



WHITE PAPER

AI Meets Big Data

(and eTailers Live Happily Ever After)

Artificial Intelligence (AI) today has the power to revolutionize marketing.

Not with Wall-E the robot or Watson the supercomputer — although those kinds of first-to-mind applications may indeed have some role to play — but with systems and programs that interact with big data to learn about and respond to consumer needs.

But aren't future-forward companies already gathering data about consumers and applying data analytics to it? Of course they are. The truth is that AI in business and commerce will mainly continue to do what people and analytics are already doing.



THE
DIFFERENCE
IS SCALE.

In the age of big data companies have more consumer data, and more kinds of data, available to them than ever before — far more than humans and their current technologies can ever hope to keep up with. And as companies fall further and further behind, they miss countless opportunities to learn from that data and apply what they learn to how they connect with consumers.

AI closes the gap by moving far past human limitations to consume and analyze data on a scale we previously could only imagine — but also in a way that’s familiar to humans. The “intelligence” in artificial intelligence is exactly what it sounds like: the ability to think independently, to grow more knowledgeable from being exposed to more information and to adapt and adjust when things change.

What does that mean in practice?

You’ll find the answers in this paper, with real-world examples of AI in action. Companies today are already using AI in countless applications. They’ve introduced virtual shopping assistants that can guide shoppers to exactly what they’re looking for precisely when they want it. There are **recommendation engines that make suggestions based on everything they know about a shopper, not just what they bought before.** We even have systems that analyze advertising markets and messages and respond to changes by altering ads and emails on the spot. Yes, that’s right — AI is at work writing ad copy, among other things.

“ **We have more data than ever for AI to work with, and AI is better than ever at working with it.**

All of this is becoming possible now because we have more data than ever for AI to work with, and because AI is better than ever at working with it.

In this paper, you’ll learn a little about the science and technology of AI for marketing today — and a lot about how companies are putting it to work, and how you can, too.

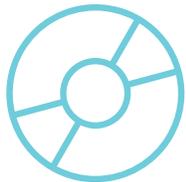
Agreeing on the Terms

AI and big data are two terms you'll be seeing throughout this paper. It's not easy to find a standard definition of either one — partly because they're relatively new terms, partly because they're complex concepts and partly because each one really does have more than one meaning. For purposes of this paper, we'll focus on how the terms apply in product marketing, and we'll be using the definitions and descriptions below.



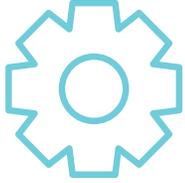
Artificial Intelligence (AI)

Artificial intelligence (AI) refers generally to **systems that can think and learn as intelligent humans would**. There are many different examples of what that means in practice, from robots and cyborgs to self-driving cars. But for our purposes in discussing AI in business and commerce in general, and in consumer marketing in particular, we're talking about systems that can **analyze vast and growing stores of consumer data and apply the results to enhance customer experiences**.



Big Data

Unlike the preceding terms, big data is not a component of AI. But the two are intertwined: AI provides the large-scale analytics needed to extract meaning and benefit from big data, while **big data provides the knowledge needed for AI to continue to learn and evolve** — or to become more intelligent, so to speak. That's why an understanding of big data is essential to any conversation about AI. But what is big data exactly? There are about as many definitions as there are experts on the topic today. Even among those dozens of definitions, though, there's common ground. Many agree, for example, that “big” doesn't refer — or doesn't only refer — to the amount of data. **It's not just that there's so much data; it's also that the data is so complex, so pervasive and available from so many sources**. These defining qualities make it challenging for companies to fully analyze and find meaning in big data. They also make AI essential for them to benefit from it.



Machine Learning

Many discussions of AI in marketing refer to machine learning, to the point that one might think the terms are interchangeable. In fact, they often are used interchangeably. But machine learning is technically not the same thing as AI; rather, it is one aspect of AI. It refers to the ability of machines to learn and evolve through exposure to new data. More specifically, it **refers to algorithms that allow machines to learn from data inputs, rather than being limited to following programmed instructions.** Machine learning is one of the four characteristics that it's been said a system must possess in order to be considered artificially intelligent.



