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IT'S AN AI AI AI WORLD


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WORLD

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To AI, Or Not To AI

There's a moment

in Spike Jonze's movie *Her* when Samantha, an operating system, tells Theodore that by curating the thousands of personal letters he's written for his customers and selecting just the right passages to showcase their collective poignancy, getting him a book deal was easy. Such is the power of perfect knowledge. Is it any wonder he wasn't the only character dating his laptop?

Few topics ignite the imagination more than artificial intelligence, or AI. To Elon Musk, "It's a technology with the capacity to enslave us," and he doesn't tire of ringing the alarm bell. And according to a report commissioned by Weber Shandwick, even if AI-fueled machines never quite ascend to rulers of the universe, there are plenty of people (82% of all consumers, in fact) who believe AI will destroy their jobs.

But to a great many others, nothing could be further from the truth. These folks see AI as a technology poised to free us from the ruthless burden of toil. At a minimum, it's essential to improving economic productivity and raising wages, a notion endorsed by President Obama in the waning days of his administration.

So what's the truth? It's simple: AI is already fully enmeshed in all aspects of the global economy, and its role will continue to grow as more and more people embrace the value it offers, as this report will make clear. Moreover, AI isn't likely to eliminate the marketer's job any time soon. In fact, we see AI as a range of technologies that will make the marketer's job busier than ever. For every campaign, every customer interaction, every product decision that your company will make, it will want the benefit of perfect knowledge that only AI can deliver.

“In contrast with our intellect, computers double their performance every 18 months... the danger is real that they could develop intelligence and take over the world.”

— Stephen Hawking

MARKETERS

Why so much ado abo

It's quietly become a major player in the world economy, and its influence will only increase in the coming years. Marketers, in particular, are committed to adopting multiple AI disciplines for their organizations.

68% *68% of CMOs report that their company is currently selling, using or planning for business in the AI era.*

55% *55% of CMOs expect AI to have a greater impact on marketing and communications than social media ever had.*

58% *58% believe that within the next five years, companies will need to compete in the AI space to succeed.*

16% *16% of organizations recently surveyed by Tata Consultancy Services that use AI to improve media buying.*

EMBRACE AI

out AI?

Rather than running and hiding, marketers are laying the groundwork to incorporate it into their organizations:

78% *78% of brands expect to provide customer experiences through virtual reality in the next four years.*

48% *48% of brands have implemented automation technologies in sales, marketing and customer service, with another 40% planning to do so by 2020.*

80% *80% of brands will use chatbots for customer interactions by 2020.*

19% *19% of global companies surveyed by Tata Consultancy Services that use automation tools to anticipate customer purchases and present offers accordingly.*

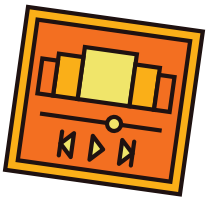
SOURCE:
"The Past, Present and Future of AI in Marketing," *Marketing News*, December 2016. "AI-Ready or Not," a report commissioned by Weber Shandwick and conducted by KRC Research in June 2016. "The Rise of the Machine: Are Robots After Your Job?," *Marketing Week*, January 2017. "Neural Networks and Modern BI Platforms Will Evolve Data and Analytics," *Gartner Group*, January 16, 2017. Survey by Tata Consultancy Services, 2017.

COMPUTER VISION EXPERT SERGE BELONGIE TALKS AI, ALEXA'S POST-VOICE FUTURE AND WARBY PARKER AR GLASSES

At first glance, Serge Belongie might look like just another chill guy in a t-shirt, who might even be in a rock band, but his unpretentious appearance belies a deep and earned expertise in computer vision. Before his current academic gig as a professor of Computer Science at Cornell University and Cornell Tech, where he teaches courses in machine learning, Belongie taught at the University of California, San Diego and co-founded several startups in the computer vision space. For the last four years, Belongie has also been helping organize the LDV Vision Summit, an annual two-day gathering of technologists, investors, academics, entrepreneurs and anyone else interested in the computer vision space. We spoke with Belongie right after the latest the LDV Vision Summit to get his take on the computer vision space past, present and future.

WHAT WAS THE IDEA BEHIND THIS YEAR'S LDV VISION SUMMIT VERSUS PREVIOUS YEARS?

