

Fund in focus: [Brompton Tech Leaders Income ETF \(TLF, TLF.U\)](#)

Artificial intelligence (AI) is based on the assumption that the process of human thought can be mechanized and, as a result, AI applications can perform some tasks that normally require human intelligence. Many ponder whether machine intelligence can surpass human intelligence. Scientists call this AI singularity, and some believe this could happen within the next century. Perhaps full-blown AI development could create deus ex machina ("god from the machine").

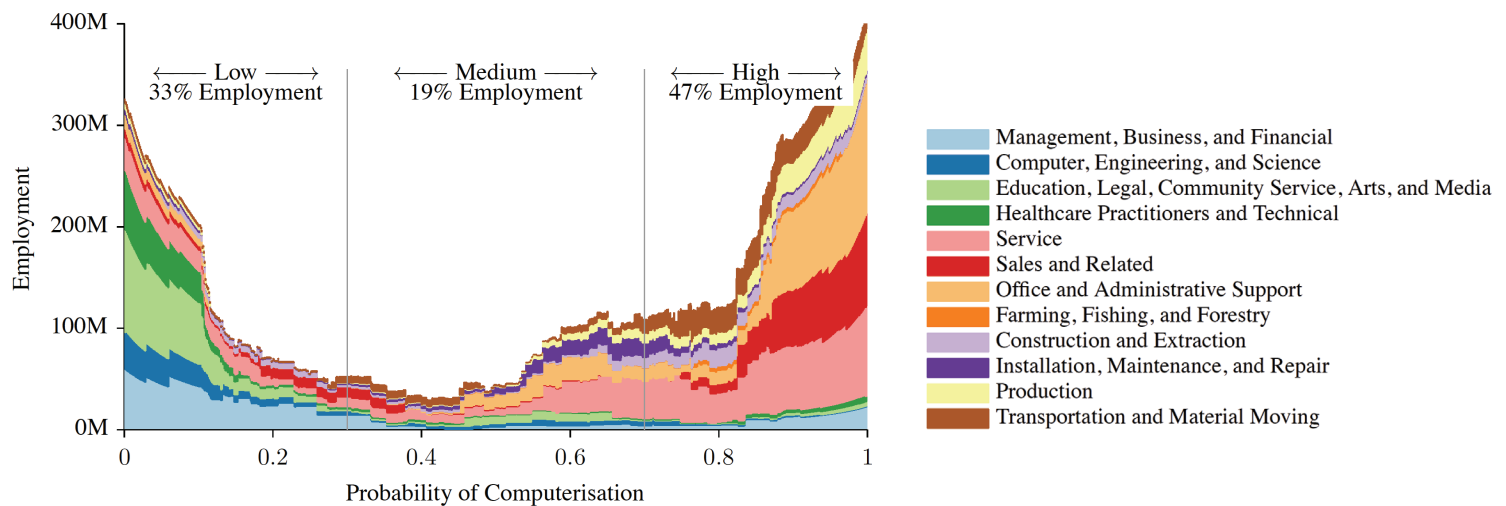
The AI spectrum is very broad but can be classified into several categories – natural language processing, optimization, rules-based, robotics and machine learning. Machine learning provides computers with the ability to learn without being explicitly programmed. Machine learning algorithms leverage large data sets to discover hidden patterns and learn to adapt and grow when exposed to new data/conditions, without human intervention.

We are entering another inning in the AI revolution given the pace of technological advancements, development of AI applications and machine learning algorithms. Improvements in silicon technology has enabled computer chips to mimic the brain's structure and processing capability. In addition, data management and storage techniques continue to improve and be optimized, which bodes well for training machine learning algorithms. Many machine learning libraries and standardized algorithms are now available through the open-source community, which provides an open and collaborative method to maintain and incrementally improve software. Cloud computing creates a sandbox for AI development, which facilitates rapid prototyping of AI applications, offers access to large datasets, and lowers cost. Many large cloud providers now offer machine learning-as-a-service.

