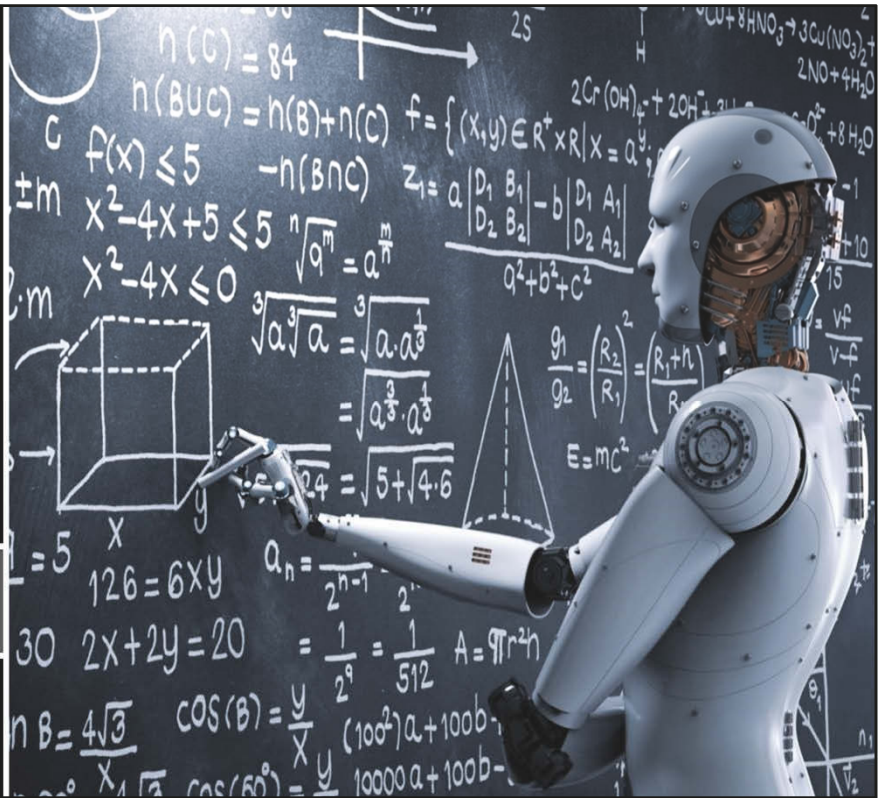
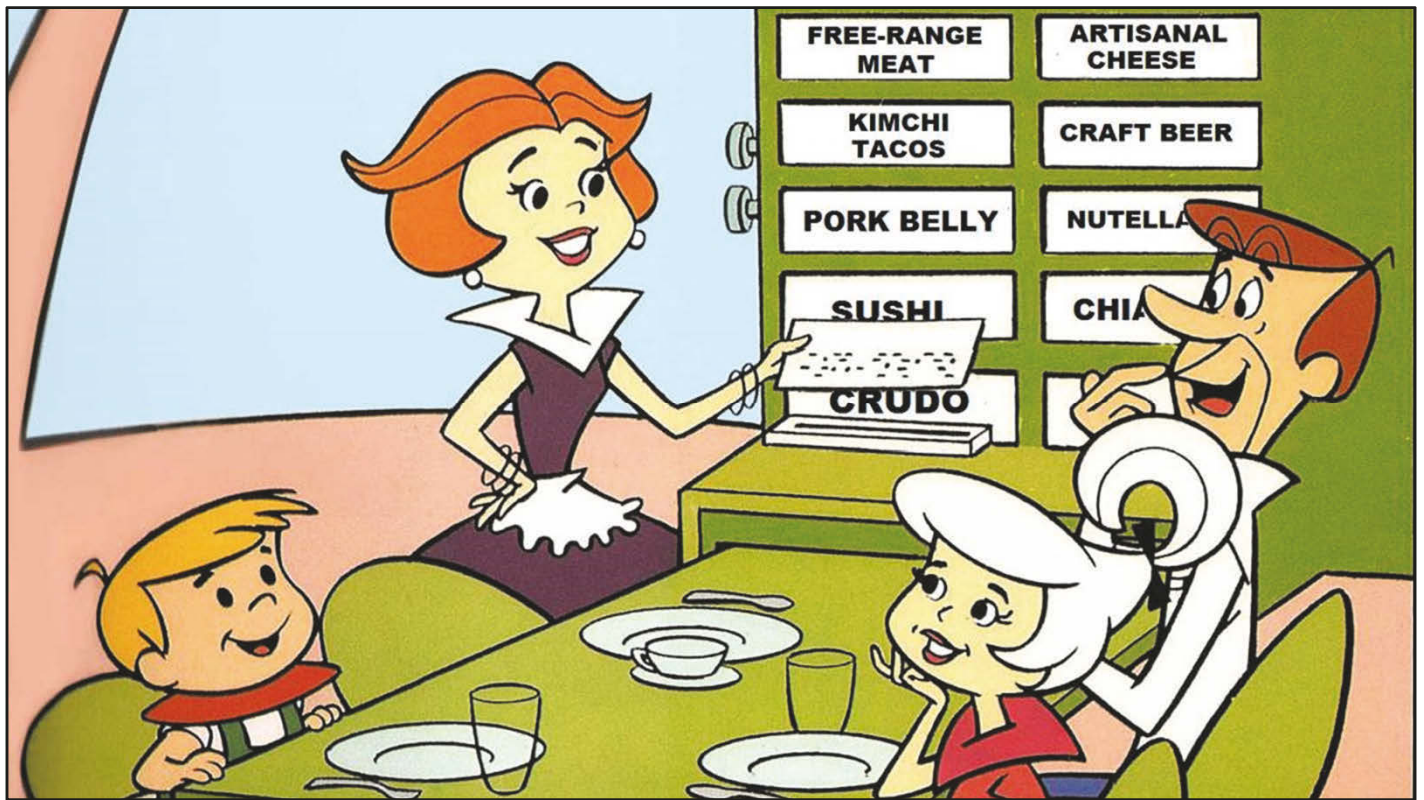


The Future is Here

Steven Zicherman, CFA
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Once upon a time, when I was a kid, ideas about how we would live in the future seemed pretty inconceivable.

