SENTIENCE
THE COMING AI REVOLUTION AND THE IMPLICATIONS FOR MARKETING
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If a superior alien civilization sent us a text message saying, ‘we’ll arrive in a few decades’, would we just reply ‘okay, call us when you get here, we’ll leave the lights on’? Probably not, but that is more or less what has happened with [the way the world is preparing for the advent of] AI.

The potential benefits [of artificial intelligence] are huge; everything that civilization has to offer is a product of human intelligence; we cannot predict what we might achieve when this intelligence is magnified by the tools AI may provide, but the eradication of war, disease, and poverty would be high on anyone’s list.

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STEPHEN HAWKING [GOOGLE ZEITGEIST. MAY 2015]
The world’s religions seek God or gods wherever they may be. The SETI (Search for Extraterrestrial Intelligence) Institute has probed the stars for signs of life beyond our planet. But our first contact with non-human intelligence may happen here on earth, with beings of our own creation.

Artificial intelligence (AI) is here today, and getting smarter every year. With both computing power and data collection increasing exponentially, our machines are gaining on us. Within just over a decade from now they will be far more intelligent than we are.

Computers are already writing stories for major newspapers, helping doctors to search for cures for cancer, and winning game shows. In short, AI has crossed the chasm from science fiction to science fact. Whilst we don’t yet have computers as smart as HAL from 2001: A Space Odyssey, Data from Star Trek: The Next Generation, or Samantha from Her, futurists like Ray Kurzweil — who’s hard at work helping Google build AIs that can understand human language — believe they’re just around the corner.

But will these machines actually be sentient? They will certainly appear sentient. Over time we’ll develop relationships with them. Business relationships. Personal relationships. Emotional relationships that, even if they’re not reciprocated, will feel very real to us.

It’s time to start thinking about what this means, both for our lives and, yes, for marketing.

Although AI has largely been the domain of academics and large internet companies, it’s starting to trickle down into the consumer sphere, and that’s where the most noticeable applications will present themselves. Those applications will be largely ad-supported, meaning that marketing will be one of the first disciplines disrupted by AI.

This may seem like a distant possibility, but the immutable march of Moore’s Law — the mega trend in technology that says computers will progressively get twice as fast and cost half as much every 12–18 months — is turning science fiction into a reality in which consumers exist, and in which marketers need to operate.

It’s hard to wrap one’s head around this type of exponential change, but it illustrates how technology can change so quickly, and why it’s so hard to predict the course it will take. Consider this: if a person was to take 30 linear steps along a straight line (1, 2, 3, 4…) they’d end up 30 paces or 30 meters away from their starting point. However, if they took 30 exponential steps (1, 2, 4, 8, 16…) they’d end up one billion meters away or have gone around the planet over 26 times. Now think about that rate of acceleration applied to the speed of computers and you can start to understand Moore’s Law. And that’s just the beginning. Observers like Ray Kurzweil, the director of engineering at Google, see exponential returns in technological progress as each breakthrough enables even bigger breakthroughs.

That is why we will now start seeing products pop into existence that seem indistinguishable from magic. For example, a universal translator is finally on its way.

Since late 2014, Microsoft has offered a preview version of its popular communication tool Skype that can translate spoken English into Spanish.
and vice versa — nearly instantly. It can also translate text conversations in 40 different languages. It’s not perfect, but it works remarkably well. And thanks to the wonders of AI, it will only get better over time.

Skype Translate is one of those things that makes you feel like you’re living in the future. And we’ve been seeing more and more of these types of things every year. We still don’t have flying cars, but Google has been developing self-driving cars that have driven over 700,000 miles without any reported incidents. In fact, just about every major automobile company is working on some form of autonomous vehicle — including the driver-on-demand service Uber, who recently revealed that they are building a robotics research lab in Pittsburgh to “kickstart autonomous taxi fleet development.”

AI is even starting to impact graphic design. A company called The Grid has automated the process of redesigning websites based on user behavior. Instead of requiring web developers to create multiple versions of a single web design and testing each one to see which performs best, The Grid algorithmically generates website designs based on fundamental design principles and tests the performance of each one. Site owners can decide what behaviors to optimize for, such as e-commerce sales, mailing list sign-ups or video views, and The Grid serves several versions to visitors, recording which ones are best at reaching those goals.

Then there is Google’s Now platform, which already anticipates what information we may want or need without us having to search for it. We’re informed of airline departure delays, movies we may want to watch and stories we may want to read based on what our social network is consuming and our
AI is becoming a lot smarter about anticipating human behavior — including purchase decisions. Uber’s data team created a model that can predict your exact destination 74 percent of the time before you tell the driver where you’re headed. And Amazon has filed a patent for what it calls “Anticipatory Shipping” in which it will begin relocating products to the nearest fulfillment center in anticipation of your order.

Meanwhile, new refrigerators from companies like LG and Samsung can track what groceries you buy, calculate when your produce is about to go bad, and place an order at the supermarket on your behalf. And if you’d rather dine out, new applications like Luka, from a company called 1000 Plateaus, can help find the perfect place by learning your preferences and habits and scanning online reviews and menus.

This new world of intelligent machines will create many new opportunities as well as new challenges for brands. On the one hand, there will be far better tools for finding new audiences and for delivering customized ads to the right customers. But it will also create new challenges, as personal AIs may take the place of traditional advertising for many consumers.

In this book we’ll explore the past, present and future of AI and how it will affect not just marketing, but the world as a whole. But before we proceed any further, let’s take a step back and ask:

**What Exactly is Artificial Intelligence?**

John McCarthy, the computer scientist who coined the term in 1956, defined it as “the science and engineering of making intelligent machines.” Most definitions follow along those lines. The problem, however, is defining what we mean by “intelligent.”