Machine Learned Ranking (MLR)

Ranking information is an example of an intelligent action that a system with AI can perform through machine learning. In MLR, **a learning algorithm uses data inputs to produce a model for ranking any information that's presented to the system.** A classic real-world application would be in a search engine that ranks websites. It's also a valuable capability for applications involving product recommendations.

Why AI Matters to Commerce & Marketing

First Things First: The Connection Between Big Data and AI

Before we can discuss in more detail the importance of AI in marketing today, we need to take a look at the importance of big data. And on that front, as the old joke goes, there's some good news and there's some bad news.

The good news is that in the era of big data, there's more consumer data to draw on than ever before. Companies today have access to information from a multitude of sources — CRM systems, online profiles, product reviews, Twitter and Facebook updates, media comments... and on and on. **There's the potential to learn more about customers and potential customers than ever before**, in infinite detail and with a level of specificity that makes the collective data a gold mine of information for determining how to market to people.

The bad news is that, well, there's more consumer data to draw on than ever before. Because while that creates great potential for insight into consumers, it also means that so much data can be 1) hard to access and manage, and 2) overwhelming to analyze.

Data, Data Everywhere

As to point 1: **The reason consumer data can be so hard to access and manage is that it comes from so many different sources.** Instead of a single integrated store of information, companies are dealing with silos of data in which information is likely to be fragmented, redundant and not readily available for comparison and consolidation.

To make the most of AI's potential to glean insights from the data, companies need to first find a way to consolidate and streamline the data. There are customer data platforms available today that can unify data from multiple sources for AI to access and use. You'll find more guidance about choosing such a platform later in this paper.

As to point 2: We talked about it briefly in the overview. Basically, **there are limits to what human beings can do with data at the rate at which it's growing** — to 44 zettabytes by 2020, according to IDC. Data analysts



44 zettabytes
of data will exist by 2020

working with traditional computing power simply can't keep up. There will be a shortage of them by 2018, according to McKinsey Global Institute.

That's why commerce in general and marketing in particular need AI.

AI Capabilities to Deal With Big Data

AI differs from supercomputers and other systems with powerful computing capabilities in one important way: As its name suggests, it has a form of intelligence of its own. An AI solution doesn't just do what it's been programmed to do; it can go further than that, responding to changing information and making adjustments based on what it learns as it goes along.

That's right, AI systems are **capable of not just computing, but actually learning — machine learning**, as defined in the preceding section, along with a subset of machine learning called deep learning. "With deep learning, machines themselves figure out which rules to follow based on data researchers feed them," as one professor summarized.

Deep learning is only possible with big data, because you need a tremendous amount of data to "teach" AI systems. The other component necessary for deep learning is the **algorithmic power to make sense of all that data**. One author described it like this: "... the more data you give these deep-learning networks and the more computational capability you give them, the better the result becomes because the results of previous machine-learning exercises can be fed back into the algorithms."

“**Machines themselves figure out which rules to follow based on data researchers feed them.**”

Here's one very basic example for someone who's trying to improve a consumer experience: being able to predict what kinds of messages a consumer likes to get or doesn't like to get, and tailoring marketing promotions accordingly.

customers to personalize product recommendations. The new in-store recommendation engine uses the same AI and machine learning technology that characterize the company's wildly successful online platform. The iPad apps in the store recommend personal care products based on skin tone, hair color and other specific individual attributes.

Netflix, with a recommendation engine that's based on deep learning, a subset of machine learning. To "train" the software to provide recommendations, Netflix provides it with massive amounts of information that it can use to identify patterns. "The goal is to stop recommending movies based on what you've seen, and instead make suggestions based on what you actually like about your favorite shows and movies."

“**The goal is to make suggestions based on what you actually like about your favorite shows.**”

Yahoo, whose Yahoo Recommends product works at mass scale to generate personalized content recommendations and deliver native advertising to users. The product combines a rich collection of input signals with machine-based learning, including adaptive learning, to characterize content relevance.

Virtual Shopping Assistants

AI-powered recommendations help consumers who don't know what they want, but AI also has a role to play for consumers who do know what they want. Virtual shopping assistants are appearing both online and in stores to advise customers when they're looking for particular items. These assistants provide an opportunity for e-tailers and retailers to interact directly with shoppers and build deep loyalties among them.

