The Potential Impact of the **Next Wave of AI** in Asset Management

StockSnips Thought Leadership Research

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Artificial intelligence (AI) is rapidly changing the way we live and work, with the potential to transform entire industries and revolutionize the way we approach complex problems. As an AI company focused on Asset management, we are at the forefront of this technological revolution, leveraging the latest AI-driven portfolios to provide our clients with unparalleled insights and returns. In this thought leadership post, we explore the impact of AI and its potential applications in various industries especially in Investing and Asset Management. Our aim is to provide an overview of AI and its potential impact and sharing our views on the opportunities and challenges that lie ahead.

The Three Waves of Artificial Intelligence

There have been several waves of AI and progress over the last 4 decades. These waves represent shifts in AI research and methods over time.

The **first wave** of AI, which emerged in the 1970s, was characterized by domain-specific expert systems with reasoning capabilities based on rules. These systems were designed to create rule-based frameworks that could reason logically and solve problems by following a set of predetermined rules, relied heavily on symbollic representation of knowledge and logical inference, with experts in the domain manually creating these rules to encode their knowledge. While these systems were useful in solving specific problems in their respective domains, they were **limited by their inability to learn** from data and adapt to new situations, leading to a stagnation in AI research in the 1980s. Despite these limitations, the first wave of AI laid the foundation for later waves, and its emphasis on logic and rule-based reasoning is still relevant in certain applications today.

1 Handcrafted Knowledge > **2** Statistical Learning > **3** Contextual Adaptation

Source: **John Launchbury - DARPA**

The **second wave** of AI, which began in the 1980s and gained momentum in the 2000s, focused on statistical learning techniques such as large neural networks. This approach involved using large amounts of data and sophisticated algorithms to identify patterns and relationships within the data, enabling the system to make predictions or classifications. This wave of AI was successful in applications such as image and speech recognition, natural language processing, and recommendation systems, and paved the way for later waves of AI.

The **third wave** of AI, known as contextual unsupervised learning, represents a significant shift in the way AI systems are designed and implemented. Rather than relying on rule-based or statistical learning approaches, this wave emphasizes the importance of contextual information and the ability of AI systems to interact with their environment and adapt to new situations. At the forefront of this wave are transformer architectures and large language models, which have enabled AI applications to achieve unprecedented levels of accuracy and sophistication in cognitive tasks. For example, through natural language processing and user intent recognition, contextual AI can create intelligent systems that understand and respond to human language and interactions in a more intuitive and natural way. The importance of contextual information is highlighted in the work of Vaswani et al., in their groundbreaking paper **"Attention Is All You Need"**, which introduced a new transformer architecture for machine translation tasks. This approach to AI has the potential to revolutionize a wide range of industries, from healthcare to finance, by enabling AI systems to learn and adapt to new situations in a more human-like way.

> **"AI is a tool to amplify human cognitive intelligence much like how airplanes and submarines have extended human motor ability to navigate the skies and the oceans."**
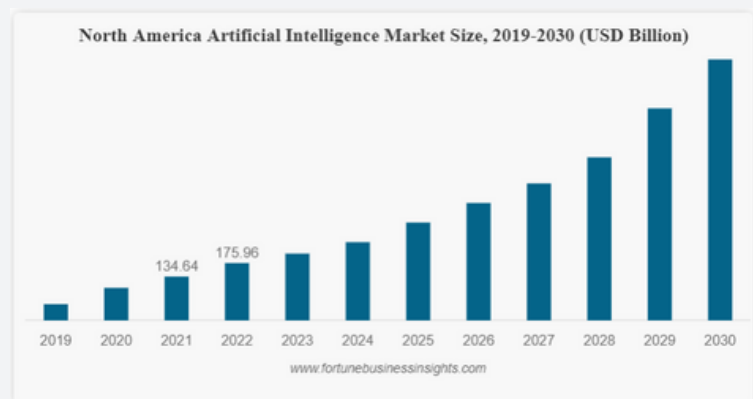
—— *Dr. Raj Reddy*

Turing Award Winner
Early pioneer of Artificial Intelligence:
University Professor of Computer Science
& Robotics at Carnegie Mellon University.

processes. Dr. Raj Reddy, in his 1988 Foundations and Grand Challenges in AI lecture at AAAI, appropriately highlighted the benefits of AI, which continue to unfold in the present day.

