



AI 101

## Q3 2023 Market Update



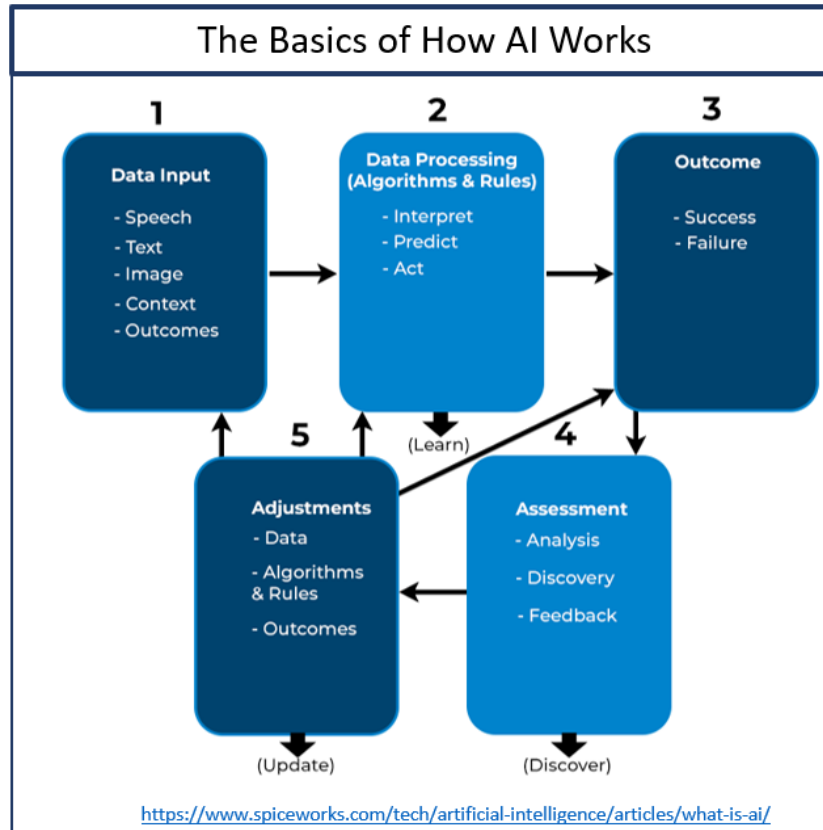
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“Success in creating AI would be the biggest event in human history. Unfortunately, it might also be the last, unless we learn how to avoid the risks.” – Stephen Hawking

***DISCLAIMER: This report was 100% written by me (a human) and not ChatGPT as many of our peers have begun utilizing. The only ChatGPT or any AI platform derived content was a sample ChatGPT query to showcase what their technology looks like. So, embrace any typos and human errors in this report, they may be going the way of the horse and buggy soon.***

What’s the deal with AI? No, I am not talking about cattle breeding and Artificial Insemination, I am talking about Artificial Intelligence. It’s a term being thrown around a lot by companies, but it’s important to understand exactly what AI is and how this tool will transform a company’s earnings. Everyone, including fast food and retail, is talking about how they will integrate AI into their businesses and help drive higher revenues. It is likely many will fail to execute at a meaningful level, but for now, it’s the buzziest term on Wall Street.

AI, as defined by Stanford Professor John McCarthy in 2007<sup>1</sup>, is, “the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable.” John McCarthy is credited with coining the phrase AI back in 1955, but his work was based off of Alan Turing’s work *Computing Machinery and Intelligence* written in 1950. Turing is famous for breaking the Nazi Enigma code machines by utilizing machines to break the code. Alan Turing is often referred to as the “father of computer science” and was one of the first to pose the question “Can machines think?” which has been developed now into the “Turing Test” to see if computer and human responses would be indistinguishable.



Not to get too technical, but it will be helpful to get some basic definitions clarified. AI, being science and computer based, becomes very technical very quickly. Below are terms as defined by the Stanford University Human-Centered Artificial Intelligence Department<sup>2</sup>.