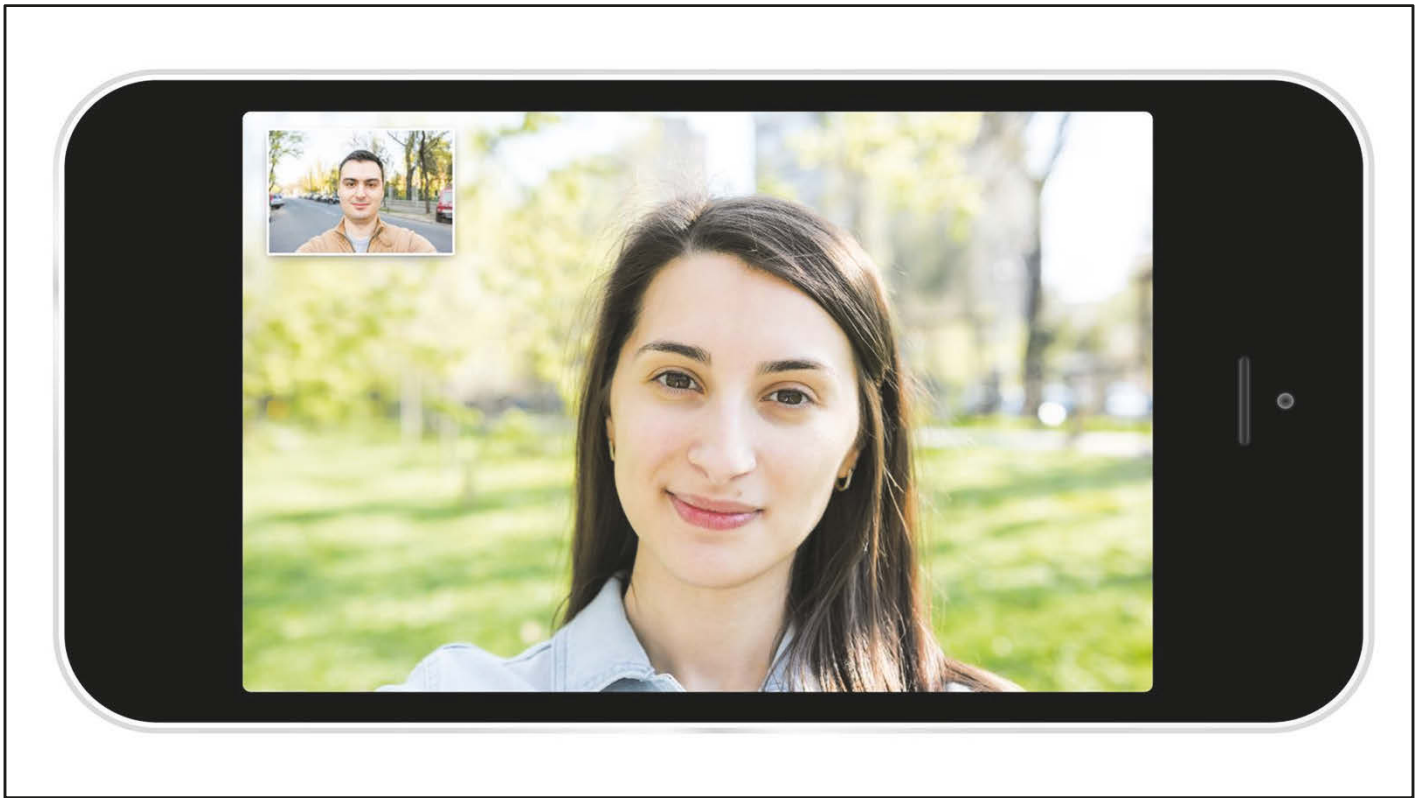


My favorite television show was “The Jetsons.”

As most of you know, “The Jetsons” was a cartoon that originally aired in 1962. I loved the Jetsons because it took place in the future, in the year 2062.

George Jetson and his family lived high above the ground in the Skypad Apartments. George worked for only an hour a day, two days a week. Indeed, the future looked bright!

What’s amazing to me is how many of the futuristic technologies highlighted in the show are common in today’s world.



For instance, we can speak to others remotely and in real-time using Facetime and Skype.



Image source: Google

iRobot Roombas clean our floors and navigate around obstacles with no programming required.



And, we have these cool smartwatches that can make phone calls, pay for a cup of coffee, track our fitness activities and stream music right from our wrist.

The logo for amazon.com, featuring the text "amazon.com" in white lowercase letters on a black background. A curved orange arrow starts under the letter 'a' and points to the right, ending under the letter 'z'.The Google logo, consisting of the word "Google" in its signature multi-colored font (blue, red, yellow, blue, green, red) on a black background.

Technology progress continues to march on but the challenge is how to invest in these kinds of developments. Our strength lies in analyzing the bigger, more established companies where business models and competitive strengths are more easily understood. We like to know what we own.