Serge Belongie: The first time we did this, in 2014, the deep learning tsunami hadn't fully hit yet. Certainly within academia it was clear that deep learning was going to have a huge impact as early as 2012, because there was a seminal paper that came out near the end of that year. But it took a few years for deep learning to attain critical mass within the industry. So the idea of having a summit that was focused on visual technologies in particular was a bit of a risk, because it seemed like it might be too narrow. A lot of things that seem ubiquitous now just didn't exist before.



WHAT KINDS OF THINGS?

SB: This was before the boom in self-driving cars and also before TensorFlow, which seems like it's been around forever and is already taken for granted, but in fact it's still quite new. What's emerged is this incredible commoditization of so many parts of computer vision and machine learning that used to require teams of Ph.Ds to develop, in terms of infrastructure, and now it's possible for individual hackers or developers on small startup teams to bring that kind of functionality to any kind of product.

I think there's a general sense that there's an unstoppable force involving computer vision and machine learning that's going to propel us towards wearables, very lightweight powerful devices that kind of disappear in to the fabric. There's this commoditization and a sense that it's almost no longer necessary to talk about computer vision and machine learning for their own sake.

AI IS ALMOST AN OVERUSED TERM TODAY, AND CAN MEAN ANYTHING FROM BASIC VOICE RECOGNITION, OFTEN CALLED "NARROW" OR "SPECIFIC AI," TO SCARLETT JOHANSSON'S CHARACTER IN *HER*, WHICH IS REFERRED TO AS "GENERAL AI." WHAT IS AI TO YOU?

SB: I still think of general AI as science fiction. The AI that mostly works today and for the next five to ten years is actually just increasingly powerful forms of automation. Most people talk about AI today in the business world in terms of utility, like collision avoidance and lane keeping assist that's essentially cruise control on steroids.

I don't actually use the term AI to describe what my group at Cornell Tech does, but, as it turns out, my university uses the term to describe what I do. That's true at a lot of universities because the general public knows what AI is, but they don't know what computer vision and machine learning are.

SO WHERE ARE WE WITH AI NOW?

SB: I'm going to share an analogy I heard from a dean at Cornell Tech. The extent to which scientists have captured AI is at the reptilian level, and he's referring to the reptilian brain, which enables tasks that a reptile can accomplish within 200 milliseconds, like hearing a particular sound and reacting or seeing a bug and taking an action. Reptilian cognition is not particularly complex, but it's still something that's very powerful visually and presumably auditorily as well.

We're at the point where if you can get the training data, a computer vision system can beat you every single time on specific tasks like classifying mold in an apartment, grading or scoring cancer in tissue samples, classifying birds, you name it. Lay down all these potential problems, collect the training data, label it, run it through deep learning and that thing will just beat everyone except the top experts, and sometimes even then. But again, this is all very focused in terms of "what is this thing in this image." As long as you key up that problem, the machine is going to beat you.

THAT ALL SOUNDS FAIRLY PRACTICAL AND NON-LETHAL. ARE THE DOOMSDAY WARNINGS ABOUT AI'S FUTURE OVERSTATING THE CASE?

SB: Yes. Although a lot of famous and successful people out there are talking about apocalyptic scenarios like Terminator and Skynet, the people in the trenches—scientists who are working in computer vision, natural language processing and all sorts of applied AI—think, at least privately, that this kind of sci-fi talk is silly. I mean, we all take the ethics aspect of it very seriously, but to look at a computer that wins at Go and then extrapolate from that something like the AlphaGo system, and then extrapolate that humanity's future is on the line, is just a really big leap.

HOW BIG OF AN ISSUE IS GETTING GOOD DATA?

SB: That's definitely a huge problem: How do startups survive in the shadow of Google, Facebook and these other huge companies that have so much data, verticals and computation power? For one, there definitely seems to be room for many niche applications where certain stakeholders don't want their content in the cloud, like semiconductor manufacturing or pharmaceuticals, where the microscopic images are of great value. Companies might not want to give competitors the chance to see those images that give away a new drug that's been discovered or a chip that's been created.

