CREWCIAL® PARTNERS

Q2 2024 | Quarterly Commentary

ENDGAME

MACHINE LEARNING, GENERATIVE AI, AND HUMAN INGENUITY

In 1996, Garry Kasparov defeated IBM's Deep Blue in a defining moment for the chess world. Computational power had grown for some time and algorithms' ability to defeat human players had been on the rise. Kasparov's victory was a beacon for uniquely human creativity, ingenuity, foresight, and guile.

Unfortunately, it would not last.

In 1997, in a highly anticipated rematch, Deep Blue narrowly but definitively defeated the 15-year World Champion, ensuring its triumph in game six in just 19 moves. Kasparov set traps to entice the machine, yet each failed. He missed a perpetual check that would have forced a draw from an otherwise losing position. As the games went on, he began looking tired. Defeated. The seven-game series appeared to take a toll on him psychologically.

In the end, it became clear that the machines had surpassed human players. And since then, for chess at least, there's been no turning back.

600 AD

FIRST CLEAR REFERENCE TO CHESS IN A PERSIAN MANUSCRIPT, DESCRIBING THE GAME AS COMING TO IRAN FROM INDIA

1999 AD

THE INTERNATIONAL OLYMPIC COMMITTEE RECOGNIZED CHESS AS A SPORT

NOT JUST CHESS!

IN 2016, DEEPMIND'S ALPHAGO DEFEATED WORLD CHAMPION GO PLAYER LEE SEDOL, SHOWCASING AI'S CONTINUED ADVANCEMENT IN COMPLEX GAMES

OVER BEFORE IT BEGINS

THE SHORTEST POSSIBLE CHECKMATE, KNOWN AS "FOOL'S MATE," CAN OCCUR IN JUST TWO MOVES

The rise of algorithms found its way into the investment world as well on much the same timeline leading to the culmination of Deep Blue. Initially building on the seminal works of Graham & Dodd (1934), Fama & French (1973, 92), and Black Scholes (1972), then later the statistical arbitrageurs of the 1980s, quantitative, algorithm-based investment firms (commonly known as "quants") have carved out a large portion of the actively managed investment management space. Best known for their dispassionate, repeatable processes, these firms are capable of generating "beta plus[1]" outcomes.

Of course, if the machines have surpassed humans in chess, it should be a foregone conclusion that they should be able to handily outperform humans when it comes to the nominally numbers-driven arena of investing, right?

Not so fast. Certainly, machine-learning systems—driven by modern-day computing technology—are capable of processing far more data and modelling far more outcomes than any human or team of humans could ever hope to. But of key importance, modelling investment returns requires a "breadth of data[2]"; it's important to take a moment and explain this concept.

Quant models require multitudes of inputs and high-quality data to accurately forecast a portfolio that will outperform the market (or a relevant benchmark). The most important word in the previous sentence is "portfolio." Quant models are unable to tell you much about any one individual stock. Traditionally, each stock has some "alpha score" attached to it based on the alpha factors and weighting scheme assigned, but these are fitted according to backward-looking signals. Portfolios are then optimized to maximize alpha at an appropriate level of risk. When it comes to building a portfolio, a quant model requires many securities to minimize idiosyncratic risk (i.e., stock-specific risk that the model may not capture or account for). Often, the amount of securities numbers in the hundreds; however, this breadth allows the model to be right more often than wrong, ultimately forming a positive skew that adds alpha in aggregate.

Humans, on the other hand, outfitted with motive and intuition, can choose to embrace this idiosyncratic, stock-specific risk to their advantage. For example, say that a company that makes "widgets" will be the beneficiary of a wonderful new technology that will reduce its cost of goods sold (COGS) by half. Reducing COGS will be highly accretive to GAAP earnings, and even with the same multiple applied by the equity market, this business should trade much higher than prior to the new technology.

If an investment manager has done its homework and has high conviction in the opportunity, it can build an outsized position in this stock in its portfolio, potentially leading to outsized returns. This is not possible in an optimized quant portfolio; in fact, such a position would be signaled as a big red flag. This is why some of the best investors, in our estimation, tend to have quite concentrated portfolios. As Warren Buffett wrote in his 1993 letter to shareholders, "If you are a know-something investor, able to understand business economics and to find five to ten sensibly-priced companies that possess important long-term competitive advantages, conventional diversification makes no sense for you. It is apt simply to hurt your results and increase your risk."