This may come as a surprise, but Amazon and Google represent an opportunity to participate in a technology category where the winners are already entrenched – artificial intelligence.

Both these companies enjoy strong market positions thanks to artificial intelligence applications that are used in many of the products we consume daily.

Some examples include: photo and speech recognition, spam filtering software and online advertising.



Image courtesy of Dartmouth College Library.

The history of artificial intelligence goes way back.

The folks in this picture are a group of researchers who met at Dartmouth College in 1956. Their mission was to program computers to behave like humans. This effort evolved over decades but the art of teaching computers to learn new things and recognize patterns remains at the core.



Machine learning grew in popularity and by the mid-90s IBM's Deep Blue computer became the first chess-playing machine to win a game against the reigning world champion, Garry Kasparov.

Innovations in artificial intelligence improved rapidly over time and by 2010, machine-learning technologies were being applied to a number of fields, including natural language processing and even drug design.



In fact, researchers at Stanford University recently developed an algorithm that is capable of diagnosing pneumonia more accurately than a human radiologist. Artificial intelligence like this could, in the near future, automate disease detection and significantly reduce our healthcare costs.

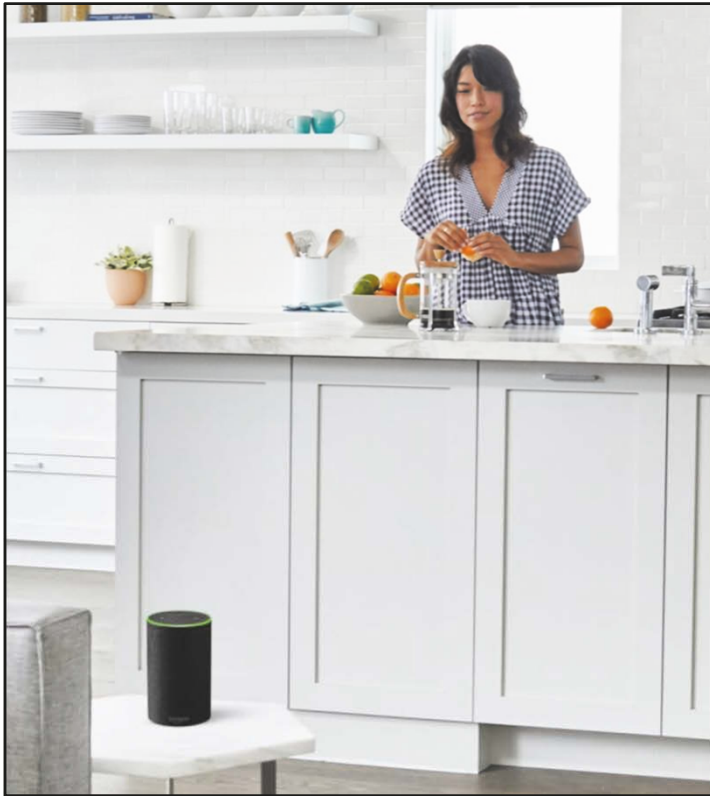


Image source: Amazon

Today, across many industries and in many parts of our daily lives, algorithms are being used to mimic human behaviour.

For instance, Amazon's Echo is a Bluetooth-enabled cylinder that runs artificial intelligence software called Alexa. Alexa is similar to Apple's Siri and named after the Alexandria library.

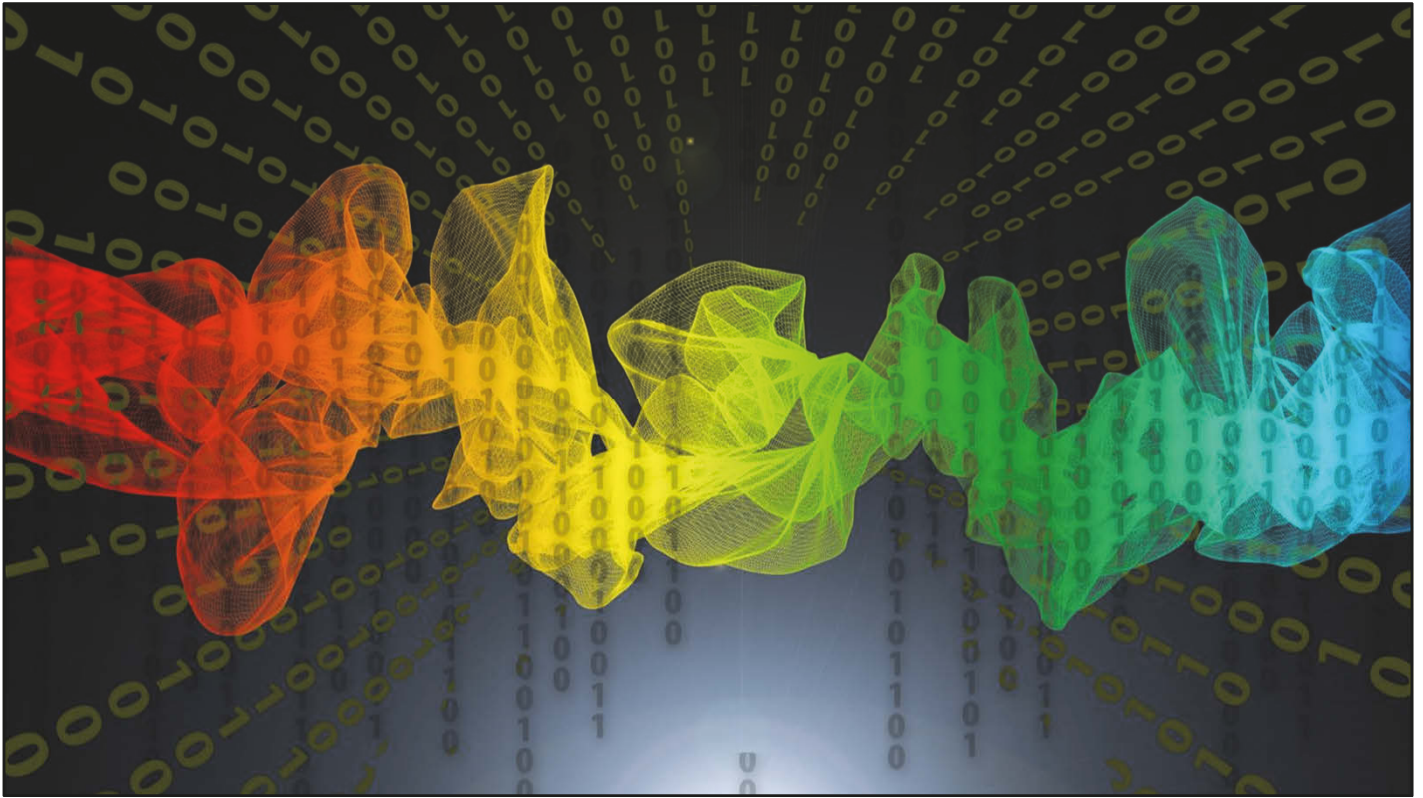
Both Alexa and Siri operate like a virtual personal assistant; you can use either application to search the web and listen to music. But, Amazon has larger aspirations for Alexa.