And that certainly fits in with this push towards edge computing, where we are moving, again, away from all these cloud services like Amazon, Google and Facebook. Even so, the vast bulk of the general public is just heaping data on Google, Facebook, Amazon and so on, so it's just incredibly difficult to compete. Now, a lot of these startups are actually aiming to get acquired, because these companies are so hungry for talent.

NEXT-GEN INTERFACES LIKE THE VOICE-ENABLED ALEXA, WHICH HAS JUST ADDED A CAMERA, ARE GROWING IN POPULARITY. WILL VISION- AND VOICE-ENABLED INTERFACES OF THE FUTURE REPLACE TODAY'S TOUCHSCREEN AND KEYBOARD?

SB: I don't think so. There's something about touchscreens and keyboards—when lumped together as input devices—that's hard to let go of. They're still just so precise. Sometimes you just want a very specific thing—an emoji, let's say. Obviously, with things like Google Lens and Amazon Alexa, there's definitely a push toward making search visual or auditory. I definitely think there's going to be another fully-fleshed out input medium for searching, but all these are ultimately pointing back to the idea of multi-modal or multimedia search. If you know exactly what you want, you should just type it in and not monkey around at all. Other times, you have no idea what something is called, but you can take a picture of it.

HOW DO COMPUTER VISION AND NATURAL LANGUAGE PROCESSING COMPARE WITH THEIR HUMAN EQUIVALENTS?

SB: Audio processing and computer vision are cousin fields in some ways. They both attach to machine learning in roughly the same way, and they both work really well when in a controlled environment. Computer vision works best when dealing with a well-composed, well-lit photo, with one main object taking up the field of view. Same with Alexa's audio recognition, which works best if there isn't too much background noise.

But when you start to create background noise, multiple people talking and saying "um" and "ah," or low light images – these are challenges still for computer systems, but which human visual and auditory systems are still amazingly good at dealing with. The big advances we're seeing on the machine end are still in the relatively controlled settings, but we will just gradually move up from there.

Advancing in this area is important for semi- and fully autonomous vehicles, where it's all an uncontrolled environment. There's no way to predict when that pedestrian is going to pop out in front of you, whereas the typical domestic setting of a Google Home or an Amazon Alexa is still considerably more controlled.

HOW DO YOU FEEL ABOUT AR AND VR IN THE COMPUTER VISION SPACE?

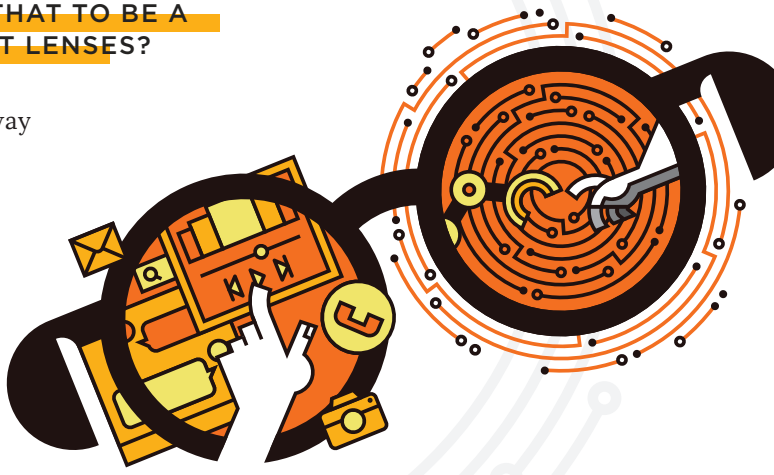
SB: I don't track VR very much, but I do stay on top of augmented and mixed reality, and it's exploding right now. And this despite Google Glass's hiccup and Magic Leap creating some confusion by making some big promises and putting out these dazzling concept videos in which it's unclear what's real and what's fake. But putting aside these anomalies, the new HoloLens is amazing. And Meta has a good set of goggles, and there's just a really mature technology stack for simultaneous localization and mapping. Independently of HoloLens, Microsoft has some cool new optic technology for near-field imaging.

Some cool stuff is happening with augmented reality and mixed reality, but I think it's still in that brick-sized cell phone phase. And you need to have quite an imagination to just jump ahead and say that this AR or MR wearable will eventually be really lightweight, and the battery will last a long time, and all that. Right now, the hardware is still very clunky, but I'm convinced it's going to be huge.

