# To Invest Using AI or to Invest in AI

A Comparative Essay

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Systematic strategies are widely thought to have been carving up the markets in the eight-year bull run enjoyed in markets. However, a key concern among sophisticated investors is that trading models built using back-tests on historical data would fail to deliver good returns in real-time since previously identified trends tend to break down – an event that is known to happen.
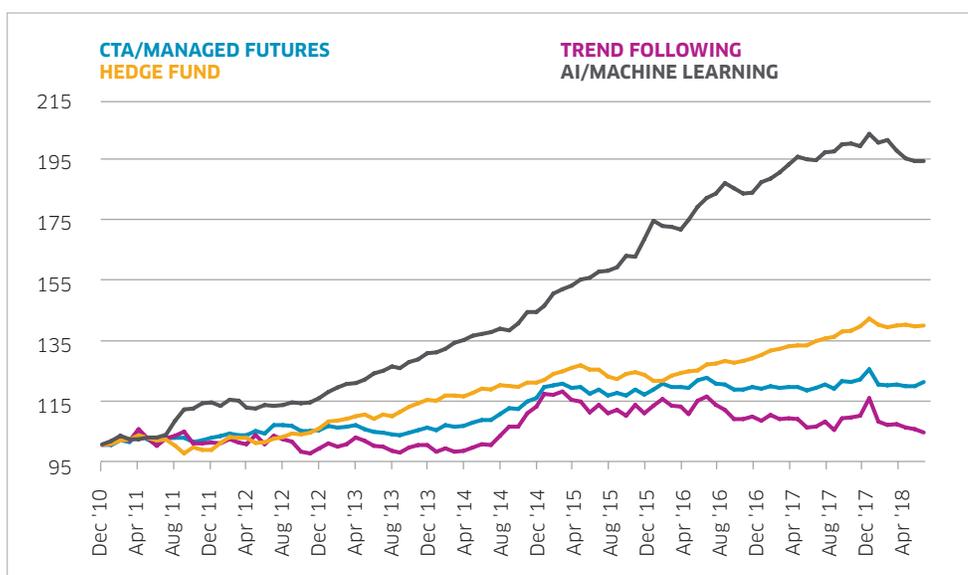
Source: EurekaHedge. Data Range: Dec '10 – Jul '18

The results from December 2010 through 2016 tell a familiar tale: the EurekaHedge indexes' performance suggests that the AI/machine learning hedge funds covered therein outperformed the average global hedge fund covered therein for all years excluding 2012. Also, while returns have been more volatile compared to the hedge funds covered, the AI/machine learning funds covered have posted considerably lower annualized volatilities compared with systematic trend following strategies.

It was also reported that the EurekaHedge AI/Machine Learning Index posted better risk-adjusted returns over the last two- and three-year annualized periods compared to its peer indexes described here, with Sharpe ratios of 1.51 and 1.53 over both periods respectively.

EurekaHedge

An independent provider of hedge fund news, indexes and databases has attempted to study this with four distinctive equally-weighted product offerings: the Hedge Fund Index – with 2,717 constituent funds irrespective of regional mandate; the Trend Following Index – with 41 constituent funds that are directional managers; the CTA/Managed Futures Index – with 446 constituent funds invested in commodity futures, options and forex contracts and the AI/Machine Learning Index – with 17 constituent funds that utilize artificial intelligence and machine learning theory in their trading processes.

However, the EurekaHedge AI/Machine Learning Index dropped by 7.3% in February from January, marking its worth month of performance. It was down 5.5% for the first two months while the S&P 500 index was up 1.5%. In 2017, the S&P 500 index rose nearly 20% while leading AI and machine learning funds were reported to have delivered a return of 9.9%. This validates some of the concerns within the investment community – the machines learnt the wrong things during the largely unidirectional markets.

Nonetheless, the general consensus of the financial services and capital markets industry remains that AI/machine learning has potential to be a force multiplier in the investment process. However, its applicability into insight generation remains a question mark.

Attempting to fill this void is a company called Buzz Indexes which leverages both AI and big data in a way that had hitherto been confined to academic reviews. Buzz identifies 50 different blogs, websites, and news services for a monthly scrape of data – in this case 50 million unique-specific data points – and then interprets their sentiment using natural language processing algorithms to determine which stocks are being talked about and whether or not people are bullish or bearish across the four previous quarters. The universe of securities considered is all stocks that trade on major U.S. exchanges and that have a market cap greater than $5 billion and trading volume of greater than $1 million. Each stock in this universe is assigned an "insight score" and the top 75 stocks are included in the index. Excessive turnover is deemed undesirable and a proprietary model caps the maximum weight of any stock in the index at 4%. This index – named the BUZZ NextGen AI US Sentiment Leaders Index – powers the BUZZ US Sentiment Leaders ETF (BUZ).