“Hey Alexa,
please add Greek
yogurt to my
shopping cart.”

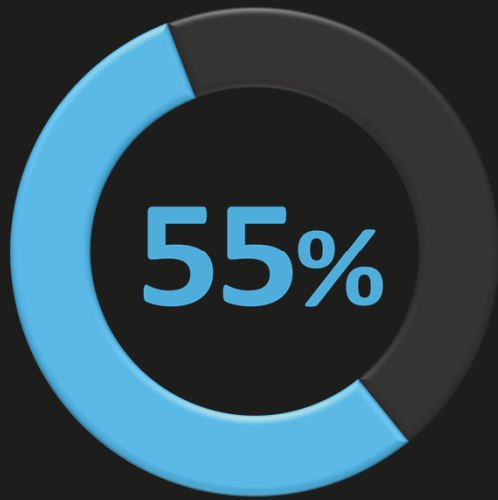
They are working towards the next evolution in online shopping – zero-click ordering.

I expect more of us will be interacting with these voice-operated devices soon. Saying “Hey Alexa, please add Greek yogurt to my shopping cart,” and having those items delivered to us within a day or two seems pretty simple.



As we spend more time shopping online, think about the volume of data Amazon collects from its tens of millions of shoppers. Amazon uses this data to better understand our preferences and purchasing habits, all in an effort to make shopping a more convenient experience.

So how are products like the Echo impacting Amazon today?