Intelligence has many definitions, but most of them include a few basic ideas: the ability to learn from experience, the ability to apply that learning to new problems, the ability to apply logic and the ability to think abstractly. But what does it mean to think, let alone to think abstractly? What constitutes actual thought — is that something a non-living machine can even do?

Many researchers agree that a machine is intelligent if it can do things that we normally associate with human intelligence. This is a useful definition, but even this can create controversy.

“There’s a joke that AI is just whatever a computer can’t yet do,” says Chris Bishop, a distinguished scientist at Microsoft Research. “There’s an element of truth in that. It was once thought that chess would be AI, that it was such a pinnacle of human intellectual achievement that if you could get a machine to play chess everything else would be easy. But then, of course, we built chess-playing computers.”

The problem is that most of today’s AI systems have narrow applications. Take Google Chauffeur, the AI behind the company’s self-driving cars, for example. It slows down when the cars ahead of you hit the brakes, it brakes for pedestrians, and it’s a stickler for traffic laws — it’s never gotten a ticket. But, unlike a human — or even a dog — it can’t learn to do anything other than what it was designed to learn. Chauffeur is great at learning about driving, but it can’t learn to play chess, or write news stories, or analyze X-rays.
There are those who argue that an AI isn’t truly intelligent unless it can match the human intellect in knowledge and adaptability. The ultimate test of this type of intelligence, for now, is called the “Turing Test.” The concept, developed by computer science pioneer Alan Turing, is that rather than asking “can machines think?”, we should ask: “can a computer fool a panel of human judges into believing that it’s human?” If so, then we might as well consider it to be a thinking machine.

During a Turing Test, the judges would ask the machine, as well as a few humans, a series of questions through a text-only medium, such as email. If the machine can fool the humans into thinking that it’s a human, then it’s passed the test. Though all purported successes have been controversial, some AIs are getting closer to passing the test. For example, in June 2014, “Eugene Goostman”, an AI computer program developed to simulate a 13-year-old boy, managed to convince 33 percent of the judges at the Royal College of London that it was human. This was hailed by some in the press as the first AI to pass the Turing Test, though many experts discounted the result because the judges assumed its strange answers and general lack of knowledge were largely due to “Eugene” being a young boy who didn’t speak native English.

Some people prefer the term “machine learning” when talking about software that can learn, but not pass a Turing Test. Others use the term “strong AI” or “general AI” to refer to this sort of human-level or better AI; and “narrow AI” or “weak AI” to refer to those systems that are designed to learn within a single domain, like the self-driving car or Skype Translate.

All AI and machine learning depend on algorithms — programs that run our Facebook feeds, decide whether we’re worthy of loans, and tell us what to watch on Netflix. They sound ominous, but an algorithm is just a step-by-step series of instructions to be completed in order to solve a problem or produce a result. And though many algorithms are indeed very complex, the basic concept is quite simple. You can think of an algorithm as something like a recipe, or substitute the word “process” or “procedure” for the word “algorithm” to understand the concept.

For the purposes of this book, we’ll use the term artificial intelligence or AI to refer to both types of AI, and the terms “general AI” and “narrow AI” to refer to each specific type.

Many of today’s AI applications are based on simulations of human brain cells called artificial neural networks. These networks don’t try to perfectly replicate the form and function of the human brain, but they do draw inspiration from it.

Neural networks, which have been around since the 1950s, are one of the earlier methods for developing AI, but they’re not the only approach. As we’ll explain later (“The Road to Intelligence”, p 20), neural networks faded in popularity among researchers in the 1970s (before making a big come-back in the 1980s), leaving room for other approaches collectively known as symbolic AI. These methods don’t seek inspiration from the structure of the brain, and instead focus on statistical modeling. Today, software companies tend to use a mix of both neural networks and symbolic AI in their applications.

Historically, AI has been the domain of academics...
and a small number of large corporations, but we’re finally starting to see this stuff become a part of our day-to-day lives. That’s largely due to three things, according to *Wired* magazine founding editor Kevin Kelly:

1. Cheaper, more powerful computer processors. As we’ve mentioned, Moore’s Law states that computers get twice as fast and half as expensive every 12–18 months.

2. An explosion in the amount of data available. Social networks, photo sharing sites and mobile phones are constantly producing data that can be used to train computers to better recognize patterns.

3. Better algorithms. The publication of a set of neural networking algorithms called the deep learning algorithms in 2006 accelerated the field. We’ll explore deep learning in “The Road to Intelligence”, p 20.

Thanks to these trends, AI is now finding its way into more and more consumer facing technologies, and the implications for marketers will grow to the point where an understanding of this area is fundamental for driving good business.

So, let’s get right into it.
Each technological epoch is built on top of the previous. The advent of computers allowed the advent of the internet, which in-turn allowed for the advent of social.

The next epoch is increasingly considered to be the AI (Artificial Intelligence) revolution - where the world’s information is hierarchically ordered to create what is, ostensibly, consciousness but with intelligence greater than every living human being on the planet.

In effect, the internet is set to wake up.

This is the endeavor of a number of organisations, with Google leading the charge. Ray Kurzweil, the head of engineering at Google, thinks they will get there by 2029.

In the run up to this there are many applications that will be created that will start to make us see the incredible power in, what will likely be considered to be, a new utility - alongside gas, electricity and water.

If only half of what these engineers are saying comes to fruition, then the way that we navigate our waking world is about to undergo the biggest transformation that any single generation has ever experienced.

This book explores the incredible potential of the far reach of AI, the road leading up to it, the tantalising possibilities for marketers and what they can do now to start to prepare.