Buffett, and the hypothetical investment manager in the example above, are able to apply human logic and intuition to understand how a one-off change can impact a security for the better in a way in which an algorithm never could (by never having encountered such a situation).

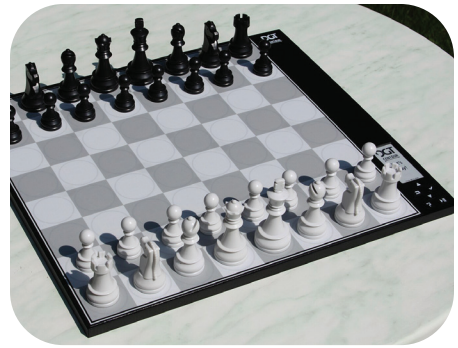
Chess-trained machine-learning systems can think many steps ahead, much like the best players that preceded them, but only because a countless number of games have been played before, and the exceedingly high number of permutations of moves and outcomes can be calculated relatively quickly and definitively.

However, what truly sets humans apart is our ability to constantly iterate and innovate beyond what's come before, drawing from a vast—and relatively unique and diversified—reservoir of cross-disciplinary knowledge and personal experience. Introduce a new rule to the game, or a new goal beyond checkmate, and the machine lacks the motivation essential to pursue greater outcomes. The world of investing is one arena where such rules aren't quite as fixed or closed as in a game like chess.

People can integrate a mix of lessons from psychology, game theory, and even personal experiences to make choices, and understand other people's choices. More importantly, they are motivated by choice; a machine isn't ethically or passionately inspired to achieve any particular, particularly abstracted, end (e.g., a foundation's focus on an ultimate "good" based on the unique makeup of their community, etc.)—it's simply focused on the output from the input. This holistic approach enables humans to devise innovative strategies able to transcend an algorithm's logical framework when confronted with a unique proposition. This continuous cycle of iteration allows humans to stay ahead of machine-learning systems, even momentarily as a machine learns and incorporates the new stratagems into its toolkit, leveraging human creativity, flexibility, and the ability to think outside the box—qualities that algorithms, which rely on predefined rules, historical data, and—crucially—human input, struggle to emulate.

In essence, machines still lack the human ability to adapt fluidly and creatively in real-time without human interaction and iteration in an open-ended world. By continually refining new strategies through integrating diverse insights, humans, especially humans leveraging machine-learning technology in partnership, can maintain an edge, continually challenging and outmaneuvering purely algorithmic opponents. This dynamic interplay between human ingenuity and machine precision ensures that the contest between man and machine remains a captivating and evolving battle, driving each forward.


Photo Credit: Flickr Collision Conf



FROM CYBORGS TO CENTAURS

Combining human intuition and AI precision, Centaur Chess (or Advanced Chess), named after the mythical human-horse hybrid, allows human players to collaborate with computer programs to make moves and elevate overall play. Introduced by Garry Kasparov in 1998 after his defeat by Deep Blue, Centaur Chess tournaments have shown that human-machine teams can outperform both individual humans and standalone machines. It has led to new strategic discoveries and a deeper understanding of chess, although it has also stirred some ethical concerns about fair play. Online platforms like Lichess and Chess.com offer Centaur Chess, while the approach continues to evolve with advances in AI and machine learning.