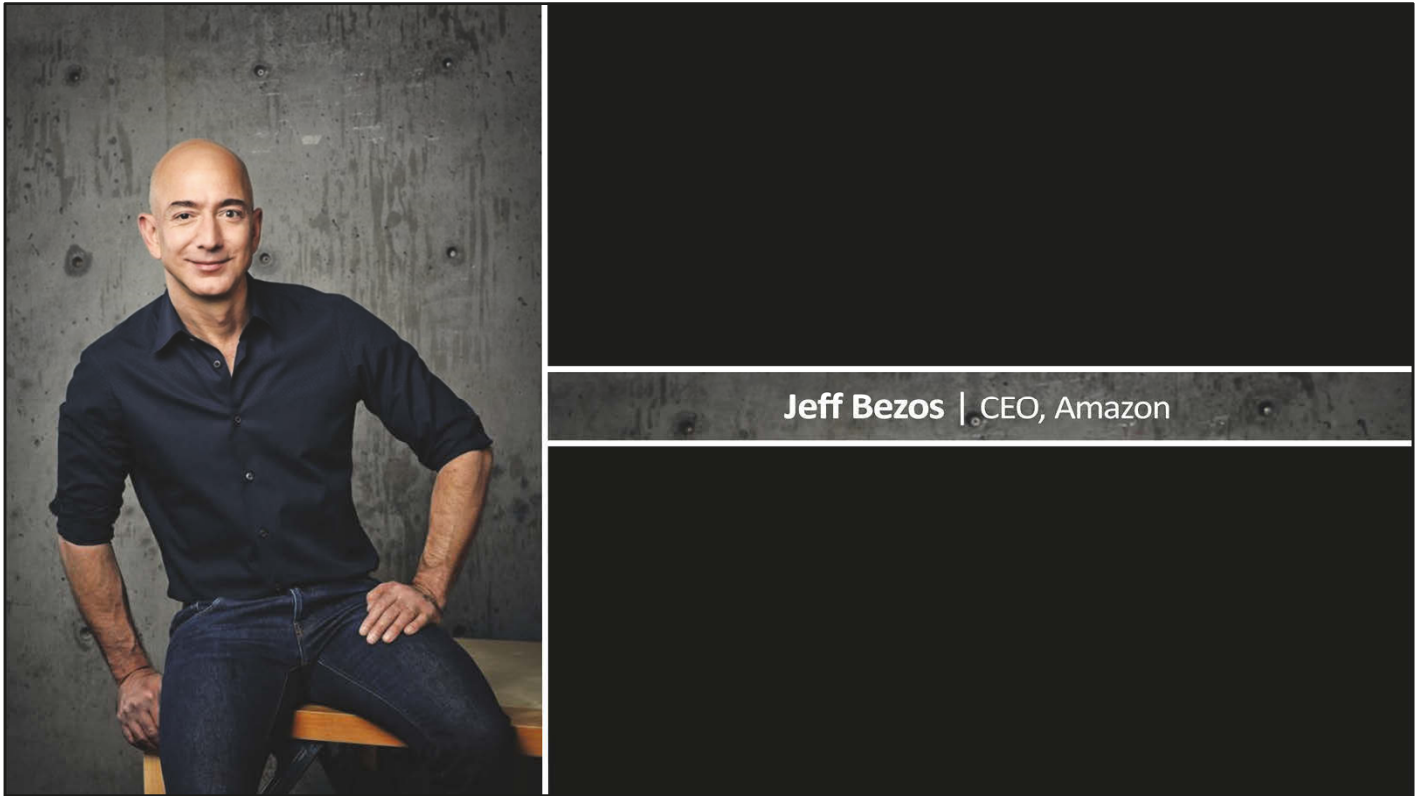


of U.S. consumers begin
their **shopping searches** on
amazon.

Source: BloomReach

Well, 55% of product searches now start on Amazon. Think about that for a second. Think about how many retailers are out there, yet more than half the time, our starting point is Amazon.

That's a big moat which is hard to compete with.



Source: Google

Amazon is one of a handful of companies that are truly customer-centric. Jeff Bezos is a smart guy. He has grown the business using innovative low-cost strategies. Bezos is also a leader who pushes the envelope and leverages technologies like Alexa, warehouse robots and high-tech grocery stores that remove the inconvenience of long checkout lines.

Amazon's focus on providing the best customer experience in everything they do is a key part of our long-term investment thesis.



how t

- how to tie a tie
- how to make slime
- how to buy bitcoin
- how to cook quinoa
- how to mine bitcoin
- how to draw
- how to buy ripple
- how to write a cover letter
- how to screenshot on windows
- how to lose weight

Google Search I'm Feeling Lucky

Report inappropriate predictions

Source: Google

Now, let's turn to Google.

Why do we love Google? That's easy. Google provides the best answers, more quickly than any other search engine. Google's algorithms are so good at providing answers, we confide in it in ways we likely wouldn't share with others.

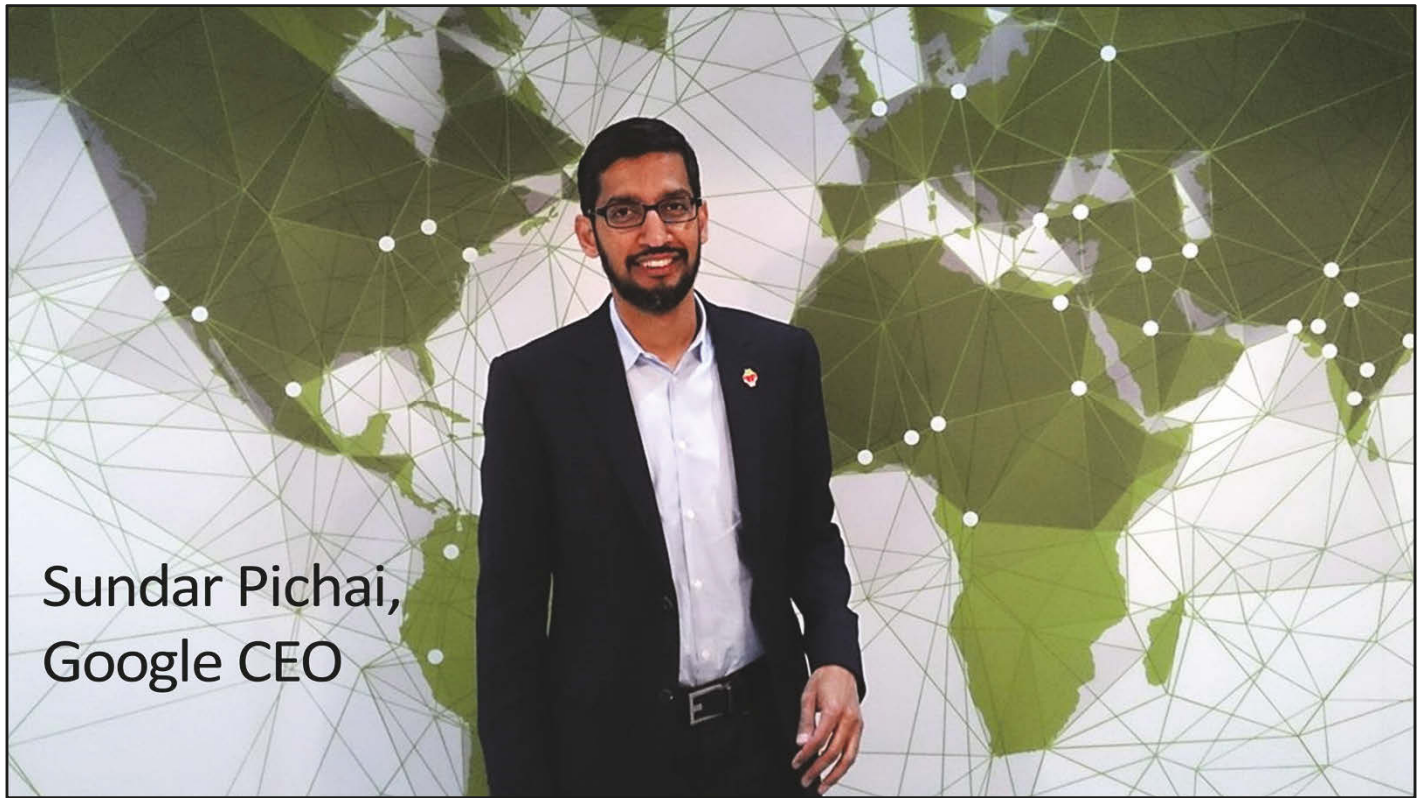
There are 3.5 billion search queries made each day using Google and the more we use it, the better it becomes. Think about how many times you started typing in a search and, in an instant, the autocomplete knew exactly what you were looking for.