AR and MR are going to be the way that we actually experience all this computer vision and machine learning functionality. Right now, of necessity, we do it via this phone in our pockets that we have to pull out, but it's all clearly moving to AR and MR.

SO WHAT NEEDS TO HAPPEN FOR THAT TO BE A REALITY? GOOGLE GLASS CONTACT LENSES?

SB: I don't think we have to go all the way down to contact lenses, but imagine a pair of Warby Parker glasses, or those spectacles from Snap—something that has that kind of form factor would be enough. So once we get to a point where it's comparable in weight to a regular pair of glasses, but has the image projection capability with wide field of view, a battery that lasts all day and it's low cost—that's when we'll have arrived.



Everyday AI

It's often said that artificial intelligence is the future of marketing. But what people don't always recognize is that AI is already an integral part of the digital ecosystem as it exists today.

Indeed, if you work in advertising, marketing, sales or customer service, there's a good chance you use some form of AI every single workday. Whether you're a marketer applying predictive algorithms to optimize creative messaging or a customer service manager employing chatbots to answer people's questions, artificial intelligence has become a fact of life inside the 21st-century office. And even on the weekends, the apps you use to stream music, play games and connect with friends are harnessing the power of machine learning to give you a personalized user experience at every turn.

Don't believe us?
Here are 13 ways you may be using artificial intelligence right now...

WHAT YOU CALL IT:

SEARCH ENGINES

WHY IT'S CONSIDERED AI:

AI empowers search engines to show people the right results, even if the user can't articulate exactly what they're looking for.

For instance, Google uses an AI system called RankBrain to guess what users mean when they've entered a query the search engine is unfamiliar with. Through machine learning, RankBrain is able to translate words and phrases that Google has never seen before into more familiar phrases that have a similar meaning.

WHAT YOU CALL IT:

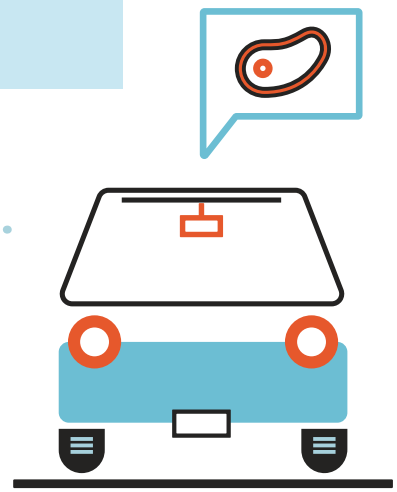
PROGRAMMATIC ADVERTISING

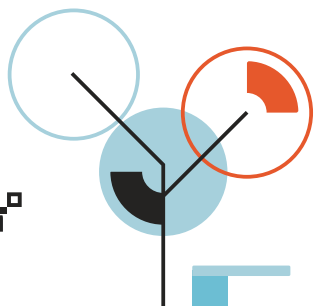
WHY IT'S CONSIDERED AI:

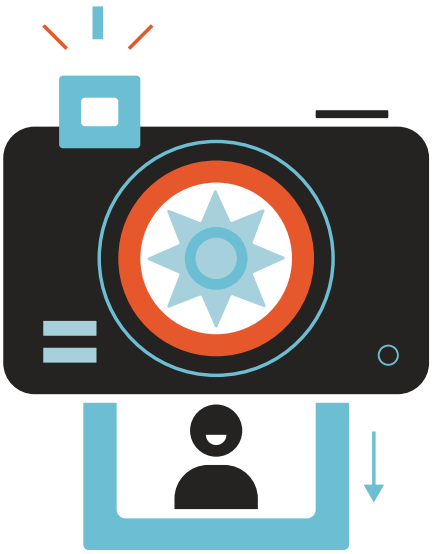
If you've ever run a programmatic advertising campaign, you've taken advantage of computational advertising—a series of algorithms that allow marketers to deliver the right ad at the right moment, based on factors like the user's demographic information, their past online behavior and the content they're looking at when the ad appears.

This past October, the lingerie brand Cosabella actually replaced its marketing agency with an AI platform created by the technology company Adgorithms. The platform optimizes campaign spending autonomously based on real-time results, and it can even make creative recommendations when certain ad units outperform others.