The global AI market is rapidly expanding and projected to reach **$2,025 billion by 2030,** up from $428 billion in 2022, according to Fortune Business Insights recent report. This meteoric rise is fueled by the increasing flow of investments into AI companies, as businesses and investors alike recognize the potential for these cutting-edge technologies to revolutionize their respective industries.

North America Artificial Intelligence Market Size, 2019-2030 (USD Billion)

www.fortunebusinessinsights.com

AI has a huge impact on a wide variety of Industries

AI is having enormous impact across various industries, including the investment sector. By extending and enhancing human cognitive abilities, AI-driven tools have the potential to significantly boost productivity and streamline decision-making

In the investment sector, staying ahead of the curve and embracing the power of generative AI models is crucial for maintaining a competitive edge in today's rapidly evolving marketplace. The impact of AI is already being felt in the field of investing, with AI-powered algorithms assisting asset managers in achieving alpha and constructing **portfolios that outperform the market**.

> "Just as electricity transformed almost everything 100 years ago, today I actually have a hard time thinking of an industry that I don't think AI will transform in the next several years."
>
> —— *Andrew NG*

In the world of technology, few people are as well-respected as **Andrew Ng**. A pioneer in the field of artificial intelligence, Ng has been at the forefront of AI research and development for many years. In a recent article on Medium, Ng shared his thoughts on the future of AI:

"AI is the new electricity," Ng wrote. However, Ng also emphasized that building AI systems requires a collaborative effort from diverse teams with a range of skills and perspectives. "Building AI is not a solo sport," he wrote. "It requires a team with diverse skills, perspectives, and backgrounds."

Generative AI – Large Language Models and Intelligent Content

Generative AI refers to the technology that enables AI systems to create new content, such as text, images, videos, and music, that is similar to content created by humans.

Generative AI is different from other types of AI, such as machine learning, which involves training algorithms to recognize patterns and make predictions based on those patterns. Generative AI goes beyond pattern recognition and involves creating something new based on the patterns that the algorithm has learned.

One of the most popular applications of generative AI is in the field of image generation, including tools that are trained and able to detect fake images.

GPT-4 - A Breakthrough in Natural Language Understanding

OpenAI, a leading artificial intelligence research organization, has recently made a significant **breakthrough in natural language understanding** and content creation with the release of ChatGPT, based on the GPT-4 model. This advancement has the potential to automate a range of human tasks and **amplify human intelligence** in content creation tasks.

One area where ChatGPT is being applied is in customer service, handling a range of customer queries and requests, freeing up human agents to focus on more complex tasks.

Another potential application of ChatGPT is in the field of education. Its ability to generate educational content in a wide range of subjects could revolutionize the way we learn. For instance, it could be used to create interactive online courses, provide real-time feedback to students, or generate personalized study material based on individual needs.

There are close to **250 companies** that have received funding and the Generative applications landscape covers sales, marketing, image and video generation, customer support and other areas in education and health care.

Embracing the Promising Future of AI Applications

With AI's rapid evolution, specifically that in which we have witnessed in 2023 alone – some key trends and developments include:

- **Automotive:** Enhancing driver safety with semi-autonomous features such as driver assistance.

- **Health Care:** Improving patient care with accurate imaging diagnostics & real-time monitoring of health.

- **Retail:** Providing personalized shopping experiences with customized product recommendations based on customer data.

- **Manufacturing:** Optimizing production and supply chain management for increased efficiency and cost-effectiveness.

- **Financial Services:** Enhancing financial planning and asset management with AI-powered solutions.

Among the industries likely to adopt AI more rapidly, financial services is projected to reach **100% adoption maturity in the next 3-7 years**, according to a PWC report. This highlights the potential for AI to transform the financial services industry, particularly in the areas of financial planning and asset management.

Several AI techniques have been in use in applications like **Robo Advisors** & **High Frequency Trading**. However, there are several challenges within stock market time series data, and the ability to predict price behavior. These are discussed below, along with the current wave of AI methods that are more contextual, adaptive, and leading a major transformation in active asset management.

AI in Investing and Asset Management

There has been an exponential growth of information in the last decade and the task of constructing portfolios that outperform the market has become more difficult. Asset Managers are looking to leverage Big Data & AI to find insights and assist in achieving alpha.

The strong form of the Efficient Market Hypothesis states that all information, public and private, is accounted for in current stock prices, meaning that no amount or quality of information can reliably generate alpha. This eliminates the possibility for potential irrational investor behavior to predictably yield alpha or excess returns.