It is learning each time we use it and there's a lot left to learn.

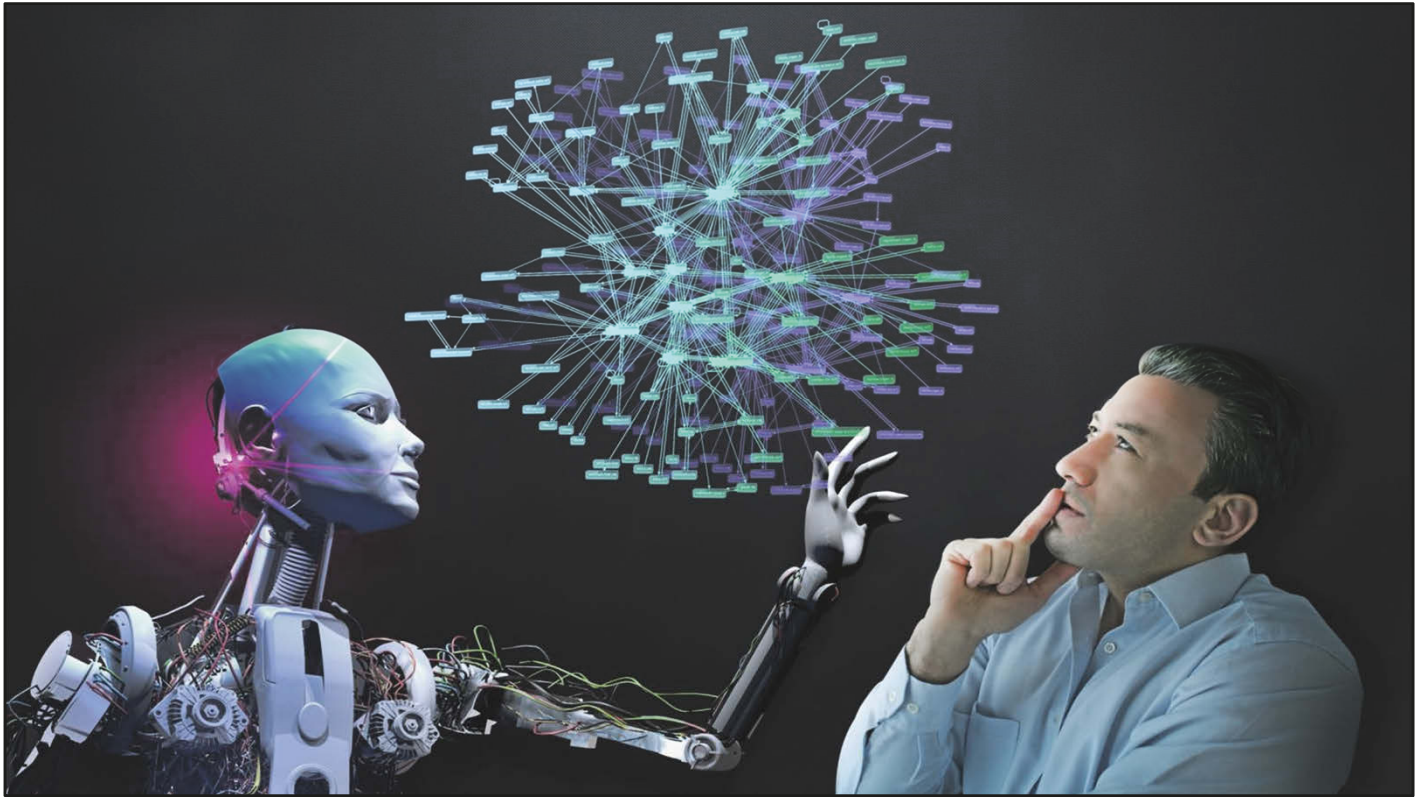
Did you know that 15% of Google's daily search queries are new and unique. Imagine that. About 1 in 6 Google queries have never been asked before!

So, how do they do it? How are they able to rank pages accurately and provide results to you right away? The answer – artificial intelligence.