Virtual shopping assistants can go further than recommendation engines, not only providing suggestions based on extensive data about individual preferences and needs, but also alerting shoppers when specific items become available that are relevant to those needs.

Some virtual assistants are already using geo-targeting technologies to localize interactions, too.

Two examples of companies using virtual shopping assistants are:

The North Face, whose Expert Personal Shopper is designed to allow online customers to find particular articles of clothing by asking questions related to their shopping and travel needs. Developed by e-commerce strategy company **Fluid**, Expert Personal Shopper is one of the first retail applications that's built on IBM's Watson AI platform.

Calvin Klein, which uses virtual sales assistants in Macy's flagship Manhattan location to provide a unique interactive experience to shoppers looking for denim products. Shoppers with a specific goal in mind — a new pair of jeans, for example — can access these virtual assistants to easily find the right size, fit and style. The solution also leverages Macy's internal AI system to synchronize LED lighting and show shoppers where on the shelves the merchandise can be found. Calvin Klein collaborated with **Creative Realities**, a marketing firm that helps retailers and brands use the latest technologies to improve the shopping experience.

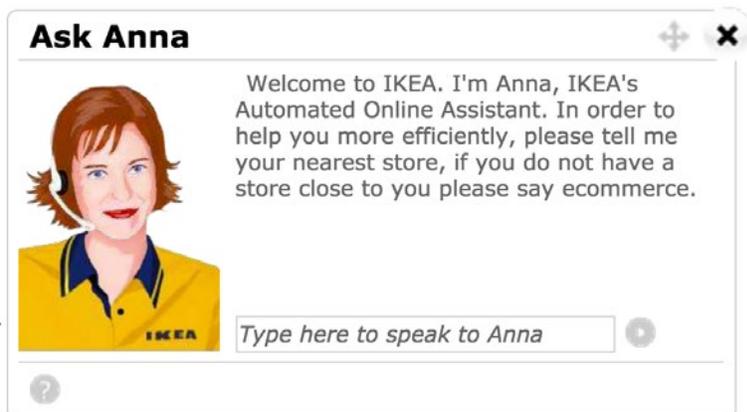


Interacting with Calvin Klein's virtual sales assistant at Macy's,

Customer Service Delivered by AI

AI has a unique ability to “listen” to customers by pulling in and analyzing data from emails, calls and other forms of communication, making it a natural choice for customer service applications. AI has potential for everything from online help to call center responses to in-store help in the form of, yes, robots. Some examples include:

IKEA, whose AI-based “Ask Anna” service assists online shoppers with support questions. “Anna” is an animated character that allows customers to ask questions with natural language queries and responds by engaging them in conversation. In a review of automated support tools that appeared shortly after Anna’s introduction in 2004, the Wall Street Journal called her the closest to speaking to an actual human.



A Fortune 500 office supply company that’s equipped its inbound call center with **SmartAction’s** AI-powered intelligent voice automation (IVA) system to handle order taking and respond to order status calls. Unlike traditional intelligent voice response (IVR) systems that are limited to application-specific programs, IVA uses an “AI brain” that reasons and learns from experience.

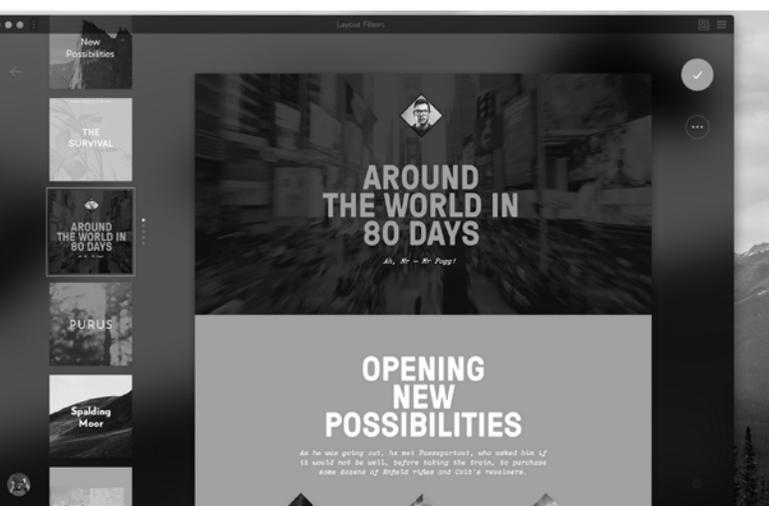
Lowe’s home improvement stores, which have started testing in-store customer service robots in California. They greet customers at the door, field their inquiries, show them to the products they’re looking for and also present a screen interface that customers can use to get additional information and instruction.