This technology also allowed the ad agency Saatchi & Saatchi LA to show Facebook users customized Toyota ads that recommended they take up weird activities based on their specific interests. For instance, people who were both martial arts enthusiasts and barbecue fans saw ads suggesting they try out a hobby called the "Tai Kwan Tenderizer."







WHAT YOU CALL IT:

IN-IMAGE ADVERTISING

WHY IT'S CONSIDERED AI:

Contextually relevant, in-image advertising relies on a machine learning technique called a neural network, a series of learned mathematical functions that process information in a manner similar to the human brain.

By feeding millions of labeled images into a neural network, GumGum has trained its AI technology to identify all kinds of objects, people, colors, concepts and brand logos. This way, the technology can place an appropriate ad inside every image. For instance, a parent might see an ad for notebooks within a photo depicting a school.

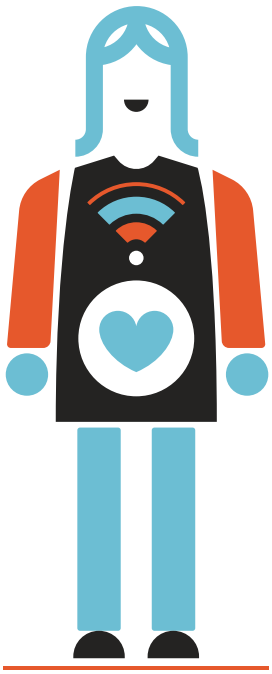
WHAT YOU CALL IT:

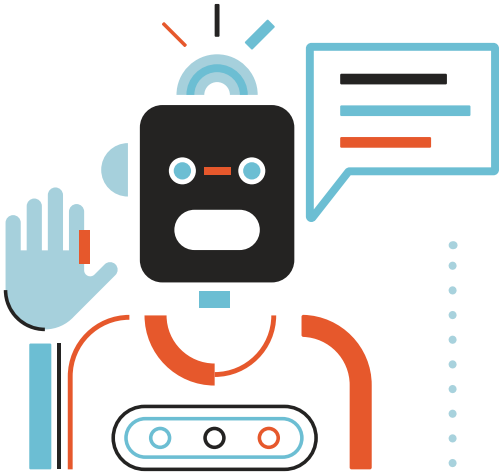
CONSUMER PROFILING

WHY IT'S CONSIDERED AI:

With consumer profiling, brands use large-scale data analysis to sort their customers into different groups based on their demographic information, past purchases, offline behavior and online browsing history. Through predictive analytics, marketers can even identify when consumers are going through major life events—the time periods during which they are most likely to switch up their shopping habits.

In one famous example, Target used its customers' past purchase activity to send mailers featuring baby products to women it predicted to be pregnant, tipping off one father before his daughter had told him the news.





WHAT YOU CALL IT:

LEAD NURTURING

WHY IT'S CONSIDERED AI:

Automated sales assistants use artificial intelligence to hold introductory conversations with a company's prospective customers. This allows firms to collect contact information, promote product features and weed out unlikely customers at scale—all without engaging their human sales teams.

For instance, Conversica's automated sales assistant uses natural language processing to conduct email and chat conversations that feel authentically human. Once the AI has provided the person on the other end with relevant information and determined that they are a potential customer, the qualified lead is passed along to a human salesperson to close the deal.

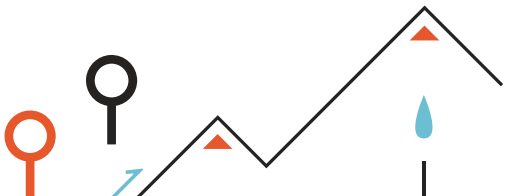
WHAT YOU CALL IT:

PRODUCT MARKETING

WHY IT'S CONSIDERED AI:

Online retailers deliver personalized product recommendations via collaborative filtering, an AI solution that links site visitors to other consumers who have similar tastes. If User A and User B both buy the same five products in May, there's a good chance User A will be interested in the first product User B purchases in June.

Collaborative filtering is the secret sauce that powers Amazon's insanely powerful product recommendation engine and the basis for its popular "customers who bought this item also bought..." suggestions.