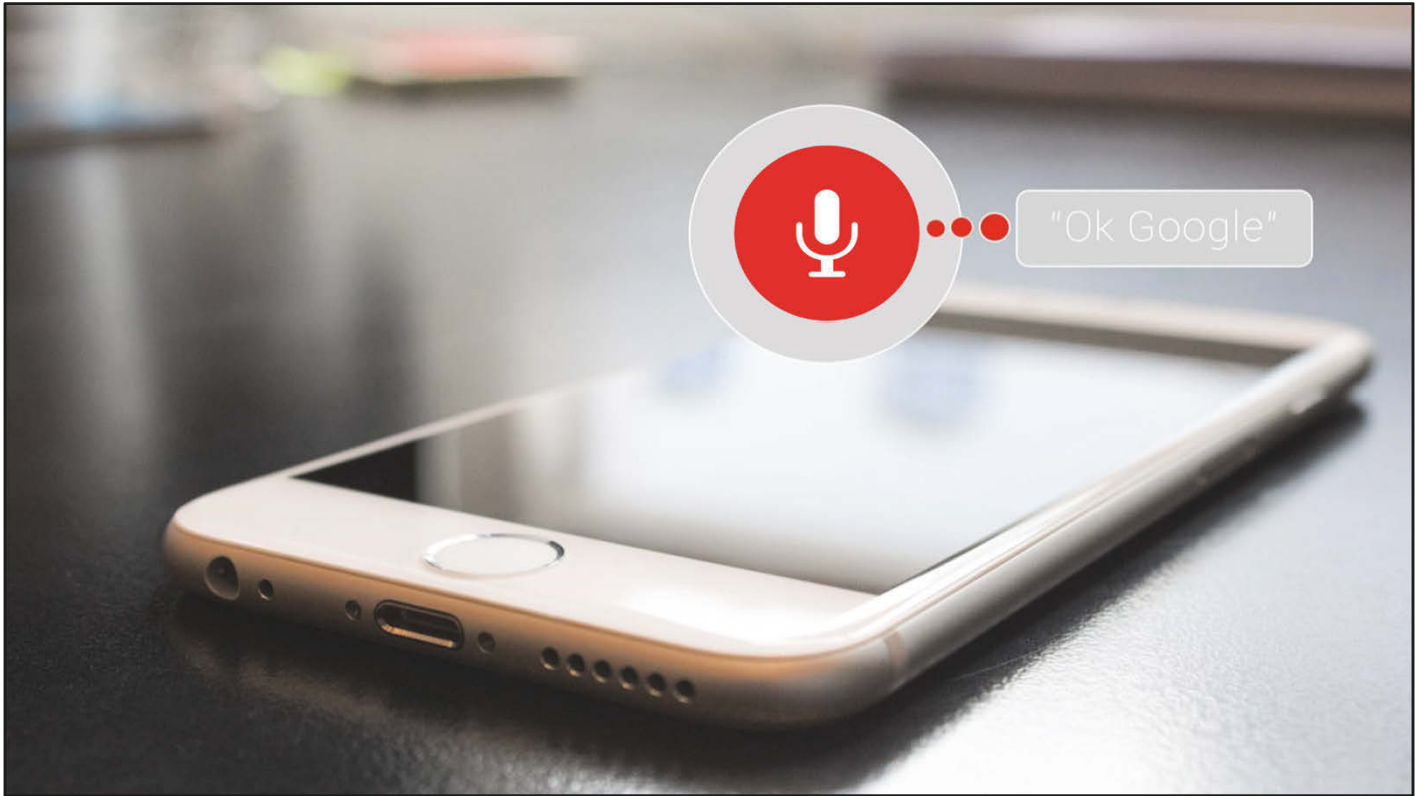


Source: Google

When Sundar Pichai was promoted to Google's CEO, he was quick to emphasize a company transition from a mobile-first focus to an artificial intelligence focus. Given this move, it is not surprising that Google has evolved into a leader in the field. Google applies their artificial intelligence in a number of ways. Most importantly, responding to search queries.



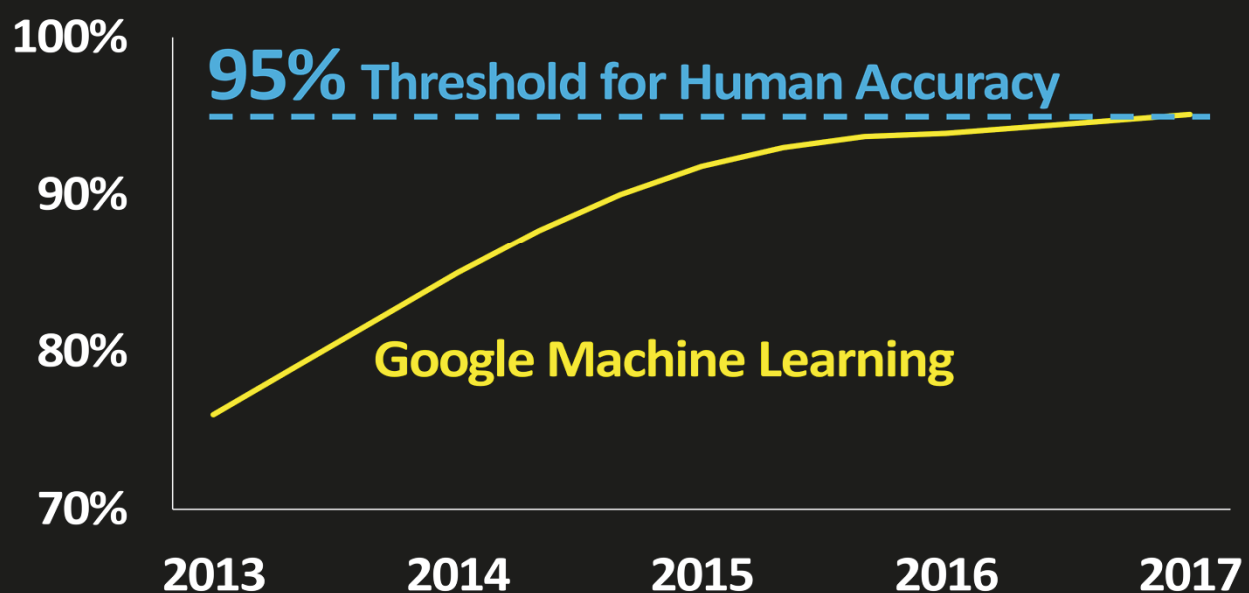
A couple years ago, Google implemented an artificial intelligence system called RankBrain into its search algorithm. RankBrain helps to process searches faster and more efficiently, providing more relevant search results. RankBrain is so good at understanding the nuances in our searches, it well-outperformed Google's own engineers when tested for precision.