When compared against three widespread indexes in the markets, BUZZ retains a substantial lead over the S&P500 (SP50) and the Dow Jones Industrial Average (DJIA) by almost 8% while its lead over the Nasdaq-100 (NDX) dwindles away to remain almost on par by 2018 since the end of 2012.
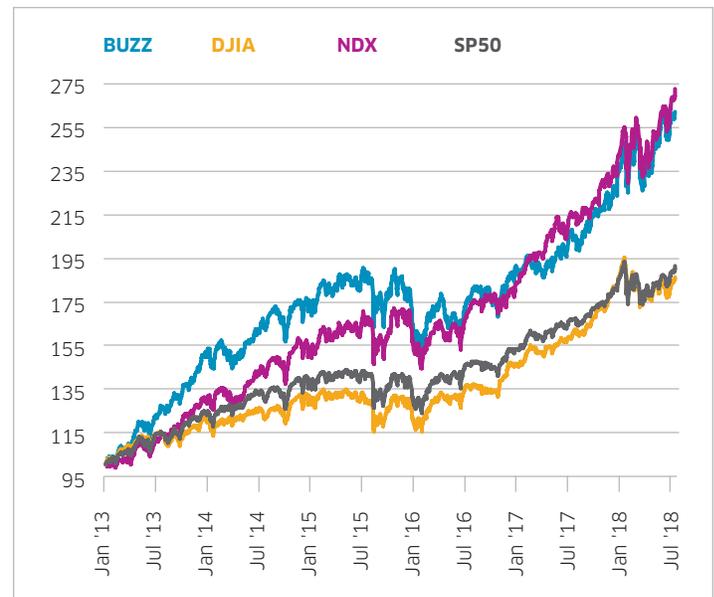
Source: FactSet, Bloomberg. Data Range: Jan '13 – Jul '18

As far as benchmarks go, BUZZ seems to have a largely similar directionality. However, the effects of size and constitution should be taken into consideration. For instance, while NDX has almost 33% more constituents relative to BUZZ, SP50 has more than six times the number of constituents while DJIA has 2.5 times fewer constituents. Also, DJIA and NDX are diversified differently. In addition, while the former is an equally-weighted sum of the constituents' price, the latter is a modified capitalization-weighted index.

Artificial Intelligence ETFs have, however, been finding gradual acceptance into the markets. As per ETFdb, they meet at least one of the following three criteria:

- They are funds that specifically invest in companies involved in the development of new products or services, technological improvements in scientific research related to artificial intelligence, or;

- They are funds that have at least 25% of portfolio exposure to companies that spend large amounts on artificial intelligence research and development (R&D) expenses. Examples of such companies are Amazon, Tesla Motors, Apple and Alphabet, or;

- They are funds that use artificial intelligence methodologies to select individual securities for inclusion into the fund.

The top 10 ETFs by assets under management are:

SYMBOL	ETF NAME	ASSET CLASS	TOTAL ASSETS ($MM)	YTD PERFORMANCE (AS OF JUL '18)
QQQ	Invesco QQQ	Equity	$69,534.56	17.81%
XLK	Technology Select Sector SPDR Fund	Equity	$23,169.18	16.86%
VGT	Vanguard Information Technology ETF	Equity	$21,862.05	17.97%
FDN	First Trust Dow Jones Internet Index	Equity	$9,580.97	34.37%
IYW	iShares U.S. Technology ETF	Equity	$4,344.98	18.15%
IXN	iShares Global Tech ETF	Equity	$2,472.41	14.21%
XT	iShares Exponential Technologies ETF	Equity	$2,340.35	7.98%
FTEC	Fidelity MSCI Information Technology Index ETF	Equity	$2,277.32	19.17%
BOTZ	Global X Robotics & Artificial Intelligence Thematic ETF	Equity	$2,229.10	-5.44%
ROBO	ROBO Global Robotics and Automation Index ETF	Equity	$2,100.67	-0.68%

Source: ETFdb.com

With the exception of ROBO, BOTZ and XT, the other top funds are more broadly invested across technology subsectors. The top performer – QQQ – tracks the Nasdaq-100 (NDX), which includes companies that are heavily engaged in disruptive technologies, such as Amazon, Alphabet, Apple, Netflix and Tesla.