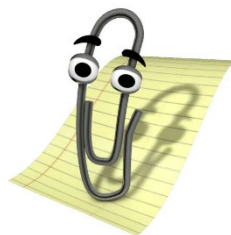
- 1.) **Generative AI:** A type of AI system capable of generating text, images, or other media in response to prompts. Models learn patterns and structure of their input training data, and then generate new data that has similar characteristics.
- 2.) **Machine Learning (ML):** The part of AI studying how computer agents can improve their perception, knowledge, thinking, or actions based on experience or data. For this, ML draws from computer science, statistics, psychology, neuroscience, economics, and control theory.
- 3.) **Deep Learning:** The use of large multi-layer (artificial) neural networks that compute with continuous (real number) representations, a little like the hierarchically organized neurons in human brains. It is currently the most successful ML approach, usable for all types of ML, with better generalization from small data and better scaling to big data and compute budget.
- 4.) **Narrow AI:** An intelligent system for one particular thing, e.g. speech or facial recognition.
- 5.) **Human-Level AI or Artificial General Intelligence (AGI):** Seeks broadly intelligent context-aware machines. It is needed for effective social chatbots or human-robot interaction.
- 6.) **Supervised Learning:** A computer learns to predict human-given labels, such as dog breed based on labeled dog pictures.
- 7.) **Unsupervised Learning:** Does not require labels, sometimes making its own prediction tasks such as trying to predict each successive word in a sentence.

- 8.) **Algorithm:** Listing the precise steps to take, such as a person writes in a computer program. AI systems contain algorithms, but often just for a few parts such as learning or reward calculation method. Much of AI behavior emerges via learning from data or experience. Considered Software 2.0.
- 9.) **Natural Language Processing (NLP)<sup>3</sup>:** A segment of AI concerned with giving computers the ability to understand text and spoken words in the same way a human being does. It combines computational linguistics (rule-based modeling of human language) with statistical ML and learning models. The goal is a computer understands the texts full meaning including the intent and statement.
- 10.) **Neural Networks<sup>4</sup>:** Modeled loosely on the human brain, they consist of thousands or even millions of simple processing nodes that are densely interconnected.

In a nutshell, AI is processing data, analyzing inputs and learning patterns enabling a computer to mimic a human. Often times, AI can process data much faster and with less errors than a human searching for the same information. This creates a powerful tool to not only consume data, identify patterns, but go beyond a basic algorithm and *think* through the next step. This tool has opened the door to many helpful technologies such as ChatGPT as well as some annoying ones, like the ridiculous chatbots and “help” menus that aren’t quite there yet on helping.

### What is ChatGPT?

ChatGPT was developed by OpenAI and partnered with Microsoft (MSFT) for \$10 Billion in early January 2023. MSFT made a significant investment in order to accelerate AI breakthroughs for their platforms and to compete over the next decade. MSFT will also continue to be the cloud provider for OpenAI, so it’s a strong partnership allowing significant potential scale and collaboration between the two firms. The markets considered this a strong investment to boost MSFT’s potential future revenues and help keep market share from competitors as the tech landscape shifts. The joke on Wall Street was that MSFT spent \$10B for an upgraded and modern “Clippy” (if you remember that slightly annoying feature in Word back in the early 2010’s).



ChatGPT<sup>5</sup> is a model that is trained to interact in a conversational way in a dialogue format that makes it possible for it to answer follow up questions, admit its mistakes, challenge incorrect premises and reject inappropriate requests. ChatGPT can answer questions, assist you with tasks and compose emails, essays and even code. Below is a query I made to ChatGPT on 6/6/23 asking it to describe AI. As you can see, its ability to write and think is far beyond Google and Clippy. ChatGPT is fun to explore for brainstorming ideas such as if you need ideas for baby or dog names (Max and Bella were its top 2 suggestions), as well as potentially figuring out the best verbiage to use in a thank you card to a distant relative.