WHAT YOU CALL IT:

DYNAMIC PRICING

WHY IT'S CONSIDERED AI:

Dynamic pricing uses machine learning to set the optimal price point for a seller's goods and services at any given moment, based on what people have been willing to pay for the product under similar circumstances in the past. It's why airline ticket prices fluctuate depending on when you buy them, and why you're likely to get hit with a surge pricing fee if you use a ride-sharing app on a Saturday night.

In the e-commerce world, a company called Feedvisor automatically optimizes prices for sellers on the Amazon Marketplace, allowing them to maximize their revenues while remaining competitive with rival sellers.

In the marketing realm, Google's dynamic price floors automatically adjust the minimum amount of money a publisher will accept for a given ad impression, based on what buyers have previously paid for similar inventory.

WHAT YOU CALL IT:

1:1 MESSAGING

WHY IT'S CONSIDERED AI:

Digital publishers provide each user with an engaging, personalized experience through a form of AI known as passive user interface. This method continuously collects behavioral data from consumer devices, using machine learning to tailor the experience to the consumer's wants and needs.

If you've ever used Spotify's Running feature, you've benefited from passive user interface. The app collects fitness tracking data from users' phones in order to match the beat of the music to the runner's pace.

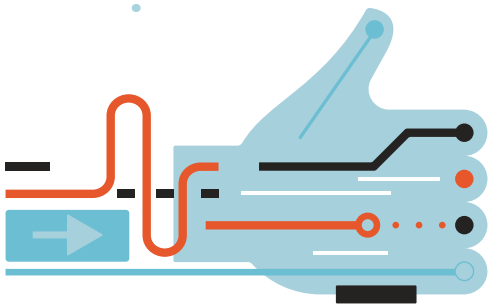
WHAT YOU CALL IT:

SOCIAL MEDIA MONITORING

WHY IT'S CONSIDERED AI:

If it weren't for artificial intelligence, marketers would have a hard time making sense of social media. For instance, data analysis algorithms identify which customers are driving the discussion online, while natural language processing uncovers the sentiment behind the countless messages people post about brands each day.

With a social media monitoring platform like Tracx, brands can see when an influential user has posted a negative comment about them, allowing the customer service team to fix the influencer's problem before more damage is done.



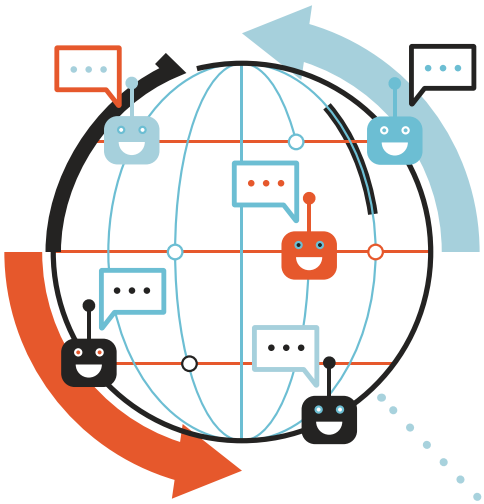
WHAT YOU CALL IT:

MESSAGE DEVELOPMENT

WHY IT'S CONSIDERED AI:

By collecting data on how people interact (or don't interact) with the ads they see, advertisers and publishers are able to build feedback loops that empower them to show the user a more relevant message in the future. For instance, if you click on an ad promoting a floral-print dress, the advertiser will know to show you ads featuring similar patterns moving forward.

By the same token, Facebook learns a little bit more about your preferences every time you click on, ignore or hide an ad on its platform.



WHAT YOU CALL IT:

SALES SUPPORT

WHY IT'S CONSIDERED AI:

In recent years, chatbots have become an increasingly popular tool for carrying out sales support functions at all kinds of companies. These virtual assistants use natural language processing to understand customer questions and provide useful information in response.

As an example, Amtrak employs a virtual assistant named Julie to help customers book their travel without tying up a human customer representative. According to the company that developed the chatbot, Next IT, Julie answers about 5 million questions each year.