For the purpose of tracking new technologies, the Nasdaq Yewno Global Disruptive Technology Benchmark Index (NYDTB) was launched in April 2018. A modified market-capitalization weighted index, it is designed to be a benchmark index that tracks the performance of over 1,200 companies engaged in Artificial Intelligence, Robotics, Automotive Innovation, Healthcare Innovation, New Energy & Environment, Data & Computing Processing and Internet of Things. Additional indexes created by Nasdaq with Yewno using NYDTB as the benchmark include targeted names and produce stronger returns.

Over the course of the past five years (i.e., its back-test period), NYTDB has closely followed the directionality displayed by NDX:
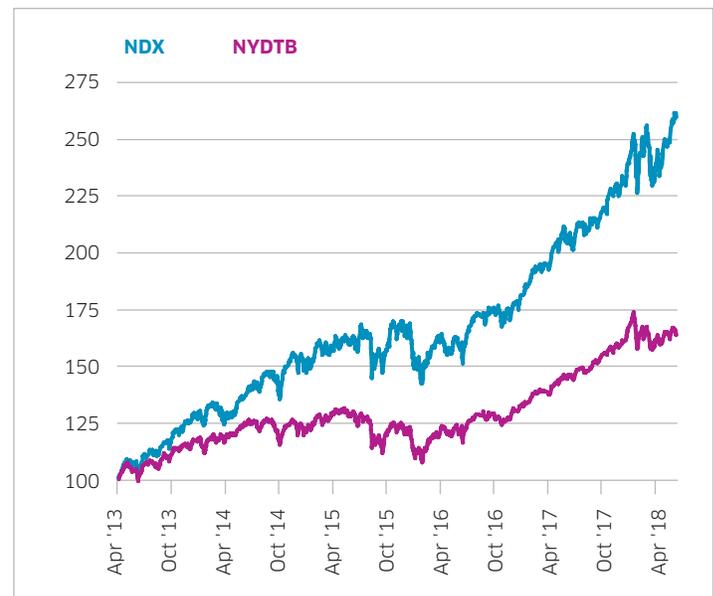
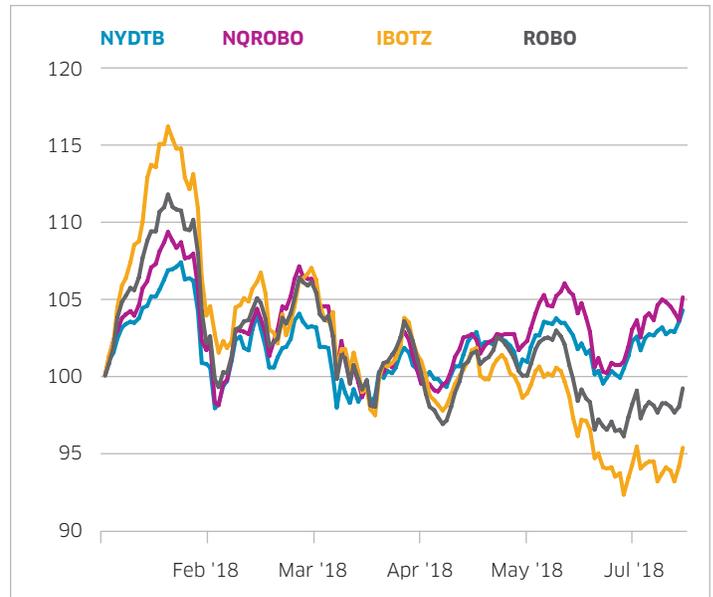Source: Nasdaq Global Indexes. Data Range: Apr '13 – Jul '18