https://jods.mitpress.mit.edu/pub/issue3-case/release/6

Going back to chess, however, it's important to remember that the mastery of strategy that defeated Kasparov was built on the backs of many bold and truly innovative players before, without which the machine's command of the game wouldn't exist. Such machines owe a debt to their makers. And speaking of bold strategies, some of the very best chess players historically were, not coincidentally, highly unconventional contrarians. Mikhail "Misha" Tal, also dubbed "The Magician from Riga," was a prominent Grandmaster and World Champion in the 1950s through 1980s. Tal held the longest consecutive streak of unbeaten games in tournament play until surpassed by the aforementioned Kasparov in the 90s. Misha Tal gained notoriety through his innovative strategies and at times maniacal will to win. He would go on to become the youngest champion of the USSR Tournament at the age of 20. Tal believed chess was an "art" above all else, and later historians of the game would refer to his games as "poems" for their complexity and beauty. Tal's highly aggressive style would involve sacrificing extreme amounts of "material" (i.e., chess pieces and their relative value) to drive highly-specific, pre-planned outcomes. Tal ascended to World Champion in 1960-61, having devised highly complicated end-game scenarios through his unconventional force-play strategy. His tactics stunned and confused opponents, who had studied and perfected, like quant investors, traditional games with traditional outcomes; they simply could not react to Tal's ingenuity. More than anything, Tal was taking advantage of the behavioral mindset of his field of opponents. They were expecting one set of strategies; Misha Tal, the contrarian, was going rogue.

If Tal had chosen a different profession and, say, became an investor, one could infer that his approach would be intrepid, highly differentiated from the crowd, and offer a wild ride—one can envision huge up years, as well as massive down years, and numerous securities overlooked by the crowd. But over a long enough period of time, should such a strategy be rooted in discipline, a long-term mindset, and a well-defined mission paired with steadfast conviction, it would be reasonable to assume that Misha Tal would have done quite well, fundamentally aided by his will to win and willingness to stand out and apart from the crowd.

At the other end of the spectrum, at the same time Garry Kasparov was dueling with Deep Blue, one of the great cautionary tales in quant investing was unfolding at Long Term Capital Management. The hedge fund, using modern computing techniques (for the day), took the arbitrageurs of the 1980s to the next level. Founder John Meriwether recruited a veritable 'who's who' from academia to join the Long Term team, from Robert Merton to the aforementioned Myron Scholes[3]. Long Term had developed a quantitative model for arbitrage trading opportunities in the fixed-income market, which it had employed to great success in the firm's first three years. Along the way, the team had begun to gain such confidence that it began to pile on more and more leverage to generate higher and higher returns based on the same trade. Heading into 1998, the firm had $4.7 billion in equity, yet had borrowed north of $120 billion to fuel its trading. However, in the midst of this success, the firm faced a one-off, black-swan event, one that the model could not have possibly predicted—the consecutive Asian and Russian Financial Crises—which caused spreads on their favorite bond arbitrage opportunities to continue to widen, whereas Long Term's strategy was predicated on the spreads narrowing, the same as it had, predictably like clockwork, in the recent past, ultimately bankrupting the firm. Later in the year, Long Term was bailed out by a cohort of Wall Street banks (who all, ironically, were falling over themselves to work with the fund in the years prior).

The point is that while quant investing and machine-driven solutions can be effective, they have their blind spots relative to human-led, fundamental investing when faced with an unprecedented or unaccounted for development.

So will the machines ever catch up to humans in the investment world? Rewinding to the mid-90s, Deep Blue was, perhaps obviously, tweaked after the first match; IBM added more processors and a deeper knowledge of the game. Kasparov faced a vastly different opponent the second time around—one which he could no longer overcome. Humans will continually seek to iterate and refine any such programs, for chess, investing, or otherwise. Looking ahead, the next frontier appears to be advanced generative artificial intelligence (AI). Is it possible that such AI could eventually perform fundamental research in much the same way that a human could today? And could it deal with new information, or black-swan events, and properly incorporate them into its analysis? Even then, should all that come to pass, can this information and understanding then be incorporated into a portfolio with sufficient concentration and conviction to potentially generate material outperformance over a benchmark over the long run?

Before answering, it's worth noting that, perhaps surprisingly, despite machine dominance, chess's popularity has recently surged[4]. While AI systems like Deep Blue and other modern engines still consistently outperform even the best human grandmasters, chess has found a new lease on life through online platforms. This renaissance reflects something of a cultural shift, where the interaction between human ingenuity and machine precision has sparked renewed interest and engagement in the age-old game, showcasing the enduring appeal and complexity of chess and gaming for its own sake.