## ChatGPT Describes AI

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how do you describe AI



AI, or Artificial Intelligence, refers to the field of computer science that focuses on the development of intelligent machines capable of performing tasks that typically require human intelligence. It involves creating computer programs and systems that can analyze, interpret, learn, and make decisions based on data and patterns.



AI encompasses various subfields, including machine learning, natural language processing, computer vision, robotics, and expert systems. Machine learning algorithms are a fundamental component of AI, allowing systems to learn from and adapt to data without being explicitly programmed. This enables AI systems to recognize patterns, make predictions, and improve their performance over time.

AI systems can perform a wide range of tasks, such as speech recognition, image and video analysis, autonomous driving, virtual assistants, recommendation systems, and medical diagnosis. They can handle large amounts of data, extract valuable insights, and automate complex processes, leading to increased efficiency, accuracy, and productivity across industries.

While AI has made significant advancements in recent years, it is important to note that current AI technologies are considered narrow or weak AI, designed for specific tasks. General AI, or artificial general intelligence, refers to the hypothetical development of machines that possess human-level intelligence and can understand, learn, and perform any intellectual task that a human being can. However, achieving general AI is still a subject of ongoing research and remains a significant challenge.

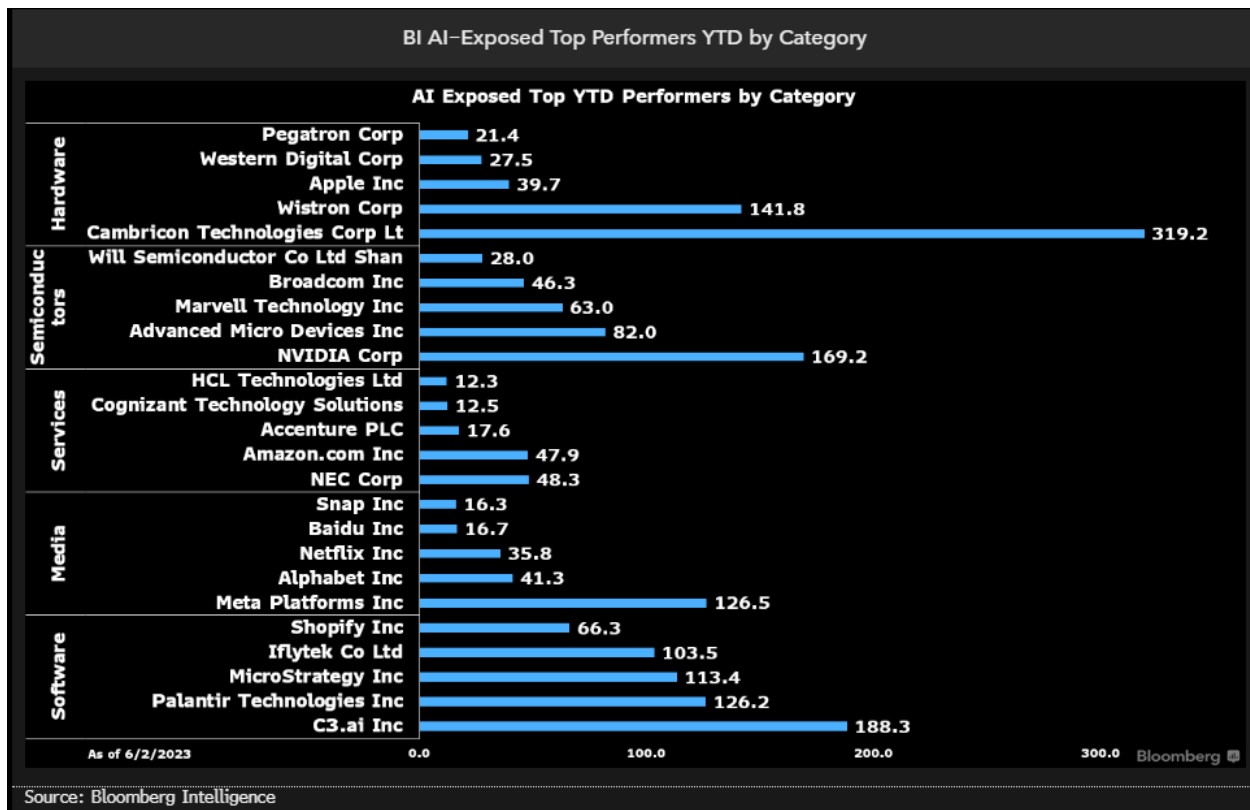
<https://chat.openai.com/>

### Investing in AI

What does this new technology mean to investors? At the end of the day, will AI drive the next decade just like the internet moved us forward into a new paradigm? It likely will drive efficiencies and allow companies to better analyze data to minimize costs and disruptions as well as potentially reduce headcount due to the ability to replace some basic functions with technology. Similar to the internet era, there will likely be a mania followed by winners and losers. Never forget, Google and Amazon were both on the ropes during the tech bubble crisis. And in 1998, Yahoo had the ability to acquire Google for \$1mm but turned down the emerging search engine. At that point in time, Yahoo was the more established internet company with its own search technology. Time often provides us with clarity on opportunities, and that missed decision ranks as one of the worst business decisions of all time.

The markets often enjoy a mania period about emerging technology and many companies start talking about how to harness the technology in order to seem more relevant and forward thinking. Many will fail. However, the street does seem to be picking some potential winners. They fall into 4 basic categories: (1) those who make the chips to drive the computing power, (2) those who provide the infrastructure or cloud-based platforms, (3) those who can harness AI to drive their business forward at a more rapid pace, and (4) health companies that can use AI for analytics, diagnostics or drug creation.