The RankBrain technology is also well-suited to deal with voice queries. Voice search is on the rise. Around 20% of mobile phone queries are made by voice and there are numerous reasons why it's gaining in popularity.

Primarily, it can be difficult to type sometimes. Voice is especially helpful when your hands are occupied, like when you're driving a car.

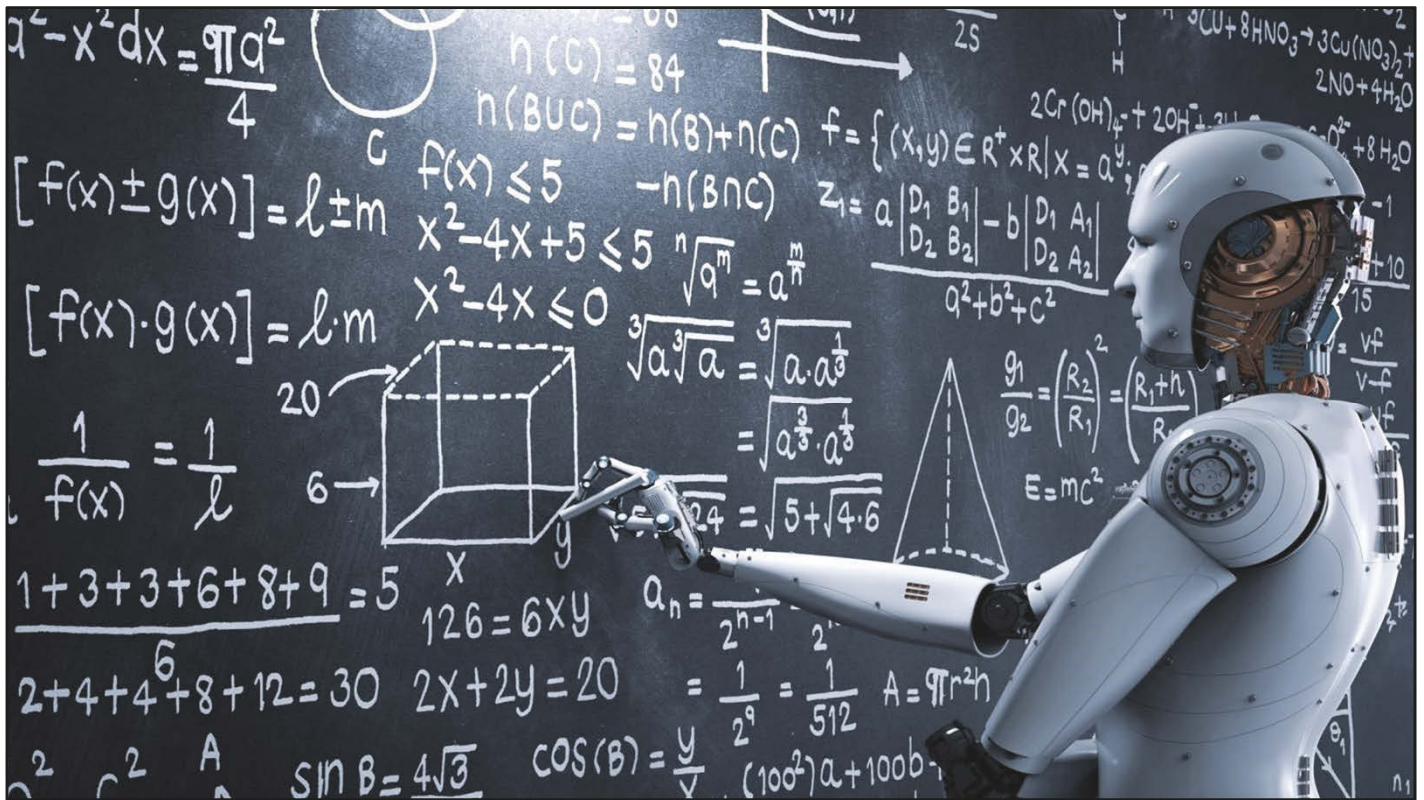
Better Word Recognition



Source: Google

This chart shows the dramatic improvement in Google’s voice accuracy over the last few years. We are now at the point where machines are as good as humans at interpreting typical dialogue. That’s a major milestone for artificial intelligence.

Google is constantly experimenting with ways to improve its search techniques using new technologies. It is these improvements that differentiate the company and maintain Google’s dominant market position.



There is no doubt that technology is changing the world we live in. Companies like Amazon and Google are well-positioned at the forefront of this change. They are improving the way we live: from the way we shop to the way we diagnose diseases.

We are excited about these innovations – and even more excited to be shareholders in these two outstanding leaders.

The principles of successful investing don't change. We think Amazon and Google will be around for a long time and we're excited to watch them grow and evolve.



Who knows? Perhaps one day, we'll evolve to enjoy the same free time as my hero from the future – George Jetson.



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