This rise in popularity signifies a notable reversal in the dynamic between humans and machines. Initially, humans programmed and taught machines like Deep Blue to excel at chess. However, the current trend shows humans leveraging AI and online platforms to enhance their own gaming skills. This development is promising for the future as it demonstrates how technology can elevate human performance, not just in chess but potentially in other areas requiring strategic or innovative thinking and learning, thus spurring human creativity to new heights and areas hitherto undreamed by AI—areas like business, medicine, and engineering. Further, the popularity and insights gained from human/computer chess competition and education could conceivably inspire the creation of new games designed to capitalize on more uniquely human strengths such as intuition, desire, motivation, and creative insight, exploiting machines' blind spots, limiting such systems' ability to dominate.

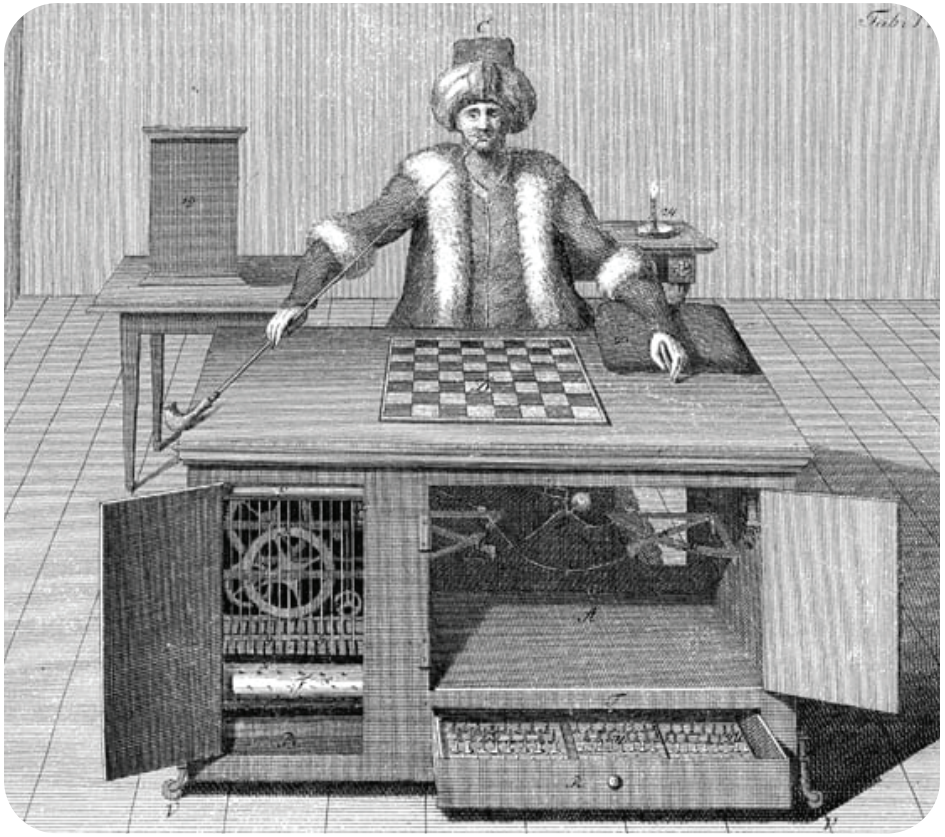
Overall, the growing popularity of online chess and the more general interplay between humans and AI signify a broader trend of using technology to enhance human potential, paving the way for future innovations and new avenues where humans might still outperform machines, particularly when working in tandem with machines.

> **PLAY THE OPENING LIKE A BOOK, THE MIDDLE GAME LIKE A MAGICIAN, AND THE ENDGAME LIKE A MACHINE.**
>
> RUDOLF SPIELMANN

Perhaps it is worth noting that the underlying large language models driving AI are also now being tested according to the same Elo rating system used to assess the relative ability of chess players[5]. It seems likely that generative AI will be trained to synthesize vast amounts of data, past stock pricing, etc., to forecast returns much in the same way human-built quant models have thus far built alpha forecasts. There is not much new there, except that perhaps the average person on their couch may soon have access to similar alpha models that have been built over decades by some of the largest and most successful quant shops, which perhaps does not auger well for those quantitative investors.

