, AI is having a more positive impact on the financial services sector than ever before.

However, up until now, such AI and machine learning algorithms have only been used by investment bankers and hedge funds at top global firms in the likes of Wall Street. We are starting to see a democratisation of AI technology, enabling everyday consumers to harness this powerful technology for themselves.

In 2010, high-frequency and algorithm trade accounted for 60% to 70% of trading in the US alone. By 2014, this number rose to 75%. By 2017, JPMorgan reported that traditional traders represented a mere 10% of trading volume.

In 2016, the Hong Kong company Aidiya, led by Ben Goirtsel started a hedge fund that performed all operational transaction through artificial intelligence solely, without any intervention of humans.

In 2017, Wall Street had its first 100% AI-powered Equity Trading Fund (ETF). In the first week of operations, it went up by 1 %, consequently beating the S & P 500 index. Remarkably, by August 2018 its shares rose by 20%. ETF operates on the premise of IBM Watson, a supercomputer processing and analyzing the news and reports related to 6000 American companies. Additionally, Watson continual learning capabilities examined its own performance, in the case of unprofitable transactions, the algorithm would learn from its mistakes to make more accurate decisions in the future.

Applications

One of the best examples of how AI is shaking up traditional finance trading is seen in the trading of commodities. Whether related to food, energy or metals, commodities are one of the oldest forms of trading and commerce in the world. Further, they are an important way of diversifying a portfolio beyond traditional securities to reduce and improve rates of return. It used to be that the average investor rarely chose commodities as a form of investment as it required large amounts of expertise, time and money. However, with the democratisation of powerful AI and machine learning algorithms, those who were once prevented from trading in commodities are now able to do so. Let us look at few of its applications

Cryptocurrency trading

The high emotionalism of the crypto market ecosystem has already become a topic of study by developers who are attempting to come up with an AI-based solution to increase profit returns. One of the first steps taken in this area was the creation of models that use a neural network to make cryptocurrency valuation predictions.

Sentiment analysis

Another way crypto trading is being influenced by AI and ML is through the analysis of sentiments. Sentiment analysis is the processing of enormous volumes of information from various sources like articles, blogs, comments, social media posts, even video transcription to work out the market’s “feelings” regarding a topic — to determine if it is positive, neutral or negative.

Forecast & Predictions

Neural networks endlessly supply increased accuracy. Neural networks make predictions associated with crypto markets remarkably faster. Their nature is to crunch information of cryptocurrency exchange rates constantly. Which are then used to forecast market movements by minutes, hours and days.

Blockchain Analysis

Both AI and blockchain are highly technical, and it appears that there is a consensus by computer scientists that these technologies will have a significant impact in the crypto and traditional financial markets alike in the next 5 to 10 years. The use of both technologies may alter the business and tech paradigm considerably enough to oblige business leaders to take action regarding developments in these areas.

Fundamental Analysis

Fundamental analysis is employed by both cryptocurrency and stock traders. In fundamental analysis, investors apply correlation to a coin or a stock valuation to range qualitative and quantitative factors. Fundamental analysis is used in the stock market to gauge macroeconomics, such as the health of the market and the companies that operate in it. In this regard, crypto and stocks have many resemblances. In addition, the matter that a project is attempting to unravel and the core team behind it is also taken into account.

Here are some ways companies around the world use AI for smarter trading.

Trading Technologies

Through its acquisition of Neurensic, Trading Technologies now has an AI platform that identifies complex trading patterns on a massive scale across multiple markets in real time. Combining machine learning technology with high-speed, big data processing power, the company provides clients with an ongoing assessment of compliance risk.

GreenKey Technologies

GreenKey Technologies' AI for trading uses speech recognition and natural language processing technology to save traders time searching through conversions, financial data and notes. With the company's platform, financial professionals are using AI to sift through, and access, notes, market insights and trending companies in real-time.

Kavout

Kavout's "K Score" is a product of its Kai intelligence platform that processes massive diverse sets of data and runs a variety of predictive models to come up with stock-ranking rating. With the help of AI, the company recommends daily top stocks using pattern recognition technology and a price forecasting engine. Its model portfolios are enhanced by AI algorithms.

Auquan

Auquan's data science competition platform democratizes trading by allowing data scientists from all backgrounds to produce algorithmic trading strategies that help solve investment challenges. As a result, investment clients can reap the benefits of data science without the need for pricey in-house expertise.

Limitations

At present, trading algorithms can fake one another out to gain advantages, which is illegal but difficult to prove. They can also predict a slower program's next moves and then trade accordingly. With firms competing aggressively to get faster trading times, a slower program could create massive functionality gaps. As algorithms become more intelligent and more powerful, the financial industry will require ever-smarter safeguards against exploitation and risk. Then there are the potential glitches. In August 2012, a trading program at one fund "ran amok," creating losses of \$10 million a minute. It took nearly an hour for the human team to identify and solve the problem, and the firm lost \$440 million in the process. Two years earlier, an algorithmic trade caused a "flash crash," in which U.S. share and future indices dropped 10 percent within minutes. Some say those incidents are telling preludes to disaster. A rogue algorithm at one of the country's major banks, or a cascading failure in which multiple big banks are derailed by faulty programs, could lead to a catastrophic crash.

AI does have following broad limitations:

Inflexible

AI is usually given a set of parameters to act upon. For example, it is taught to react a certain way when faced with situation X. It does not recognize major market crashes and will stick to its guidelines no matter what. Others claim that AI is unable to recognize patterns on a human level due to its inflexibility.

Inhuman

It seems obvious, but AI cannot account for various facets of the stock market like insider trading. However, it has more instrumental benefits which makes it a necessary tool for a profitable trader.

Unbiased

AI does not bring human biases into its analysis of stocks and currencies. For example, behavioural bias like the bandwagon effect (when one simply follows what the majority of people are investing in) and emotional bias like overconfidence bias (when one believes he or she is at a higher level of investing than others because one works in a specific sector that correlates to the market). However, this may bend either ways and sometimes easy pickings for profit may be missed.

Conclusion

There are many tools that a profitable trader needs to possess like analysis, execution, and experience. AI is great at analysing the market and presenting its results in forms of signals or alerts. Using AI does not immediately make you a profitable trader, but it definitely increases your odds of success significantly. Many believe AI is the trading of the future and perhaps humans will be

rendered useless due to the superior abilities of AI. For now, we should view AI as a valuable tool to cooperate with in order to maximize our chances of profit in the market.

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