For a different and curated focus on new technologies, the Nasdaq Singularity Index (NQ2045) was launched in December 2017 which makes its selections based on the custom singularity sector classifications as determined by The Singularity Group. Over a period of two years prior to its launch (which would constitute its and NYTDB's back-test), the index displays a very strong performance versus MSEXP (the index underlying XT ETF) and the benchmark NYDTB:
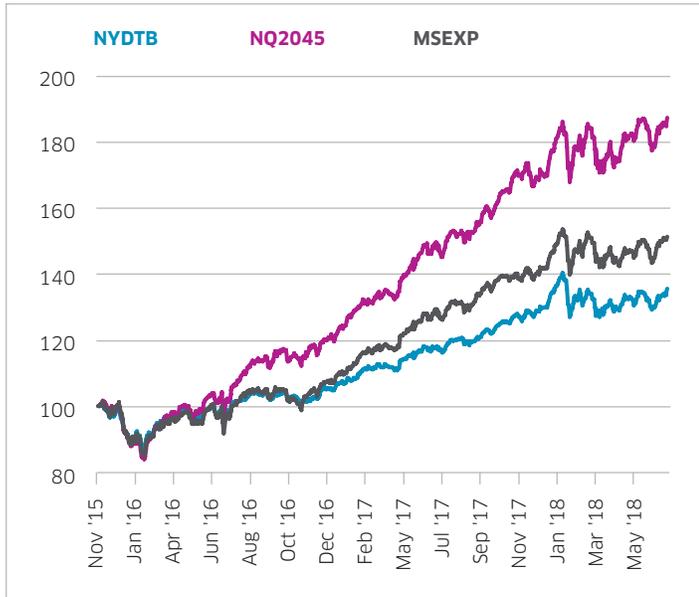
Source: Nasdaq Global Indexes, Bloomberg. Data Range: Nov '15 – Jul '18

For coverage in AI and robotics, Nasdaq launched the Nasdaq CTA Artificial Intelligence and Robotics Index (NQROBO) in December 2017. The index includes companies in artificial intelligence or robotics that are classified either as enablers, engagers or enhancers.

NQROBO has 98 constituents. Relative to this, IBOTZ (i.e. the index underlying the BOTZ ETF) is relatively modest in coverage at 28 constituents while ROBO has 88. Over the course of the last nine months (which was when the ROBO ETF went to market and also includes the back-test period for both NYDTB and NQROBO), IBOTZ and ROBO have relatively higher crests and troughs vis-à-vis the benchmark while NQROBO retains an edge over the benchmark while largely retaining directionality with its comparable counterparts.

Source: Nasdaq Global Indexes, Bloomberg. Data Range: Jan '18 – Jul '18

YTD comparison indicates the continuing strong performance of both the benchmark and NQROBO while both IBOTZ and ROBO show lower returns and higher volatility:
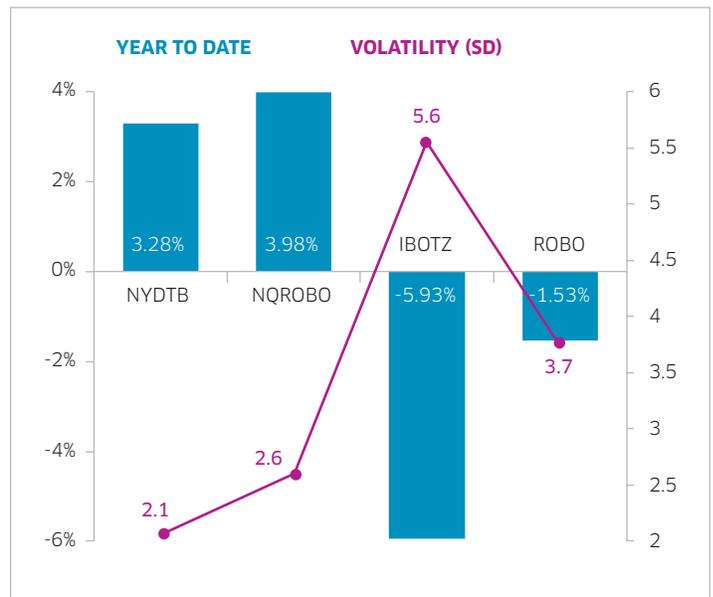
Source: Nasdaq Global Indexes, Bloomberg. Data Range: Jan '18 – Jul '18

Given the results, it could be summarized that while big data might have some limits on trend analysis for markets, they tend to be roughly directional with existing markets when the training model is done right. However, beyond the financial markets, companies that invest in and harvest insights using AI and machine learning are poised to be value drivers in diverse sectors of the economy – from agriculture to precision machinery.

An answer for whether to invest in AI or to invest using AI remains open to lessons learned as these technologies grow. However, a growth in understanding and adopting new technologies would be the order of the day and the benefits of adopting new technologies are being recognized by key decision makers across the economic landscape.

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