- 1.) **Chip Stocks:** Obviously, AI runs on a lot of computing power to handle all the data and learn. The semiconductor space is what will drive the ability to run AI since you need a lot of processing ability to drive the technology. Chip makers are basically the engines driving computing power, making them a potentially large winner in the AI race. You can't run complex programming without the chip power to allow it to function and learn. NVDA has been one of the biggest beneficiaries of the AI bump, as its business is well positioned to take more market share in a rapidly growing market. It helps that ChatGPT was trained using 10,000 of NVDA's GPUs clustered together in a supercomputer owned by MSFT. One caveat, many of these stocks have seen a large increase in price over the last 12 months, so investors must weigh the potential upside to revenue and earnings vs. the current price and multiple.
- 2.) **Software/Tech Stocks:** These stocks either support AI deployment or are direct beneficiaries from the technology. AI and the large amounts of data consumed need to utilize cloud-based platforms in order to function efficiently. ADBE is a lesser-known name playing in this field and unveiled its AI driven platforms they have coined Adobe Sensei and Firefly. Might become a lot more difficult to track photoshop (though their AI platform has a tool to identify potentially altered photos), as AI driven editing and image tools become stronger. GOOGL is actually considered slightly behind the curve on AI and has struggled rolling out Bard, its AI platform. Bard is a conversational AI chatbot developed by Google to assist in search and to function similarly to ChatGPT. Bard made a factual error during its first live demo, confidentiality stating incorrect information on NASA's James Webb space telescope. Software will be needed to support AI as well as providing these platforms for the public to access some of the top AI chatbots.
- 3.) **Discretionary/Retail Stocks:** These are the stocks that will benefit from the enhanced capabilities and analytics that AI provides. One sector of this market is self-driving car technology and general automotive tech. TSLA is a leader in the push for a fully autonomous, self-driving car and AI driven programs should make that a reality sooner rather than later (though it's for the insurance companies to fight over liability assignment and regulators to decide it's safe!). AMZN and other retailing companies such as WMT and TGT can utilize AI for better pattern recognition, revenue growth modeling, store layout, website layout, sales, and even customer service. Every company will likely say they are focusing on AI for improved revenue, it is likely some will be more successful than others. A company needs strong infrastructure and a focus on technology and data driven decisions in order to harness the power of AI.
- 4.) **Health Stocks:** Healthcare was already learning to embrace data analytics a decade ago. Data analytics helped drive insurance companies to fully cover the cost of an annual physical, as they learned it was cheaper for them to have healthy participants and focus on preventative care rather than pay for the cost of hospitalizations. AI in health could also provide much more rapid breakthroughs and drug creation as well as the potential way down the road for rapid creation of customized medications and treatments per individual. Per a 2019 article published by the Royal College of Physicians<sup>6</sup>, it's anticipated, "AI can perform as well as, or better, than humans in key healthcare tasks, such as diagnosing disease. Today, algorithms are already outperforming radiologists at spotting malignant tumors, and guiding researchers in how to construct cohorts for costly clinical trials." AI can help drive innovation, data analytics, customer service and billing assistance as well as potential robotics and robotic process automation. AI in health has a lot of barriers with regulation and adoption, but it will certainly continue to change the landscape.