Targeted Marketing Content

From digital ads to landing pages, marketing content has become increasingly challenging to fine-tune and manage so consumers receive the most appealing and effective messages. That content creation and management is challenging should come as no surprise, given the number of channels and the amount of content that companies must deal with today. AI-based solutions are available to help create and deploy — often in near real time — the most effective, targeted content possible. A few examples include:

Lord & Taylor, the clothing retailer/etailer that worked with advertising optimization company **Rocket Fuel** to identify the audience for its message and adapt its advertising accordingly to increase online women’s fashion sales. Rocket Fuel’s AI-driven Direct Response Booster solution, part of its Advertising That Learns platform, is credited with enabling Lord & Taylor to boost customer acquisition by improving customer targeting.

A Top 100 online US retailer used marketing language engineering to improve its AdWords advertising, appealing more effectively to audiences and resulting in 358% order rate improvement. The company worked with **Persado** to identify and apply the most effective wording for its ads. Persado’s technology uses AI to apply analytics to the information in content such as emails, ads and landing and determine the most effective wording to use in them.



The Grid uses AI “filters” instead of templates.

There’s even a company now touting the promise of websites that design themselves, thanks to AI. **The Grid**, in the process of crowdfunding at the time of publication of this paper, has received a lot of attention for its announcement of AI-based software that will speed and simplify web development. The software will collect images and text from a company that needs a website and then use AI to analyze the content and create a website that’s based on that analysis in about three minutes.

Steps You Can Take to Get Started Now



Brainstorm how AI can help you meet your business goals.

Start with the basics: Want to increase revenue from product sales? Could AI-generated email help you more effectively target existing customers with information about a product that's a good prospect for more sales? Or if your goal is to improve your customer's shopping experience to increase loyalty, **are there AI-based tools that are a good fit for your business?** The possibilities are infinite — think about some of the examples in this paper and how they might apply in your situation.



Document all the data your business produces.

One of the hallmarks of an AI system is that its ability to process and analyze massive amounts of data of all kinds. **What kind of data can you make available to AI systems?** Remember, too, that AI-based systems depend on having plenty of data to help them learn and adapt in ways that will benefit your business.



Identify which data you are — and aren't — collecting.

Knowing how much data your business produces is fine, but it doesn't begin to have value for your business until you are systematically collecting it. **Perform a data audit that tells you what data you currently are and aren't collecting.** For data you're already collecting, note the platforms for the data, the data types and how — or if — it's being used.

**Choose a customer data platform.**

You need a technology platform that will unify all the data from multiple sources that's available to your business so that you can easily access it for AI purposes. Finding the right solution will take some effort, but will be well worth it. **Investigate what's available to you, meet with the vendors and ask them these key questions:**

Is the demo data real/live data? If not, can the vendor establish that the demo you see reflects how it will perform with real data in your environment?

How will the solution integrate all your data sources?

Will it work with the more-obscure elements of your stack?

How will your team access the data?

What time-to-value can you reasonably expect from the solution? Ask exactly how the vendor calculates time-to-value.

How much manpower will be required on your end? Will you need dedicated data warehouse staff? For how long?

**Find an AI solution that will work with your data to deliver what you need.**

“AI” is a term many vendors may casually toss around; be sure it really applies to what you're considering buying. Remember, you're looking for solutions that are capable of learning and adapting based on the data they're exposed to. You'll want to prepare a set of questions to ask vendors, just as you did for your customer data platform. Questions about time to value and resource requirements for your company are always appropriate, but beyond that, the specific questions will depend on the type of system you're considering and what you hope to accomplish with it.



ABOUT UMBEL

Umbel is a Customer Data Platform that empowers marketers to unify and access their own customer data. Powered by the Digital Genome®, Umbel brings together data across silos and marketing execution systems into one unified, beautiful and actionable customer platform. Umbel's vision is to make data the most valuable asset you own. Founded in 2010, Umbel is headquartered in Austin, Texas.