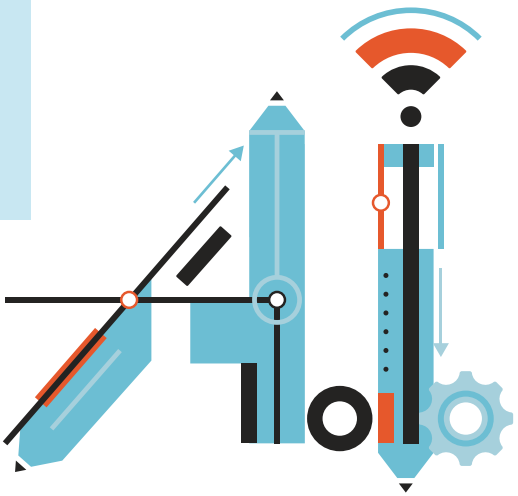
WHAT YOU CALL IT:

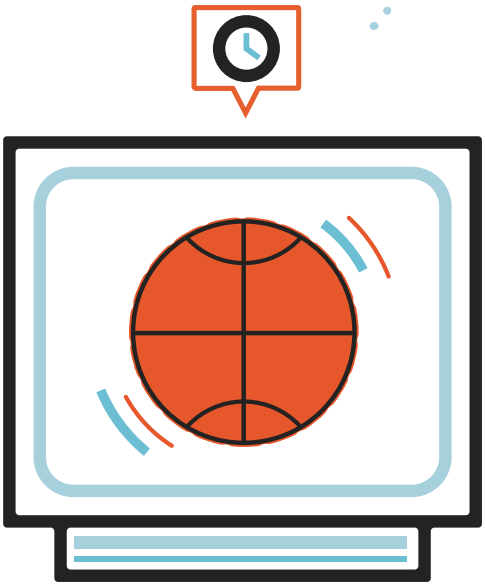
AUTOMATIC CONTENT CREATION

WHY IT'S CONSIDERED AI:

At the forefront of artificial intelligence, brands and publishers are using natural language generation to automatically turn data points into written content–without the use of human writers.

For instance, Narrative Science's Automated Description product can quickly generate in-depth summaries of real estate properties, complete with short reviews of nearby restaurants. Over time, the software optimizes its copy based on the descriptions that drive the most engagement.





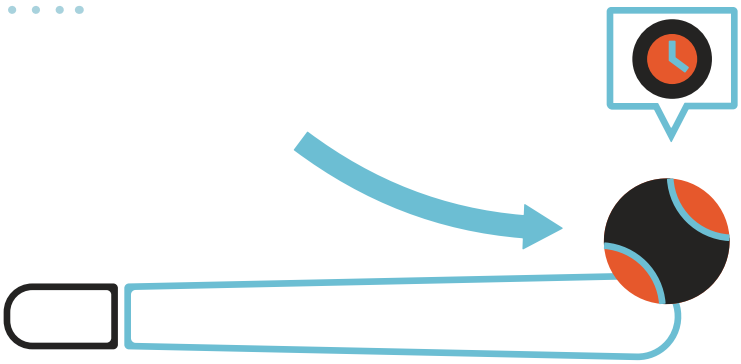
WHAT YOU CALL IT:

SPORTS SPONSORSHIPS

WHY IT'S CONSIDERED AI:

The same neural networks that are utilized by in-image advertising can also help brands gain greater insight into how much their in-stadium sports sponsorships are really worth. By identifying when a company's logo appears on-screen during a live sports broadcast, this technology tells brands exactly how much screen time they're getting.

GumGum's Sports product measures the ROI of sports sponsorships using a formula that takes into account how much time the logo spends on-screen and how prominent it is to the viewer. By comparing this metric to the number of people watching, we can tell you how much it would have cost to buy an equivalent amount of reach and engagement across broadcast TV, streaming video and social media platforms.



AI in the Wi

Lots of tech companies offer AI-p

and even more CMOs report they

names using AI today? **Here are j**

1

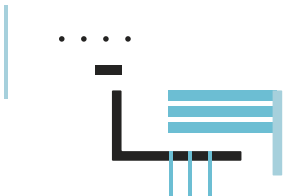
Under Armour + IBM Watson = Better Health

Under Armour bills its UA Record app as the "body's dashboard." Powered by IBM Watson, it tracks "steps, nutrition, advanced sleep data and real-time workout stats, such as heart rate, pace, distance and calorie burn," according to the app's description. It also taps into data gathered by other fitness-tracking apps. By feeding that data through IBM Watson, the app provides recommendations for nutrition and training advice, completely customized to each user. For instance, by entering sleep data (i.e. the number of hours you slept the night before), Record will tell you how your body mass index (BMI) compares to other members of your cohort who get more sleep.