### What are the potential downsides to AI?

Beyond the obvious Hal or Skynet comparisons, AI does come with many concerns that will need to be addressed over the coming years. AI driven bad actors will become increasingly difficult to stop. This isn't just AI driven large-scale corporate or government hacking but think about AI driven identity theft or phishing attempts. If one can have AI duplicate a voice, or create a deepfake video, it will be extremely hard to not fall for a phishing call that sounds like its coming from your grandson who is in jail and just needs some gift cards to post bail. AI driven video and audio will make it extremely difficult down the road to know when you are talking with a real human, or when you are talking to a bot. Emails, as NLP becomes even better, will be tough to discern again if it's actually the human you reached out to or a computer. This may drive people to more face-to-face interactions as they do not want to be interfacing with an algorithm. Lastly, the issue with fake news and spoofing is likely magnified with AI since it can help create more plausible stories with photoshopped (but very authentic looking) photos or videos. Social media has already become a cesspool, imagine what it looks like when the machines that are arguably getting considerably smarter than us start manipulating our feeds.

There are also ethical considerations as well as the potential that AI will become uncontrollable or ungovernable. The potential for AI to grow faster and become smarter than humans is certainly a real concern. As well as the balance of power between nations and the military, espionage, and warfare implications of the technology becoming an issue. Potentially, similar to nuclear bombs, AI might need to be regulated and the world agrees on certain limits to the technology to preserve peace and balance. The major questions of privacy/surveillance, bias & discrimination and the role of human judgement will all need to be answered as we move forward with AI.



Lastly, what happens to our labor force if suddenly multiple millions of jobs become rapidly obsolete? While technology is ever changing and the labor market shifting in response to change, it does seem plausible that large scale AI adoption drives out a large percentage of the workforce. In 2017, McKinsey Global Institute estimated<sup>7</sup>, “activities most susceptible to automation involve physical activities in highly structured and predictable environments, as well as the collection and processing of data. In the United States, these activities make up 51 percent of activities in the economy accounting for almost \$2.7 trillion in wages. They are most prevalent in the manufacturing, accommodation and food service, and retail trade, and include some middle-skill jobs.” More recently, Goldman Sachs<sup>8</sup> predicted that 18% of the work globally could be computerized and that in the United States and Europe, approximately two-thirds of current jobs are exposed to some degree of AI automation. Automation has been taking jobs for years (think toll both collectors vs. toll tags), but AI has the potential to accelerate that trend to a point where employment for humanity becomes a consideration. We can’t all be internet influencers.

## **Conclusion**

AI, in some form or fashion, is coming down the pipeline whether you like it or not. There will be opportunity for growth in certain companies and segments of the market, but it may not be the lift the mania is predicting today. Similar to how Yahoo vs. Google played out in the 1990’s, the landscape will be shifting rapidly as well as the potential may not develop as quickly or as widely as the market is predicting today. We do feel AI will become more integrated in our lives, and many companies will adopt AI into their businesses over the coming years. Some will do it better than others, and we also have the specter of regulation or restrictions in the AI space.

I, for one, welcome our robot overloads. (Kidding). But be ready to embrace new technologies and not be a Luddite. Understanding AI is the first step to ensuring you are ready to invest in the space.

## **Sources**

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