But as previously stated, the investment world is incredibly complex and diverse, and the forces that impact the value of a security are far more nuanced than simply its own history or value relative to similar securities. Of course, we would argue that an algorithm could create a positive skew given sufficient breadth, but there are just too many idiosyncratic opportunities on which one could otherwise capitalize. We would argue human inspiration, ingenuity, and foresight still play a major role—the major role—in significant outperformance, and will going forward.

Just as the resurgence in chess has demonstrated the powerful synergy between human creativity and machine precision, the future of investing will similarly thrive on the integration of human insight and AI. Success in this domain will not be achieved by relying solely on either human intuition or algorithmic calculations; instead, it will come from harnessing the unique strengths of both—mission-oriented strategic human thinking, creativity, and adaptability, alongside AI's capacity for data analysis, pattern recognition, and scalability. This synergy will pave the way for innovative investment strategies and enhanced decision-making capabilities, with the ultimate goal of driving better outcomes for investors in the complex world of finance. At Crewcial, we have already begun to experiment with these systems and tools operationally to drive efficiencies and better facilitate certain—still firmly human-driven—processes.



ARTIFICIAL ILLUSION

The "Mechanical Turk," created in 1770 by Hungarian engineer Wolfgang von Kempelen, was a famous 18th-century automaton designed to play chess. The machine featured a life-sized mannequin dressed in Ottoman robes seated behind a large wooden cabinet with a chessboard on top. While it appeared to operate autonomously through a display of intricate gears and mechanical parts, the Turk's chess-playing abilities were actually controlled by a hidden human operator inside the cabinet.

Touring Europe and the Americas, the Turk captivated audiences, defeating many skilled players, including notable figures like Napoleon Bonaparte and Benjamin Franklin. Its clever design, with sliding panels and levers, allowed the operator to manipulate the mannequin's arm to move chess pieces.

The Turk's secret was eventually revealed in the early 19th century; despite this, it left a lasting legacy by sparking early discussions on artificial intelligence and mechanical automation.

https://engines.egr.uh.edu/episode/2765

Crewcial's AI Acclimation

PAST

- Initial AI Tools Integration: Over the past two years, controlled experimentation with AI tools has helped fuel process and operational efficiencies across select back-office operations, with team members gaining valuable experience with the applications and limitations of such tools.

PRESENT

- Greater Operational Automation: Today, we use AI to streamline tasks such as organizing data, amalgamating notes, and capturing internal meeting minutes. This automation reduces the administrative burden on staff and allows the team to focus more on strategic initiatives, like enhancing client onboarding processes and developing tailored client solutions.

FUTURE

- Advancing AI Capabilities: Looking ahead, we plan to develop and implement both third-party AI tools and custom in-house GPTs[6]. These advancements will further enhance our operations by filtering out inefficiencies, better facilitating access to information, and improving transparency into data-driven considerations. This ensures our team can prioritize high-impact tasks, such as performing comprehensive or targeted analyses and developing innovative, custom investment strategies, with the ultimate goal of better client outcomes and stronger business growth.

Ignoring the tools at one's disposal is the equivalent of wearing a blindfold during a chess match, but we also fundamentally agree with Buffett that, all else being equal, knowing your businesses well is far better than rote diversification. And at its human core, while being contrarian is often admittedly difficult and fraught with all-too-human anxiety, we believe it's ultimately the most rewarding path for the disciplined investor, even when it involves traveling alone for vast stretches.

If we have one lesson to glean from the rise of AI and success of Deep Blue, why try to beat the machine at its own game, when you can start playing a new game alongside the machine?

Endnotes

[1] In practical terms, if an investment has a beta-plus value, this means it is more sensitive to changes in the stock market; if the market goes up, this investment will usually go up even more. (But if the market goes down, this investment will likely go down even more too.)

[2] The different types of data that an organization manages.

[3] Myron Scholes and Robert Merton, influential financiers and economists, helped developed the Black-Scholes-Merton model, revolutionizing options pricing and risk management in finance.

[4] 1500 years and still going: Chess embraces the online world to become more popular than ever – Annenberg Media (uscannenbergmedia.com)

[5] https://lmsys.org/blog/2023-05-03-arena/

[6] GPT stands for “Generative Pre-trained Transformer.” It is a type of artificial intelligence model designed to understand and generate human-like text based on the input it receives.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