Today AI systems are becoming more sophisticated and one step closer to competing with human intelligence. We've seen computers beat world chess champions (IBM Deep Blue vs Gary Kasparov) and Go champions (Google's AlphaGo vs Ke Jie). Interestingly, AlphaGo leveraged actual game play (with human opponents) as well as games played against itself to refine its learning capabilities in the Go game. Recently a new class of AI applications called large language models were developed, with more conversational capabilities versus traditional chatbots. Last year both LaMDA (Google) and ChatGPT (Open AI) were able to pass the Turing test. This test, which was introduced by mathematician Alan Turing in the 1950s, suggests that machines can think if their written replies to questions could not be distinguished from a human respondent. LaMDA was able to convince an engineer it was conscious and sentient.

With the proliferation of AI, many are concerned about machines taking over human jobs. Almost 50% of jobs are susceptible to automation over the long term, according to various industry studies (Frey and Osborne, OECD, World Economic Forum, McKinsey) - see figure 1 below. While there remains much debate about the extent to which robots will take over jobs, McKinsey analysis also suggests that only 5% of global occupations can be automated in their entirety, with 60% of those having at least 30% of automatable activities using current AI technology. We believe that AI will in the near term co-exist with humans in the workforce, augmenting functionality, improving productivity, and realigning the labour force towards more highly skilled jobs. Historically, innovation has redefined jobs and created new opportunities. As an example, the industrial revolution drove significant productivity improvements; the computing revolution created more jobs involving the use or development of computers; and the Internet boom led to business models and jobs that didn't exist previously.

Figure 1 – Artificial Intelligence Disruption on Employment



Source: Carl Frey and Michael Osborne, Oxford University as of September 17, 2013.

AI has the propensity to disrupt the global economy over the longer term and drive the next leg of growth. AI could contribute up to \$15.7 trillion to the global economy in 2030, more than the current output of China and India combined, according to a report by PwC¹. AI transformation is three pronged: 1) automation – creation of a new virtual workforce; 2) augmentation – AI can augment human labour; and 3) diffusion – AI innovations could drive transformational changes in the economy (new industries, business models etc.). Figure 2 below illustrates examples of how AI can drive innovation and transformational change across the economy.

Figure 2 – Artificial Intelligence Driving Innovation Across Industries

Healthcare	Financials	Advertising & Digital Content	Retail & Freight	Energy & Industrials	Customer Service	Business Intelligence
Smart Implants (Ex: Hip & Knee)	AI Thematic Fund Offerings	Marketing Efficiency	3D Shopping & Product Try On	AI Tools for Pipelines	Customer Analytics	Developer Tools & Assisted Code
Medical Imaging	New Trade Pricing Tools	Enhanced Ad Targeting	Sidewalk Robots for Deliveries	Geological Models	Insurance Claims and Records	AI-Related Consulting
Pathology Detection	Generate Client Portfolio Reviews	Recommendation Engine	Supply Chain Efficiency	AI-Enabled Microgrid Tools	Transcribe and Summarize	Integrated Smart Home Interface
Personalized Medicine	Automated Trade Prices, Execution	Higher Ad Conversion	Inventory Management	Energy Usage Analytics	Client Onboarding	Automate Back Office Tasks
Identify Biomarkers	AI Portfolio Management	Ad Auction Dynamics	Demand Prediction	Energy Trading Enhancements		Fraud Prevention and Protection
New Drug Development	Increase Trading Velocity	Content Creation	Truck Routing Capabilities	Labor Scheduling		Cybersecurity Capabilities
Analysis of Genomic Data		Customized Travel Itineraries	Higher Fleet Utilization	Reservoir Optimization		Risk Assessment & Management
Physician Point of Service Tools		Video Game Development	Autonomous Fleet Networks	Leak Detection & Track Emissions		Accelerated Data Analysis
						Predictive Modeling

Source: Morgan Stanley as of March 2, 2023.

Fund in Focus

Brompton Tech Leaders Income ETF (TLF, TLF.U) provides investors with actively managed exposure to a portfolio of equity securities of large capitalization, primarily North American-listed Technology Companies. TLF currently has exposure to AI technology through holdings in semiconductor companies, mega tech and large enterprise software companies. Leading chip manufacturers and related semiconductor companies provide the silicon building blocks that make AI possible. Mega tech companies have a significant number of AI patents, offer machine learning-as-a-service and can leverage their large userbase in driving AI adoption. Large enterprise software companies have begun to offer intelligent decision-making capabilities in their software as well as intelligent automation. We believe the AI revolution will provide structural growth tailwinds for many tech companies over the long-term.

¹PwC's Global Artificial Intelligence Study: Sizing the Prize, 2017.

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