2

Lowe's Robo at Your Service

Responding to complaints about poor customer service, hardware chain Lowe's introduced OSHbot in late 2014. The machine, which can talk and move, was programmed to to greet customers and guide them to their item of choice, via voice recognition or an onboard touchscreen display. OSHbot was the product of a collaboration between Kyle Nel, who headed Lowe's Innovation Labs division, and Marco Mascorro, the CEO of a robotics startup called Fellow Robots.



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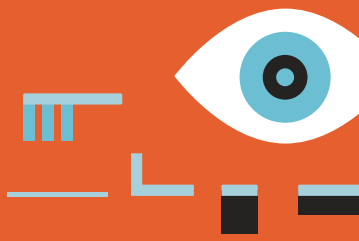

3

The robot has since been upgraded to Fellow's Jetson TX2 platform and renamed LoweBot NVAii. LoweBot navigates the aisles autonomously, often using cameras and odometry alone to find its destination. And once the store is closed, the LoweBot makes use of its high-resolution camera, LED light source and deep learning-based classifier to track which items need restocking, saving employees a lot of time.

1-800-Flowers.com and Conversational Marketing

1-800-Flowers.com isn't shy about adopting emerging technologies. It's also one of the few household names actively working to perfect conversational commerce, an AI discipline that engages with customers using voice commands, text and chat apps. 1-800-Flowers.com's version is an AI-powered digital gift concierge they call GWYN (Gifts When You Need). GWYN helps customers find the perfect gift for mom or the boss, often suggesting items across its entire portfolio of products. In the process, GYN solves a challenge 1-800Flowers.com has struggled with: educating the market that they offer more than just flowers. Now when consumers ask for recommendations, GWYN can offer a variety of options, such as fresh fruit for gift recipients on health kicks.

Aye Aye, AI

AI is certainly a hot topic right now, as evidenced by the steady drumbeat of stories and reports on how AI is reshaping our economy and our approach to work. What can we conclude about its potential impact on marketers and marketing organizations?

To start, AI will greatly help marketers identify trends in big data. AI is eminently suitable to crunching through massive datasets, looking for that perfect knowledge. This will be a huge step forward for marketerkind. And through the power of natural language generation, AI will be able to sift through the data, and generate insights in plain English for the marketer.

Another key use case: creating content on the fly. Neural networks can already reason and act with human creativity. These programs already allow news organizations to create stories based on facts. It's easy to imagine a world where chatbots speak with every customer across all of a brand's touchpoints, picking up differences in demographics and regional preferences to engage in two-way conversations.

Chatbots will also be used to deliver just-in-time customer service and sales support. Tapping into the insight generated from the collective interactions across an entire customer base, chatbots will bring a level of experience not humanly possible. Unlike humans, a chatbot never forgets, and that huge body of knowledge will always be available at any moment to help a customer.

At the dawn of the AI era, the special will become mundane. Tasks that typically require marketers to call in an army of data consultants—such as determining the impact of a TV campaign on actual viewers—will be heavily automated. Whereas current technology selects a few shows for analysis, in the AI era all shows will be routinely analyzed.

Next, the impossible will become possible. Let's say you're an online retailer and you want to rewrite your entire product catalog in your brand voice. Natural language generation technologies will allow you to do so in a relatively short timeframe. In addition to improving your Google search rankings, your copywriters will thank you.

> Neural networks can already reason and act with human creativity.

Finally, and most importantly, the demands on the marketer will increase, even though AI is supposed to make things easier. As we get closer to perfect knowledge, marketers will want to use it in everything we do. That means retailers will want a unique pricing strategy for every product in their catalogs; CMOs will want offline sales analysis for every online ad campaign, regardless of size; and product marketers will look to every customer care issue raised when planning the product roadmap.

We offer one additional proof point here: If you're in the digital advertising ecosystem, you've already witnessed a ton of AI-powered automation. Are you really less busy than you were 10 years ago?

We didn't think so.


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