According to BlackRock CEO, Laurence Fink, the likely reason for the relative underperformance of active equity funds, and the resulting outflows, is the **limitation of a human discretion in active portfolio management and stock-picking**. According to him, the democratization of information has made it much harder for active management. Active portfolio management has to rely more on big data, AI, factors and models within quant and traditional investment strategies.

Despite this, behavioral finance literature posits that investors respond to market sentiment meaning asset prices can diverge significantly from their fundamental value (Baker and Wurgler 2007). While there are countless outcomes tied to measures of market-level sentiment[1] and other market-level measures such as VIX, little is understood about individual stock-level sentiment. The advent of natural language processing (NLP) and large language models like Google's BERT and Open AI's GPT-4 has enabled processes to overcome much of this challenge of analyzing unstructured content. Machine learning models that process millions of news articles and opinions to uncover individual firm sentiment and use this output to derive alpha-generating strategies are being tested and in use today.

Stock market data presents a multitude of challenges that must be addressed to develop robust models. Most models are marred by the problems of over fitting, heuristics and poor out of sample results. This is because, the financial domain is hugely complex and non-linear with a plethora of factors influencing each other.

> **"The old way of people sitting in a room picking stocks, thinking they are smarter than the next guy — that does not exist anymore."**
>
> BlackRock executive Mark Wiseman

First, the relationship between stock prices and their underlying factors is often non-linear, which means that traditional linear models may not be effective in predicting price movements.

Second, non-stationarity is another technical challenge that can make it difficult to model stock prices accurately. Non-stationarity refers to the idea that the statistical properties of stock price data can change over time, which means that historical patterns may not be a reliable guide to future price movements. Non-stationarity can arise for a variety of reasons, including changes in market conditions, shifts in investor sentiment, or changes in the regulatory or economic environment. When data is non-stationary, traditional statistical and machine learning models that assume stationarity may not be effective in capturing the underlying dynamics of the data. To address non-stationarity, advanced machine learning techniques such as deep learning and recurrent neural networks can be used, as these models are better able to capture non-linear relationships and temporal dependencies in the data.

Finally, it is accepted that the stock market is influenced by human behavior, including emotions such as fear, greed, and uncertainty, which can lead to irrational decision-making and unpredictable price movements. The CAPM is a widely used asset pricing model that assumes that investors are rational and that asset returns are determined by the risk-free rate, the expected market return, and the asset's beta (a measure of its sensitivity to market movements). The model does not explicitly account for herding behavior or other forms of sentiment in financial markets, and some researchers have argued that the model may be incomplete or inaccurate as a result. However, there is also a growing body of research that seeks to incorporate herding behavior and other forms of sentiment into asset pricing models. For example, some researchers have proposed models that incorporate measures of investor sentiment or market volatility into the CAPM or other asset pricing frameworks, while others have developed more complex models that explicitly model herding behavior. In this new frictionless information world of social media, the impact of consumer and market sentiment, is posited to be a significant factor that can impact stock price modeling.

What does the Future Hold for Asset Management?

AI and machine learning have been used in trading and hedge funds for some time, but the application of AI is now expanding across the entire investment landscape. One area seeing significant growth is in AI-driven ETFs, which have become increasingly popular among investors. However, it's important to note that there is a distinction between ETFs that use AI to make investment decisions and those that invest in companies that develop or utilize AI technologies. As the use of AI in investment management continues to grow, we are likely to see an even greater proliferation of AI-driven ETFs and other investment products in the years ahead.

We see significant potential for research and development of AI in the following areas:

High Frequency Trading Algorithms – This is a category of algorithmic trading where a large amount of data can be processed in real time to understand patterns and mechanically execute the trades. This area continues to evolve as machine learning algorithms are deployed and computing power continues to increase.

AI Powered Portfolio Construction – The role of active managers is changing given the pressure from passive indexed funds. Using AI and big data for ranking, clustering and picking of stocks in a portfolio and subsequent rebalancing can introduce significant time and cost savings, while regularly optimizing portfolios to reflect changing market conditions. The new wave of AI methods can also leverage alternative datasets and not rely solely on fundamentals.

Forecasting Price Behavior – This remains the holy grail for asset managers as predicting price behavior is key to delivering Alpha and risk management. This is an area where adaptive algorithms that can poll the market environment and dynamically adjust to market regimes would provide the competitive edge. AI algorithms that are used in robotics and autonomous driving deal with similar problems and could be used for predicting stock price behavior and tail risk hedging strategies.